Oregon State Agricultural College

Biennial Report of the Board of Regents 1926-1928

CORVALLIS, OREGON

Oregon State Agricultural College

Biennial Report of the Board of Regents 1926-1928

College Press
1928

CONTENTS

To His Excellency
the Governor of the State of Oregon:

As required by law, I have the honor to submit the report of the Board of Regents of Oregon State Agricultural College for the biennium July 1, 1927, to June 30, 1928, including the report of the President of the College and the appended reports of the deans of the several schools, the Director of the Agricultural Experiment Station, the Director of the Extension Service, the Treasurer, and other officers.

The different reports indicate the extent and character of College activities and the value of the service rendered, not only in conserving, protecting, and developing the economic interests of the state, but particularly in the training of the thousands of young people who come to the College for their education.

In the Treasurer's report (pages 257-283) will be found a detailed statement of receipts and expenditures for each of the three divisions of the College organization—Resident Instruction, Agricultural Experiment Station, and Extension Service. In addition, a list is given (pages 284-368) of all help employed, including the salary or compensation of each employee, together with the term of service and the amount of compensation. Every item of expense from State funds is audited and approved by the Secretary of State, and all expenditures from Federal funds are audited and passed by Federal authorities. In addition, all funds are regularly audited each year. Should any information be desired not contained in the printed report, it will be gladly given.

As shown in the President's report, the entire millage income is now required in meeting maintenance costs. With the growth of the College, both in student enrollment and in the demands for special service, there is unavoidable increase in the cost of operation, and to meet this cost, it will be necessary to use part of the student tuition, as well as the entire millage income. As much as possible of the student tuition fund will be used, however, in meeting the most urgent needs for building construction and other capital investment. Congestion is being relieved in a number of departments through the construction of buildings for which tuition fees are being used during this biennium. But, as pointed out in different divisions of the report,

there is still urgent need for additional buildings. Particular emphasis is placed upon the imperative need for land required by the Agricultural Experiment Station and the School of Agriculture.

In this connection, special attention is called to the parts of the report in which it is shown that the actual net cash returns to the state each year, as a result of the work done by the College, far exceed the amounts expended for its support.

Respectfully submitted,

J. K. WEATHERFORD,
President of the Board of Regents.

December 20, 1928.

Oregon State Agricultural College President's Biennial Report *for* 1926 to 1928

To the Board of Regents:

The President of the College has the honor to submit his report for the two fiscal years 1926-27 and 1927-28. The biennium has been characterized by the continued steady growth of the Resident Instruction Division in student enrollment and in breadth of service to the state, by further emphasis on the means of character-building and scholarship, by the development of a more systematic program of educational and vocational guidance, and by a more exacting basis of selection of students applying for admission from outside of Oregon. It has been characterized also by development of the program of investigation and research through the establishment of the Engineering Experiment Station and through wide extension of the work of the Agricultural Experiment Station, with many agencies—national, state, and industrial—cooperating in various projects. It has been characterized, finally, by the expansion and the more intensive application throughout the state of various phases of the Extension Service program, including radio service, 4-H Club work, county agent work, and the agricultural-economic program.

The biennium has been marked, however, by the fact that demands on the millage income for operation and maintenance alone have become such that for the first time since the passage of the second millage measure in 1920, no margin whatever has remained for building construction. It was imperative that additional room be provided in order to relieve congestion and provide at all adequately for certain work of instruction and research. No other funds being available, the Board of Regents established a resident tuition, the receipts from which, supplementing those from the non-resident tuition fee, in force since 1921, were made available for building construction. In addition, funds were provided, through the issuance of bonds to be paid for on the amortization plan from dormitory receipts, for the construction of a men's dormitory to provide housing facilities long and urgently needed for men students. During the bienni-

um, also, the Memorial Union Building, funds for which have been raised by contributions from students, faculty, alumni, and friends of the College, has been completed, and will be formally opened on November 17, 1928.

The buildings thus constructed from unusual sources of income—tuition fees from resident as well as non-resident students, bonds to be retired over a period of years from the proceeds of rental income, and voluntary gifts to the Memorial Union—have helped to relieve the more immediate and pressing needs of the institution for room, and have cost the State nothing in direct taxation.

Thus, through emergency measures that seem amply justified by the conditions confronting the institution and the State, the College has been able to maintain the institutional plant and its facilities so that the high standard of instruction has not been impaired, and the more serious handicaps under which some of the investigational work had been carried on have been temporarily relieved.

STUDENTS

It is the purpose of the College to fit its students for the realities of modern life. Parents expect this, and students, as a rule, come to the College with this objective definitely in mind.

Educational purpose of the College.

The College, in fact, is generally recognized for its practical aims, and its emphasis on the application of science to industry. It has consistently developed, with the approval of the State Board of Higher Curricula, the peculiar fields of training that belong to it as a land-grant college. These fields cover a "system of public education suited to the needs alike of workers, business men, home makers, technicians, and professionals."* The College, while primarily vocational and technical, includes also the training that makes for "high moral and ethical ideals."* Its curricula, therefore, include not only the technical courses required to develop the varied industries and resources of the state, with thorough training in all of the basic cognate sciences, but also such general instruction in language, literature, history, government and economics as constitutes an essential part of a liberal education.

*Senator Nelson, author of the 1907 amendment to the Second Morrill Act.

Such an education, as observed by Dean Smith in his report,* "should lead first to economic independence, and second to such ability and appreciation as will enable one to use that economic independence with understanding, sympathy, and enjoyment." It is important to the state, therefore, as he points out, that those who are to develop the industrial and economic resources of today should have, besides technical training, the educational basis for ample, unprejudiced thinking and intelligent, significant living. But a liberal education today is a distinctly different thing from a liberal education one hundred or even fifty years ago. Since science, moreover, has become the handmaid of industry, education has been definitely claimed by the business and commercial world as an indispensable ally. Thus, in a comparatively short space of time, through the contributions of productive research, the technical and industrial phases of education, formerly so little known and appreciated, have come to command their due share of public attention and support. Oregon State Agricultural College, like the land-grant colleges in general, offers this type of education. It is an education, first of all, as defined by Senator Justin S. Morrill, author of the land-grant college act, "for the world's business, for the industrial pursuits and professions of life," but it is equally "a liberal and larger education" for citizenship in the broadest sense of that term.

Student enrollment increases.

Since the publication of the last biennial report two years ago, 3,039 students have matriculated at the institution for the first time. This number represents an increase of 8½ percent as compared with the new students received during the preceding biennial period. The growth in attendance, although moderate in recent years as compared with the congested period immediately following the war, has been steady and satisfactory, in view of various conditions affecting enrollment. New tuition fees, rigid entrance requirements, and the high standard of scholarship maintained, have limited, to some extent, registration figures. Enrollment for 1926-27 in full year courses was 3,772, in summer session 1,068, and in short courses 248, or a total of 5,088. For 1927-28 the corresponding figures were 3,818, 1,194, and 299, or a total of 5,311. These figures, of course, are exclusive of persons pursuing extension work. Detailed information showing the distribution of students among the different schools of the College, classification by courses, geographical distribution, scholarship ratings, and de-

*Report of the School of Basic Arts and Sciences p. 75.

grees conferred, will be found in the appended report of the Registrar (page 157).

The biennial report for 1906-1908 shows that in the academic year 1907-08 the total enrollment of students with the standing of freshman or above was 756. Compared with the enrollment for 1927-28, this reveals an increase in the twenty-year period of 405 percent. Even this does not indicate the real growth of the institution. In 1907-08 but one year of high school work was required for admission to the freshman class. The requirement now is graduation from a standard four-year high school, with the completion of the full fifteen units of work and a prescribed distribution as to subject-matter.

The institutions of higher learning in Oregon have cooperated in developing uniform minimum entrance requirements for graduates of Oregon high schools. This agreement, reached in 1921, has done much to bring about, in the more than 260 high schools of the state, uniformity of procedure with respect to preparation of students for entrance to college. At the College all residents of Oregon who are of good character and meet the standard requirements are accepted for entrance.

Admission requirements selective.

In the case of application for admission received from students who have attended other institutions of higher learning, only those whose records are satisfactory at the institution last attended are accepted. Applications of transfers are rejected unless the standing of the student is equal to the rating required here for graduation. In case the applicant's average rating is sufficiently high, but grades in certain subjects are not up to standard, advanced standing is refused for the low grade work. The number transferring to the College from other institutions continues to grow.

Applicants for admission from outside of Oregon are selected on a basis somewhat different from that followed in the case of Oregon residents. Non-residents must not only meet the regular requirements exacted of residents of Oregon—graduation from a standard high school with the full fifteen Carnegie units of credit and a specified distribution of subjects—but must also give evidence of their special fitness to do college work. They are admitted only on a basis of personal selection, with merit and accomplishment the important factors.

The rules in force at the College governing the classification of students as residents or non-residents have been adopted by joint committees of the Boards of Regents of the University of Oregon and Oregon State Agricultural College. The original rules, adopted in August, 1921, by a joint committee consisting of the presidents of the two Boards of Regents, have been modified from time to time, as experience has suggested, by joint action of the two institutions. The rules now in force at the College were adopted December 13, 1927, by action of a joint committee of the Boards of Regents. These rules are believed to be both reasonable and just as a means of determining between resident and non-resident students, and are enforced with rigid fidelity. The present basis of selection of non-resident students thus admits to the institution only those who are qualified to do a high grade of college work.

The quality of work demanded at the College, in fact, in all departments, is high, equal to that of the best state institutions of the country. This means that much attention is given to questions relating to scholarship. Every effort is made to give the student opportunity commensurate with his ability. The stronger students are encouraged to make the most of their time; those students who do not or cannot make satisfactory progress are eliminated. The Scholarship Committee, composed of eight members of the faculty, with subcommittees in the several schools of the College, gives much time to those students who have scholarship deficiencies. The attitude of the committee is always one of helpfulness, but after ample opportunity has been given a student to improve his work he is eliminated when in the opinion of the committee such action is for the best interests of the student and the College. To graduate, it is necessary for the student to maintain a scholarship average considerably above passing grade. During the biennium this fixed average has been about the same as the average of the entire student body, approximating eighty-four percent, the lowest passing grade being seventy percent. In order to maintain this standard a careful check is made of the records of all students at the close of the sophomore year. Those who have satisfied all requirements at that time are allowed to proceed toward graduation and are awarded the Junior Certificate. No student is classified as of junior standing until he has received this certificate. Students failing to qualify for the Junior Certificate because of deficient scholarship are either eliminated or transferred to non-degree status. In case of the latter action, the stu-

Scholarship promoted.

dent may be permitted to continue in some specially arranged program, but is no longer a candidate for graduation.

The biennial report issued twenty years ago shows that for the years 1906 to 1908 students were graduated to the number of 148. The two graduating classes for the biennium just ended include 1,011 students, or an increase of 583 percent as compared with the earlier period. The 1,011 recently graduated include 24 receiving advanced degrees, 936 receiving bachelor of science degrees, and 51 the degree of pharmaceutical chemist.

More than a thousand graduate.

That the great majority of students who attend the College are serious-minded and very much in earnest in their work is each year evidenced in a number of ways. As shown in the report of the Registrar, 41 percent of the students attending in 1927-28 were entirely self-supporting, and an additional 27 percent earned more than one-half of the funds needed to meet college expenses. Only 20 percent of the total enrolled, in fact, were dependent to any great extent. The scholarship standing maintained by the student body as a whole is high, and college officers report splendid cooperation on the part of the students in all efforts promoting a high quality of college work and wholesome campus influence. The average age of students in attendance for the past year was 21.03 years.

Students serious-minded.

The alarming number of freshmen dropped from the colleges and universities of the country for failure to carry their work has led the American Council on Education to give serious consideration to the tremendous waste involved. Many of these failures have been found to result from misfits. The student took the wrong course. Discouragement and lack of initiative followed his failure to make a success of his work. His first year in college, instead of helping him to find himself, and acquire the momentum of real achievement, left him baffled and confused. To avoid this sort of disaster, peculiarly important in a technical institution, the College has striven for years to give the public, and especially the high school senior, through publications, a clear idea of the different types of work offered by the institution, the objectives they lead to, and the special aptitudes they may demand. Around freshman week, a project in which this institution was somewhat of a pioneer in the West, the College has built a program of orientation, tests, and guidance which has also helped the student to adjust himself to his new environ-

Reducing mortality of entering students.

ment and meet, without confusion, his new obligations. In addition, the College has shaped its curricula in such a way as to give the entering student a chance to determine his aptitudes, to test out his peculiar resources, and to lay a substantial foundation for a successful college course—if he has the ability to do successful college work in any of the major fields of a land-grant college. In the School of Engineering, for instance, there is a common freshman program, devoted to the tool subjects. Whether the student selects civil, electrical, or mechanical engineering, therefore, his first year is basic to all major types of engineering. Essentially, too, it is foundation work for any college course, but with enough try-out elements to help give the student and his advisers an insight into his abilities. In Agriculture, Home Economics, and other technical schools, also, there is a freshman program common to practically all majors in the school and basic to a broad college curriculum. Through such fundamental means as this, along with careful advisory aid from members of the faculty, the College has striven to reduce the mortality of entering students.

College pioneers in statewide vocational guidance.

Another project which the College has emphasized during the past few years for aiding students to discover their educational and vocational aptitudes and limitations, is vocational guidance. Employed at the College by different schools for many years, and discussed in College publications as an element of importance in promoting alertness and thoroughness of scholarship, it has more recently become the central theme of the Educational Exposition, and through these annual gatherings of high school delegates and faculty representatives has exerted statewide influence. Leaders of national recognition and influence in directing the educational and vocational interests of college students have been brought to the College to give visiting high school students and teachers the most helpful and authoritative information in this important field. As a result of the notable work done from year to year at the guidance conferences of the Educational Expositions, the College was urged to carry the work into various parts of the state, where county-wide conferences, sponsored by the county superintendents and the high school principals, gave to high school seniors the essentials of self-analysis and the means of acquainting themselves with the character and the demands of the various vocations. Nine such county conferences have been held during 1928—all that could be accommodated with the limited staff of specialists available. In the same way,

through the initiative of the Portland Rotary Club, a vocational guidance program, directed by the School of Vocational Education at the College, was conducted in Portland throughout the spring months of 1928, with the cooperation of the City Superintendent of Schools and the Director of Vocational Education. This work—treated somewhat in detail in the reports of the Dean of the School of Vocational Education and the Registrar, appended to this report—has carried the principles and the method of vocational guidance to thousands of students and teachers in the high schools of Oregon, and represents, as Dean Jewell observes, "the most far-reaching effort made by any institution west of the Rockies to give expert aid and guidance to the young people of a state."

Evidence of the sterling character of the students at the College and the high quality of their work has been particularly manifest during the biennium. A sophomore in Agriculture, in competition with 600,000 4-H Club members throughout the country, won the H. A. Moses leadership trophy as national champion member of the 4-H Clubs for 1927, with all the perquisites belonging to that honor, and also the $250 cash prize offered by the Philadelphia Farm Journal as the outstanding Club leader of America, a double honor never before won by a single state or an individual Club member. Student judges of dairy livestock and dairy products won distinction in the annual contests of the National Dairy Show for both 1926 and 1927. Records for the two years were as follows: 1926—Dairy Cattle, high man in all breeds, high team in Guernseys, third team in all breeds, etc.; Dairy Products, high team in butter, high man in butter, sixth team in all products, etc. 1927—Dairy Cattle, high team in Jerseys, high man in Jerseys, eighth team in all breeds, etc. Dairy Products, high man in butter, fifth team in all products, fifth man in all products, sixth team in butter, etc. These records, in view of the wide competition, are obviously very high. Students in the department of Farm Crops, in competition with institutions throughout the West won the intercollegiate crop judging contest in 1926, which included as an award a trophy valued at $400, and they won the hay grading contest in 1927.

Distinguished attainments indicate high character of student body.

Among the 1928 graduates of the School of Engineering, one passed the highest civil service examination written by any man in the United States; one received a very coveted fellowship at the University of Illinois; another received a fellow-

ship at the California Institute of Technology; seven were employed by the General Electric Company of Schenectady, N. Y., and Fort Wayne, Indiana; two by the Bell Telephone laboratories of New York City; two by the Westinghouse Electric and Manufacturing Company of Pittsburgh; and many others were engaged for a wide variety of work before the close of their senior year.

A 1927 graduate in Commerce was awarded one of five fellowships, each yielding $750 a year, given by New York University through the cooperation of seven New York merchants whose establishments are the part-time laboratories of the five advanced students in training for service as business executives. In the 1927 spring examinations for certified public accountants two seniors in Commerce stood highest in grade average among all the applicants. One of the two received national recognition for his high record in the examination. The other was honored by being sent on an important commission to South America. Both became practical certified public accountants.

Among the seventeen graduates of the School of Forestry in 1928 eleven voluntarily took the Forest Service examination for junior forester, the highest professional grade in the country. Nine of the eleven successfully met the requirements of the examination. This represents a showing better than that made by any other school of forestry in the United States.

A Chinese student in Home Economics, now at the College, won highest scholastic honors among sixty-seven competitors for indemnity scholarships in the United States. A 1928 graduate in Home Economics, because of her creative skill in designing, was awarded an important scholarship in the Art League in New York City.

In Pharmacy the character of the student body is clearly indicated by the fact that during the past biennium, as usual, an exceptionally high percentage of graduates successfully passed the state examinations of the Oregon State Board of Pharmacy and those of other states. While the average percentage passing state board examinations throughout the country is only about 50 percent, at the College it has regularly been between 90 and 95 percent.

Distinction in intercollegiate military competition for the biennium is illustrated by the exceptional winnings of the College rifle teams. Competing with the leading colleges of the United

States, the team in 1926-27 won 51 out of the 57 matches assigned to it, and in 1927-28 won all the matches assigned to it—more than fifty. For the sixth consecutive year the team won the Ninth Corps Area match in 1927-28, thus giving the College the Pacific Coast Intercollegiate Gallery rifle championship. As a result of these victories, the team entered the National Collegiate contest, in 1926-27 winning fifth place and in 1927-28, against 46 entries, winning second place. The Doughboy of the West trophy, competed for by all the leading colleges of the Coast, was won by the College during both years of the biennium, the first year by an average of 7 points per man and the second by an average of 11 points per man above the nearest competitor. These consecutive winnings give permanent possession of the trophy.

In debate, formal oratorical contests and extempore speaking contests, the College teams, in competition with the best institutions of the West and the country in general, have made a very creditable record, distinctly above the average.

A junior, taking special work in vocal music, in competition with thousands of amateur vocalists throughout the country, won first place among men contestants in the western division, and second place in the national competition of the Atwater-Kent audition contest, an honor involving a cash prize of $2000, a scholarship in a selected conservatory of music, and many incidental advantages.

Examples of superior attainment such as these could be multiplied in many fields of endeavor, indicating very clearly the sterling quality of the student body.

Democracy and economy fostered.

Democracy and economy are definitely fostered at the College. Through moderate student fees, every student is assured of all the essential campus benefits—the health service, the student daily paper, attendance at all intercollegiate athletic contests held on the campus, attendance at annual concerts of the student musical organizations, and the privileges of the student social center, the Memorial Union. All social events are supervised by joint student-faculty authority, which limits the expenditure per capita so that no student may find himself excluded because of excessive costs. As shown by the report of the Dean of Men the aim is to keep such costs within reach of the average student. In other ways effort is made through experts in various departments of the College to encourage living groups to seek economy and integrity

in all arrangements for building houses, managing them effectively and providing wholesome and appropriate food. Through the help of the professor of household administration, an approved budget system has been established in all sorority houses, and costs of operation have been very generally reduced, with improved accommodations and service.

Student Loan Fund grows.

The Student Loan Fund with assets approximating fifty thousand dollars is maintained for the benefit of worthy students in need of immediate financial assistance in order to continue their work in College. It is administered by a committee of the faculty, which makes a careful study not only of all the applications directly presented for loans, but of the needs of students as they come to the attention of other members of the faculty or of students. The fund is handled through the Business Office of the College, where the accounts are kept and regularly audited.

During the academic year 1927-28 loans were made to the number of 453, averaging $92.74 for each loan. Since 1911, when the fund was established, 4,597 loans have been made, averaging $54.41. During this period $250,119.45 has been loaned, and interest has been earned in the amount of $9,707.79. Loans are made for a period of twelve months only, with renewals possible under suitable conditions on payment of interest, which is at the moderate rate of four percent. Losses are negligible—averaging less than one-half of one percent—and the good accomplished through the systematic administration of the fund is inestimable.

By-products of the administration of the Student Loan Fund are often as valuable to the students as the actual receipt of the money. Each applicant for a loan is required to make out a budget of his expenses for the year. This budget is analyzed by the committee and afterward considered by a representative of the committee in conference with the student. Counsel regarding the habits of the student, and the essentials that make for right living, along with economy, often makes the contemplated loan unnecessary, or at least of more constructive value.

While the fund has grown from the initial $500 contributed in January, 1911, as the foundation of the fund, to $7,844.81 in December, 1918, and to approximately $50,000 in 1928, and the good accomplished in enabling worthy young men and women to get an education at the College has been correspondingly enlarged, there is still urgent need for more capital in the loan

fund. No more constructive investment in enabling young people to help themselves, to enlarge their capacity for service and to increase their sense of responsibility, can well be devised than a contribution to the student loan fund.

The Health Service, working in cooperation with other departments of the College, such as Physical Education and Bacteriology, is concerned with student health throughout the institution, the sanitation of student living quarters, and the establishment of health habits that will aid in building up the physical welfare of our citizens and safeguard society against contagions. The staff includes two full-time physicians in regular attendance at the Health Service Building on the campus, with two full-time graduate nurses and a secretary; and two full-time graduate nurses in attendance at the student hospital.

Health Service beneficial.

The Health Service is available to all students who seek its aid. A physical examination is required of all entering students. Upon this examination are based the recommendations for the health program of the student.

During the past biennium 87 percent of the students availed themselves of the benefits of the Health Service, a much larger percentage than during any previous biennium. There were more office calls by students than ever before; the benefits from these office calls, in the way of prevention of further illness, resulted in fewer house calls by the physicians. Consultations for advice have doubled, and cases of illness have been greatly reduced. X-ray examinations have increased and hospital cases have been reduced, there being but 57 during the past year. The year 1927-28, in fact, has been the best in the history of the Health Service in respect to the limited number of serious illnesses and the absence of epidemics.

Conditions treated during the biennial period totaled 18,305; surgical dressings numbered 7,096; consultations for advice 1,649; medical examinations 2,400; X-rays 1,691; and office calls 29,437. The physicians paid 1,350 visits to students at their college residences, and treated at the hospital 204 patients, who required hospital service for a total of 1,223 days.

The more serious contagions throughout the biennium were promptly got under control, and only the minor contagions, which students fail to report, became at all general. In the past ten years no general contagion has afflicted the student body at the College.

This invaluable service is supported entirely by student fees. It is inadequately housed in a small frame building on the campus, one of the oldest still in use, and in a remodeled dwelling, which serves as a hospital, down town. As reported in the biennial report for 1924-1926, there is serious need for larger and more modern facilities. A new infirmary on the campus is needed—a wise insurance of the health of College students, a sound investment in the promotion of the principles of statewide health.

The College has received no State appropriation for building construction since the passage of the second millage law in 1920. As indicated elsewhere in this report, no millage income has been available for capital investment during the past biennium. At no time, moreover, has the millage income been sufficient to meet even the most pressing demands for additional room and other improvements. By 1927, therefore, conditions had become such that it was impossible, without serious impairment of the efficiency of both the instructional and investigational work of the institution, to enter upon another college year without additional room. No funds being available from other sources, a resident tuition fee seemed the only alternative.

Under ordinary conditions a tuition fee required of resident students is objectionable, and is contrary to the policy of most state-supported institutions. A high tuition, moreover, would be an obstacle in the way of many young people who are already struggling to meet the usual expenses of a college education. A moderate tuition, however, would not work general hardship, it was hoped, and seemed the only means of providing for some of the most pressing needs. Accordingly a tuition fee of $12 a term, or $36 a year, corresponding to the non-resident tuition fee of $50 a term, or $150 a year, was voted by the Board of Regents to be imposed upon all resident students beginning with the fall term of 1927.

Resident tuition established.

In addition to this fee, all students bear a part of the expense of their education through the payment of departmental laboratory and shop fees, and all students pay fees for the support of student body enterprises, the Memorial Union, physical education, etc. Such fees vary in different schools and departments from about $40 to $80 per year, the aggregate average for the student body being $60. Including the tuition fee, therefore, resident students pay toward the expense of their education at the College an average of $96 a year. Non-resident students in the same way pay an aggregate average of $210.

MANY GRADUATES ATTAIN DISTINCTION

A college is judged by its graduates. Leadership of its graduates reflects credit upon the institution that trained them. Not that the sole, or even primary, function of a public institution of higher learning is to develop leaders. Rather, it is to raise the level of citizenship and increase the productive efficiency of those who receive its training—to enable the youth to do better those things which his natural ability would enable him to do, in some measure at least, even without a higher education. But among the mass of students who graduate from college—still a very small percentage of the total population—there are those who attain distinction, chiefly through rendering conspicuous service to the public.

Oregon State Agricultural College has many such leaders. Yet three-fourths of all the graduates of the institution have been out of college only fifteen years or less. More than half of them have been out of college only seven years or less. It is obvious that the great majority of these alumni are still on the morning slope of life, climbing upward toward the divide, and that the rewards of highest fame and honor belong to a generation more advanced than theirs. Not to dwell upon the graduates of the earlier decades, however,—the lists of which include a United States Senator, a vice-president and chief counsel of the Southern Pacific Railroad, a national secretary of the American Home Economics Association, a noted writer of books for boys, two prominent missionaries in the Orient, and leading educators, journalists, business men, farmers, and engineers—a few instances of leadership among more recent graduates will indicate the type of men and women the institution is training. Many other instances, equally pertinent, could be mentioned as representative of the different schools.

School of Agriculture.

One-third of all the agricultural colleges of the country have graduates of the School of Agriculture on their horticultural faculties, six as heads of departments. A 1917 graduate in Agriculture, who was entirely self-supporting throughout his four years in college, successively served as county agent, teacher of agriculture in high schools, and principal of a high school, until within ten years after graduation he had become state supervisor of vocational agricultural education. A 1918 graduate in Agriculture, after serving in various capacities, including that of professor in a mid-western agricultural college and special assistant to the Secretary of Agriculture at

Washington, D. C., was recently appointed head of the Division of Agricultural Finance in the United States Department of Agriculture. A 1914 graduate who obtained his master's degree in 1917, is associate agronomist in the office of Forage Crops, United States Department of Agriculture.

Chemical Engineering.

A 1922 graduate in Chemical Engineering, having spent a year and a half in European study and research as a Guggenheim fellow, was appointed professor of physical chemistry in the California Institute of Technology. Another graduate of the same class, following a two-year fellowship at Harvard, joined the laboratory staff of the American Iron and Steel Company. A 1926 graduate, after enjoying two yearly scholarships at Yale, won highest honors in competitive examinations that secured for him the Henry Bradford Loomis Scholarship of $1,700.

School of Commerce.

A recent graduate in Commerce is general sales manager for a great Northwestern power company, which has offices in four states and does an annual sales business of more than a million dollars. Another Commerce graduate has charge of the interests of the Standard Oil Company in Malaysia. Many recent graduates have attained positions of managing and administrative importance in business. advertising, salesmanship, banking, and education. The list is impressive, and represents widely varied fields of service.

School of Home Economics.

Eight of the leading colleges of the country, besides the United States Bureau of Home Economics, have on their staffs graduates of the School of Home Economics, two as heads of departments. Six graduates are serving as home demonstration agents and seven as directors of school cafeterias in one of the Pacific Coast states. One hundred and fifty graduates of the School are teaching in Oregon, and one hundred and forty-five others in the Pacific Northwest, California, and Hawaii. A 1919 graduate, after teaching in Oregon schools for several years, during which time she planned a special home economics building for one of the larger city schools of Oregon, is now supervising a business in school cafeterias in a western metropolis involving $100,000 a year. A 1921 graduate is head of home economics instruction in Yenching College, Peking, with students representing regions throughout all China, a pioneering project of great constructive value. A 1922 graduate was recently awarded a scholarship of $1,200 by the Ameri-

can Association of University Women, for study in New York and Berlin.

The most prominent high school teaching positions in vocational agriculture, commerce, and home economics on the Pacific Coast are held by comparatively recent graduates of the School of Vocational Education.

The following excerpts from the appended reports of the deans of schools give examples showing how readily the graduates of the College adapt themselves to the demands of the modern world. The first is from the report of the School of Forestry:

School of Forestry.

"The first class, numbering four, graduated from the School in 1910. Early classes were very small. Due to the brief period since the establishment of the School, outstanding success on the part of any considerable number of graduates is hardly to be expected. Many of these men, however, are rendering marked service to the timber industry. One man is a forest supervisor in the Federal service and has charge of more than a million acres of forest land. Two are deputy forest supervisors, while many hold responsible positions as technical foresters in the Federal organization. Two graduates are deputy state foresters. One has supervision over private forest protection work in Oregon. Two are professors of forestry. One is a bank president and another a bank cashier in lumber towns. Two men have done exceptional work in forest entomology. One man is at the head of one of the largest logging operations in the Northwest, with 550 men under his direction. Two hold responsible positions as logging superintendents. Two are production managers for large sawmills. At least ten are acting as logging engineers for logging companies."

Another is from the report of the School of Mines:

School of Mines.

"According to present knowledge, one of the 1918 graduates has a responsible position with the Standard Oil Company with headquarters at Buenos Aires, Argentine. One of his classmates is in charge of important research and laboratory work for the Federal Lead Company in Missouri. A graduate of 1922 is metallurgist for a large smelter in Salt Lake City. One of the 1925 class is rated as an outstanding authority on frozen gravel dredging and is located at Nome, Alaska. Two other graduates are with the Bethlehem Steel Company, one as superintendent of one of their largest mines, the other in charge of some important mill operations. Some have continued on into research work, either in college or with government bureaus, and are preparing themselves for certain highly specialized fields."

A concluding excerpt indicating leadership among graduates is from the report of the School of Engineering, where, in addition to the graduates mentioned, belongs an Electrical Engineer-

ing graduate of 1923 who has recently been appointed plant training supervisor of the Pacific Telephone and Telegraph Company with headquarters in Seattle:

"Successful records in years of early experience, as well as in those of advancement and responsibility, are confined to the graduates of no one department. Within the biennium a graduate in Civil Engineering took highest place in Civil Service examination for junior engineers, a graduate in Mechanical Engineering made the highest record in a technical examination given for a group of engineers very carefully selected from the leading institutions of the United States by the Chief Engineer of the General Electric Company, and a graduate in Electrical Engineering was sent to the patent office of the General Electric Company in Washington, D. C., for a training course and a four-year course in law at George Washington University.

School of Engineering.

"The record of those who have been in service from five to fifteen years is no less distinguished. One graduate is Pacific Coast manager of the largest appraisal company in the Northwest, one is a successful contractor in the city of Portland, another is head of the Civil Engineering department at the University of South Dakota, one is production manager of the Iron Fireman, another is production manager of a pump company, another is assistant laboratory director for the Ethyl Gas Corporation, one is electrical supervisor for the Southern Pacific Company, one is superintendent of tests for the Portland Electric Power Company, etc.

"An illustration of how graduates are supplying the need for technically trained men in the Northwest is found in one of the largest electrical power companies, where thirteen men in responsible positions are graduates of this institution. Another example is found in the construction of the Bull Run dam, where six of the engineering staff in charge of the concrete tests and of the inspection and supervision of construction are former students of the College and where the general gravel and plant foreman for the contractors is also from this institution. During the past year we have received many complimentary statements concerning the training exhibited by our graduates from members of large corporations and government bureaus."

That the training offered at the College as preparation for particular vocations and professions is effective in practice, is shown by the fact that the graduates of the several schools are for the most part engaged in occupations directly related or allied to the vocation for which they took training. Considering the fact that in many departments of higher education—such as Home Economics, where all major students are women, and Commerce and Vocational Education, where a large proportion of the students are women—marriage and homemaking must occupy the lives of a considerable number of women graduates soon after they leave

College training vocationally effective.

college, a proportion of one-third or more of the graduates eventually pursuing the occupation for which they trained would be an average record. At the College the proportion is very much higher.

In the School of Home Economics the fact is never lost to sight that seventy-five percent of the young women of the United States are married before they reach the age of thirty years. Hence the various curricula in the School provide the essential principles of homemaking, along with the professional training of the curriculum, no matter what its objective. Many graduates of the School pursue professional careers for which they took training, both before their marriage and after. The majority of these acknowledge a double debt to the School—training for homemaking as well as that for dietitian, teacher, institutional manager, costume designer, etc. All the graduates of the School thus derive vocational advantage, more or less direct, from their training.

In the School of Vocational Education, as noted by the Dean of the School in his report appended hereto, demand for the graduates of the School covers a wide field. While the calls for specialized teachers of home economics, agriculture, commerce, industrial arts, etc., are many and persistent, these calls often require that in addition to the major technical specialty the graduate shall teach some related or academic subject. But nearly all the graduates of the School who enter the profession of teaching teach the particular subjects for which they took training.

In the School of Commerce, where the training in the essentials of business covers a wide field of application, graduates make various vocational uses of their education. As analyzed in the appended report of the Dean of the School, the occupations of graduates include positions as accountants, merchants, bankers, salesmen, commerce teachers, secretaries, stenographers, managers, etc., most of them quite obviously related to the training received.

In some of the schools, more immediately technical, the proportion of graduates following the professions for which they trained can be calculated with considerable accuracy. In Pharmacy, for example, 98 percent of the 445 graduates of the School are engaged in occupations definitely related or allied to the profession of pharmacy, 21 percent being proprietors of drug stores. In Civil Engineering about 90 percent of the graduates are engaged in the occupation for which they trained, while in other

departments of engineering the percentage is about 85. More than three-fourths of the entire engineering graduating class of 1928 were definitely engaged for satisfactory positions before the close of their senior year. In the School of Forestry more than 80 percent of the graduates, covering a total period of eighteen years, are engaged in some occupation related to the timber industry. In the School of Mines an equally high percentage are pursuing mining or allied occupations where their technical training is of practical value to them. In Agriculture the percentage is about 80. In spite of the increasing opportunities in professional and scientific positions, such as commercial research, teaching, farm publications, inspectorships, extension and experiment station work, and the great reduction of man power on the farm due to modern machinery, the number going into practical agriculture is approximately 33 percent. More and more the value of an agricultural course for a scientific or business career in an agricultural commonwealth is recognized. In dairying, farm crops, and horticulture more men are going into the practical phases of farming than into technical or professional jobs. In animal husbandry, where nearly all the graduates go into some phase of the livestock industry, nearly 50 percent go on to the home farm or farms of their own. Facts such as these, some of which are sketched in the reports of the schools appended hereto, together with the substantial progress of graduates, are conclusive evidence that the training offered at the College is meeting the needs of the modern world into which the students go.

GRADUATE STUDY

The reports of the several schools show a notable development in graduate study during the biennium, or express an earnest desire to meet the insistent demand for such work. In Agriculture, where graduate work has been pursued for many years, with suitably prepared candidates appearing each year at commencement for the master's degree, the Dean of the School is definitely recommending to the Board of Regents that three years of graduate work in certain fields of scientific agriculture be offered leading to the doctor's degree. Considerable progress has been made during the biennium in the development of graduate work in agricultural economics and rural sociology affording the training required in preparing advanced students to grapple with the vital problems that are confronting the public in this important field,

The doctor's degree in Agriculture.

and to take the positions of leadership that are calling for trained men as county agricultural agents, research specialists, managers of cooperative marketing associations, and directors of agricultural interests with large commercial organizations serving the farmers.

The situation in the School of Engineering is sketched briefly by the Dean of the School in his appended report, which shows that the demand for work leading to the master's degree in engineering is rapidly growing. The cause for this, and the fact that one out of every eight graduates in engineering the country over is pursuing graduate work is discussed by the Dean as follows:

Engineering research essential.

"Graduate study in Engineering is particularly desirable and necessary for those who contemplate a life work in research, designing, or education. In early days of industrial development much dependence was placed upon the individual and the ingenious inventor, but with the increased size and complexity of modern industry, random discoveries of a mechanical nature have given way to systematic research. This development is creating a demand for men who have been carefully and purposefully trained in the exploring of new fields, in the developing of new methods, and in the designing of new machines. Such men can be best developed by a continuation of training beyond the undergraduate period."

In Home Economics graduate work has greatly increased during the biennium, both in the regular and the summer sessions. Fifty home economics graduates, representing twenty-five colleges, took advanced work in the Summer Session of 1928. A sequence of courses is being developed in each of the five departments of the School whereby graduate students may complete the requirements for the master's degree through summer work only. The influence of Purnell projects has of course given fresh impetus to advanced study and research in home economics. As set forth in the report of the Dean of the School of Home Economics, a research project, now under Purnell auspices, has been under way for nearly three years gathering and analyzing data regarding the "Present Use of Time by Farm Homemakers." Some of the results of this study are being prepared for publication. In nutrition, household administration, clothing and textiles, and other fields of home economics, graduate students are finding rich opportunities for advanced study and research.

Research begun in home problems.

In the School of Forestry, for the first time in the history of the School, two men were granted the master's degree in 1927-28.

In Forestry and Mines.

An extension of opportunities for doing graduate work is strongly urged by the Dean of the School. Such an extension, he points out, would enable major professors to render more valuable service along research and graduate lines. "With the flood of students to institutions of higher learning and the resultant keen competition among professionally trained men," he continues, "the bachelor's degree is coming to mean less as a measure of training. Real professional leadership must come more and more from the group which has had the advantage of graduate years."

Oregon has many unsolved problems in connection with the development of her mineral resources, most of which call for expert study and analysis. The training of graduate students to approach these problems in a scientific spirit is one of the aims of the School of Mines, which offers a suitable background for such studies.

In Pharmacy and Industrial Chemistry.

Oregon presents a fertile field for original investigation in drugs and pharmacy. Up to the present time, however, due to the fact that undergraduate work has demanded the full time of members of the staff and all of the equipment funds that could be assigned to pharmacy for use of undergraduates, the School has been unable, as indicated by the Dean of the School in his appended report, to undertake graduate work. Because of present facilities afforded by the new Drug Laboratory, established at the College by the State Board of Pharmacy, and the additional staff member thus made available for part time, the School will offer graduate work beginning in the fall of 1928.

Graduates of the department of Chemical Engineering to the number of twenty men are now doing graduate work in various institutions—Yale, Illinois, Wisconsin, Minnesota, Columbia and other universities and colleges. Nineteen men and one woman have already obtained their master's degree and six have been granted the degree of doctor of philosophy. Because of limited instructional staff and equipment the department has not been able to offer graduate work.

In Vocational Education.

In Vocational Education, where requests for graduate work are both frequent and urgent, the situation is set forth by the Dean of the School in a section of his report entitled Graduate Study and Research. Particular attention is called to the following excerpt from that report.

"Only a generation or so ago higher education was looked upon as only for the exceptional few, and largely only for men who wished training for the so-called learned professions. Nowadays, college training is looked on as the rightful portion of almost every normal child of the commonwealth. Not long since graduate training was a thing for college and university specialists only. Now that the masses, very properly, are taking four years of collegiate training in preparation for life itself, and adding three years of graduate training to that for any specialty whatever, conditions demand that the teachers of a state, more than any other class, keep abreast of this movement. Graduate training for departmental teachers in the high schools is now demanded by several western states. The alumni of this institution are going to be forced out of a number of the western states unless they meet all the requirements for a standard master's degree. Even this advanced degree does not stand today for preparation as much above that of the average man as did the bachelor's degree only a few years ago.

"Approximately a thousand graduates of the College are now actively teaching; most of them, of course, on the Pacific Coast. Very few of them have their master's degree. Many of those who have such degrees have found it necessary to go elsewhere for graduate work although they have desired to take their advanced degrees from their alma mater. The reputation of this institution as a source of skilled vocational experts is such that many graduates of other institutions apply for graduate work here. There is an opportunity to make this College one of the great centers of graduate and research work in its peculiar field in the West.

"Every large college and university recognizes that graduate classes must be small and that faculty members must be given time for individual conferences with graduate students. This is not waste by any means, for by so doing the state provides for itself leaders for the future, and such provision is not made in any other way."

THE STAFF

During the year 1926-27 the Resident Instruction staff included 11 deans, 60 professors, 30 associate professors, 51 assistant professors, 105 instructors, and 11 fellows, or a total of 268 persons, representing the full-time equivalent of 248. The Agricultural Experiment Station staff included, besides the director, 6 professors, 2 assistant professors, 7 branch station superintendents, 6 branch station assistants, and 5 fellows and assistants, or a total of 27 persons on full time; together with 12 professors, 4 associate professors, 6 assistant professors, 2 instructors, and 1 fellow, dividing their time between Resident Instruction and Station work, representing the full-time equivalent of 11 persons. In addition, 2 persons from the U. S. Department of Agriculture gave full time to cooperative projects. The total full-time equivalent of the Agricultural Experiment Station staff was thus 40 persons. The

Teaching, research, and extension staffs.

Extension Service staff included the director and 55 specialists, or 56 persons on full time. In addition to the specialized groups enumerated above, there were 8 persons engaged in general administrative duties, 15 engaged in library work, 18 in military work, 9 in music, and, for all divisions of the College—Resident Instruction, Experiment Station, and Extension Service—91 engaged in clerical and secretarial work, a total of 141 persons.

During the year 1927-28 the Resident Instruction staff included 12 deans, 60 professors, 27 associate professors, 49 assistant professors, 109 instructors, and 16 fellows, or a total of 273 persons, representing the full-time equivalent of 240. The Agricultural Experiment Station staff included besides the director, 6 professors, 2 assistant professors, 7 branch station superintendents, 6 branch station assistants, and 11 fellows and assistants, or a total of 33 persons, all engaged solely in work of the Experiment Station; together with 18 professors, 6 associate professors, 5 assistant professors, 3 instructors, and 1 fellow dividing their time between Resident Instruction and Station work, representing the full-time equivalent of 12 persons; and 6 persons from the U. S. Department of Agriculture engaged in cooperative work. The full-time equivalent of the Station staff was 51 persons. The Extension Service staff included, besides the director, 58 specialists, or 59 persons on full time. In addition, there were 8 persons engaged in general administrative duties, 15 engaged in library work, 16 in military work, 8 in music, and, for all divisions of the College—Resident Instruction, Experiment Station, and Extension Service—94 engaged in clerical and secretarial work, a total of 141 persons.

The total number on the College staff for the first year of the biennium was thus 496, representing a full-time equivalent of 485; for the second year of the biennium the total number of persons was 512, representing a full-time equivalent of 491.

In the several reports of schools and divisions appended hereto, record is made of the death, during the biennium, of four members of the College staff; namely, Dean Grant Adelbert Covell and Professor Henry Clay Brandon, of the School of Engineering, and Mr. Calvin Jehu Hurd, Specialist in Marketing and Organization, and Mr. William Lee Shovell, county agent of Malheur county, of the Extension Service. Mr. Shovell was in the service of the College only from February, 1926, to the date of his untimely death on October 21, 1927. Mr. Hurd served the College through the Exten-

Obituary.

sion Service from 1917, when he joined the staff as a county agent, to the time of his death, July 12, 1927, when, as Extension Specialist in Marketing and Organization, he had just completed a notable survey of the prune industry. His work in pioneering marketing and organization enterprises in Oregon was constructive and sound. Professor Brandon, as Professor of Industrial Arts and Director of Shops, served the College, with efficiency and devotion, from October, 1913, to about the middle of the past biennium, when his health broke down. He died October 12, 1927.

Dean Covell joined the staff of the College as Professor of Mechanics and Mechanical Engineering in 1889; and throughout the thirty-eight years of his service to the institution, during which the School of Engineering and the Engineering Experiment Station were evolved, his shaping hand and judicial mind were devotedly at work in the interests of the School, its instructors and its students. In 1908, when the School of Engineering and Mechanic Arts was organized, he became its Dean, retaining this position until the spring of 1927, when he became director of the newly organized Engineering Experiment Station and Dean of Graduate Work in Engineering. His death occurred November 20, 1927, from heart failure, resulting from a paralytic stroke which he suffered several months before. He was sixty-five years of age.

Dean Covell was greatly beloved by his colleagues and by the college alumni and students. A man of sterling character, unflinching candor, and essential dignity, he was also both gentle and genial in spirit, and exercised a wholesome and constructive influence upon the College and the community. His contribution to the work and ideals of the institution will be enduringly remembered.

Professional preparation advanced.

The professional preparation of the faculties, as indicated by academic degrees held, shows a satisfactory improvement for the biennium. With a number of the staff availing themselves each year of the opportunity for advanced study while on sabbatical leave, it is to be expected that the number holding advanced degrees will steadily increase. Whereas two years ago the faculties included 33 with the doctor's degree, the number is now 40. Those holding professional or technical degrees now total 24 as compared with 17 two years ago. Faculty members whose highest degree is the master's total 95 as compared with the former total of 84. The

number whose highest degree is the bachelor's has dropped from 117 to 115. An increasingly large proportion of those who do not have master's or doctor's degrees are engaging in advanced study at summer sessions, during leaves of absence, or in some cases on a part time basis in connection with teaching work.

The benefits of sabbatical leave were briefly reviewed in the biennial report for 1918-1920. In the report for 1922-1924 mention was made of the fact that a special committee of the Board of Regents had been appointed to confer with similar committees representing other Oregon state institutions of higher education in order that any action concerning sabbatical leave taken by these institutions might, if possible, be uniform. As a result of extensive study of the several provisions for the sabbatical leave as adopted in colleges and universities throughout the United States, the Regents, at a meeting March 5, 1927, approved a plan for sabbatical leave.

Sabbatical leave authorized.

A member of the College staff of the rank of assistant professor or above who has served the College continuously for at least six years may be granted a leave of absence for not more than one year on half pay, provided that the granting of such leave shall not result in any additional cost to the College. In determining the required total of six years' service in the case of those who have risen to professorial rank, or its equivalent, in this institution, three years of service in a position below professorial rank are counted as two years. Leave of absence is granted for purposes of research, writing, advanced study, or travel undertaken for observation and study of conditions in our own or in other countries affecting the applicant's field. Such leave is granted only when the President and the Board of Regents are convinced that the applicant is capable of using his year of sabbatical leave in a manner which will make him of greater service to the College and the State. Each staff member granted sabbatical leave signs a contract to return to the College, upon the completion of his year's leave, for a period of at least one year's service at the same salary received for the year previous to leave. During his year of sabbatical leave he renders to the President of the College in writing a report at the end of each quarter. Nine sabbatical leaves were granted for the year 1927-28.

The sabbatical leave is found to be of mutual benefit to the staff member and to the institution. The former, through study or travel, is brought into contact with distinguished specialists in

his field in other educational centers, gaining enlarged outlook, quickened intellectual zeal, and matured scholarship. He establishes cordial professional friendships with other scholars engaged in the same work of research and teaching as himself. Mingling with the student body of a graduate school he develops an increased understanding of the student point of view. Members of the College staff who have been on leave during the year just past testify to the benefits which they have found. "I was able to come into contact with research workers who are leading the field . . . men who are studying national as well as local problems." "I have secured some of the newer information in these fields. . . . I find that I come in contact with the students in a different way and have got their viewpoint. . . . I have found it of benefit to study the methods used by the different instructors." By the increased efficiency of these staff members on their return from sabbatical leave, the institution is assured improved instruction, an energized faculty, and increased staff morale and loyalty. Each staff member on leave, moreover, constitutes for a year a special representative of this institution at some great university, a circumstance which results in many benefits of special value to the College.

"Probably nothing in recent time has contributed more to stimulate the intellectual and professional interests of the faculty," according to one of the deans (see page 78, appended reports), "than the adoption of the plan for sabbatical leave. It puts into the hands of the ambitious the means, and takes away from the sluggish the last alibi. There remains now but the working out of some retirement system for the development of thoroughly modern and efficient departments."

Plan for retiring allowances recommended.

Progress made by the faculty committee which for the past several years has been investigating the principles and operation of faculty retiring allowances, was discussed in the biennial report for 1924-1926. At that time it was pointed out that the University of California, among western institutions, had adopted a system of retiring allowances. It was noted also that the committee had fixed on the mutual contributing plan of the Teachers' Insurance and Annuity Association as the one recommended for adoption by the state institutions of higher learning in Oregon.

As a result of further investigation during the past two years, the faculty committee has made the following recommendations:

1. "That the contributory plan recommended by the committee five years ago be adopted.

2. "That the offer of the Teachers' Insurance and Annuity Association of New York to make a survey of the conditions relative to the cost of a retirement allowance plan be accepted. This offer stipulates that this survey will be made free of cost and without obligation on the part of the College.

3. "That Oregon State Agricultural College join the University of Oregon in accepting the offer of the Carnegie Foundation for the Advancement of Teaching, to assist each institution to meet its accrued liabilities by providing an annuity equal to not less than 50 percent of the maximum salary of two of the older members on each staff. It is understood that the Carnegie Foundation will assume this obligation only upon the condition that the two institutions enter into a contract with the Teachers' Insurance and Annuity Association as recommended above.

4. "That in view of the generous offer of the Teachers' Insurance and Annuity Association, as set forth in the second suggestion, the institution should accept the same as a preliminary to further action."

Pursuant to these recommendations, the Board of Regents of the College has accepted the offer of the Teachers' Insurance and Annuity Association to make a survey of the institution.

Publications of the staff.

During the biennium eight books by members of the College staff have been published. Members of the staff have been the authors of 70 bulletins. A total of 47 different magazines have published 91 articles by members of the staff. The writing of the staff is predominantly scientific and technical; that it is not wholly so, however, is shown by the fact that it has included during the biennium nine poems in magazines, one book on an historical theme, and one book of verse. A comprehensive summary of the publications of members of the faculty was included in the biennial report for 1924-1926, pages xi and xii.

Spirit of research penetrates entire institution.

As evidenced by the appended reports of the deans of the several schools, the spirit of research effectually penetrates every major department of the institution. Not simply through the members of the staffs of the agricultural and engineering experiment stations, where projects of investigation and research are definitely financed, and where results of the most far-reaching significance have been worked out from time to time, but also through the initiative and creative scholarship of members of the resident instruction staff in general, primarily concerned with teaching or administration, notable results have been achieved. More important, perhaps, than specific economic gains resulting from these examples of research, is their effect on the minds and habits of undergraduate

students. To be alert to test old methods and seek for new, and to maintain an open and inquiring mind, is one of the greatest assets of a higher education. Contact with vital problems of research, conducted by the scientific method, is the surest means of stimulating this inquiring spirit.

Many and varied problems are confronting Oregon in fields that are peculiar to the scope of the College. These pertain to the forests, the minerals, the agricultural products, the water-power, the soils, plant diseases, noxious weeds, insect enemies, irrigation, drainage, food and drug problems, sanitation, engineering, industrial chemistry, etc.; but they pertain also to the facilities for transportation and commerce, to taxation, animal diseases, marketing of farm products; to nutrition, household economy, and a multitude of other problems, the satisfactory solution of which would add immensely to the prosperity and happiness of our citizens.

In so far as funds have been appropriated, through the Agricultural Experiment Station, to attack these problems, results obtained, as shown by the report of the Director of the Station appended hereto and by various publications of the Station, have abundantly justified the expenditure involved. Economic gains, indeed, have often been tenfold to a hundredfold. Where a margin of funds or of time has been available in the Resident Instruction division, research has produced corresponding gains. But the pressure of undergraduate instruction has been such that sustained research on an adequate scale has been impossible. Many promising problems lag in solution because of lack of funds or time to complete the projects; others cannot be undertaken at all. Unnecessary losses to the commonwealth thus continue, and assured gains are postponed or never realized because the agencies that are willing and competent to do constructive research in these fields lack the comparatively small margin of funds to do the work. As rapidly as funds are available, however, to establish teaching and research fellowships or to promote investigation, the research program of the several schools will be commensurately extended. The benefits of such a program are constructive and far-reaching.

SERVICE TO THE STATE

Particular attention is called to sections in the reports of schools and divisions, appended hereto, on service to the state. The College is peculiarly an organization for service to the entire

commonwealth. Not only through the Agricultural Experiment Station, the Engineering Experiment Station, and the Extension Service, but through research and investigation in many other divisions of the College and through personal service of experts in many departments of science and technology, the institution lends a helping hand to the industries, the resources, and the citizenship of the state. The constructive results of such service are often beyond estimate. The Resident Instruction Division, no less than the divisions of experimentation and extension, is conscious of its supreme obligation to render service to the state and nation.

It is through the direct function of teaching students in residence at the College, in accordance with the soundest and most progressive principles of science and education, that the several schools of the College render their fullest service to the public. Thousands of young people, year by year, thus become more alert and capable citizens of Oregon. But in addition to this primary function of the Resident Instruction schools, many other services are rendered directly or indirectly to the industries and resources of the state.

In Vocational Education.

"It is self-apparent," to quote from the report of the Dean of the School of Vocational Education, "that the welfare of a state is synonymous with the welfare of its agriculture, its commerce, its engineering facilities, its home enterprises and the happiness that goes with their proper functioning. The various divisions of the College as a whole are only subdivisions of the very life of the state. The School of Vocational Education is given over almost entirely to the project of making recent discoveries and opportunities in these various fields of immediate avail to the people of the commonwealth. In the exact proportion in which the boys and girls, the young men and women of Oregon become efficient farmers, engineers, foresters, business men, bankers, secretaries, pharmacists, homemakers, artisans,—citizens in the broad sense of the term, in that same proportion will Oregon attain to that rank among the states of the Union to which its resources entitle it."

The services of the School of Agriculture, through its instructional work and through its specialists in farm crops, soils, horticulture, dairying, etc., link up with every vital interest of this important industry. As consulting experts, the experienced

members of the staff are in immediate touch with all constructive movements in their respective fields. They work hand in hand with the leaders everywhere. Their activities take them to all sections of the state and to all the great gatherings of scientific experts and practical workers throughout the country. In the report of the Dean of the School of Agriculture, appended hereto, the briefest possible summary of the extra-curricular activities of members of his staff is presented on pages 67 to 72, inclusive. Convincing as are even these brief notations of the wide and varied services of the agricultural specialists, the story is only partly told. For these men are active also, as the report explains, in the work of the Experiment Station and the Extension Service. Concerning this work, however, Dean Cordley says in his report, "Under the head of Miscellaneous Administrative Duties, mentioned above, may be grouped many kinds of extra-curricular duties . . . and many kinds of service, which are performed by the Agriculture faculty for the citizens of the state and which are necessarily charged to Resident Instruction because of the lack of a special fund with which to meet the cost of this type of work." The services involved in this work are too well known to dwell upon here, and too extensive, indeed, even to enumerate in a document of this kind. Such services, supplementing research and teaching, have been a determining factor in the whole field of progressive agriculture in the state for more than a quarter of a century, and have penetrated into neighboring and even distant states, where the influence of Oregon-trained men is a significant factor in farm management and practice. Throughout the agricultural world, in fact, scientific leadership traces back, through many important threads, to Oregon.

In Agriculture.

The School of Commerce, in the same way, by anticipating problems and broadcasting the results of careful study and analysis of the facts involved, has constructively served the business interests of the state. Among the projects it has handled during the past biennium may be mentioned its cooperation with the Oregon Retail Merchants' Association in investigating the "Cost of Doing Retail Business in Oregon in 1926," and in publishing a report on this problem; in conducting business institutes in seven of the important trade centers of the state, beginning at Baker in March, 1928; in publishing the results of investigations on taxation, marketing, and operating costs of retail merchandising; and in conducting extension classes in the American Institute of Banking in three Wil-

In Commerce.

lamette Valley cities. Not the least among its services, however, in addition to teaching approximately one thousand students registered in Commerce, is the instruction each year of at least an equal number of young people registered in other schools of the College, in the principles and practices of modern business as used by the soundest and most efficient industries of today. This is in fulfillment of the idea that there is a business side to every vocation, and that the engineer, the farmer, the forester, the worker in any field, is not fully equipped for his job unless he knows its business possibilities and limitations.

In Engineering.

The School of Engineering during the biennium has rendered various services to the public, and through the organization of the Engineering Experiment Station has established a new and wider basis of carrying on research and making its technical resources available to the people. Vital contacts have been maintained between the engineering staff and students on the one hand and professional engineering associations on the other. A number of addresses have been given, and a considerable number of technical articles and bulletins have been published, some of them involving a great deal of independent research on the part of their authors, and making available to the industries of the state information of practical value. The results of its work on high tension insulators, for instance, have enabled the electric power companies to operate without the frequent shut-downs formerly encountered. The results of its work on fish screens have been considered sufficiently important to be published by the National Bureau of Fisheries. Off-the-campus courses for automobile machinists and for manual training teachers have been offered in Portland each winter of the biennium, with enrollments varying from fifteen to twenty-five students. A short course at the College on modern methods of designing and controlling concrete mixtures had an attendance of about fifty. Counsel of staff members concerning water supply systems, demonstration of welding and forging methods, advice to drainage districts and such services have been among other activities of the School of Engineering in the interest of the public.

The department of Chemical Engineering has made such progress in its research in producing cedar wood oil during the biennium that it is now chiefly concerned in finding a market for the oil, which can be manufactured in large quantities. The department made a brief chemical survey of the state in 1926, the

results of which open up possibilities for promising development. The nitrate deposits in the Owyhee canyon, for instance, are regarded as of value for future commercial use. The department has recently undertaken experiments in the use of Douglas fir for pulp and paper manufacture.

In Chemical Engineering.

The School of Forestry has established on its arboretum tract, with the cooperation of the Federal Forest Service and the State Board of Forestry, a forest nursery, with a capacity of half a million seedlings for the benefit of the state. A research dry kiln for studying the various methods of seasoning lumber and other forest products has just been completed, and will serve valuable purposes of investigation as well as provide a means of demonstrating proper lumber seasoning practices to operators of small sawmills. Considerable service has been rendered to the people of the state by members of the staff in matters relating to the proper care and utilization of forest properties.

In Forestry.

Through the initiative of the pulp and paper industry of the Pacific Northwest, which sent representatives to the College to prepare the basis of a cooperative program of research, a technician from the College went East early in June to devote the summer months to a survey of the pulp and paper manufacturing plants in the eastern and middle-western states, to study the curricula and equipment of colleges and universities that are now conducting courses in pulp and paper manufacture, and to determine the most effective means whereby the College, through a program of research and instruction, can render assistance to the rapidly developing pulp and paper industry of this section of the country. The representatives of the industry who visited the College stated that the pulp and paper industry is now the seventh largest in the country; that during last year the largest industrial pay-roll in the State of Washington was in pulp and paper products; that the business is already one of very great importance in Oregon, and is destined to be its greatest future industry. In spite of this fact, they reported, there is now offered in this territory no comprehensive curriculum for the training of the higher technicians needed, and no opportunity for laboratory research on cellulose products. The representatives urged the desirability of Oregon State Agricultural College establishing a curriculum for the training of technicians and a suitable laboratory for research. They gave assurance of practical constructive aid on the part of the pulp and paper industry, and declared that the matter is urgent and should not be delayed.

The project has therefore been initiated on a cooperative basis, the industry providing to date about three-fourths of the funds.

The School of Home Economics through many channels exercises a stimulating and constructive influence on the industries and institutions, as well as the homes, of the state. A parental conference, addressed by experts, was held at the College last spring, the report of which is being published. Through extension projects, as well as in campus teaching, emphasis is being placed on the responsibility of the homemaker as an intelligent consumer and wise purchaser; on equipping her to understand mental and physical growth and the needs of childhood; on the larger problems of health and human efficiency; rather than on the details of housekeeping or the routine of institutional management. Like the man trained in engineering, the woman trained in home economics, to be highly efficient, must be able to use principles and ideas in constructive thinking as well as exercise skill in craftsmanship.

In Home Economics.

Varied services are rendered to the mineral industries of the state through the School of Mines and the members of its staff. Contacts are maintained with mining projects and mineral resources. Hundreds of samples of minerals, sent in for examination, are given due attention. Such work, when not in competition with professional assayers, is done without charge, in the interests of the state. A charge is made, however, for assaying and analysis, to avoid unfair competition with professional men doing business in Oregon. The Oregon Mining Survey has succeeded the Oregon Bureau of Mines and Geology, and the Dean of the School of Mines, as director, is thus brought into close relationship with mineral development throughout the state. An enlarged and more effective service, with proper support and cooperation, thus becomes possible.

In Mines.

The School of Pharmacy, with the aid of its new drug laboratory conducted in cooperation with the State Board of Pharmacy, is now in position to enlarge its service to the druggists of the state through analysis and inspection of pharmaceutical materials. The School has continued its aid to the peppermint industry, and has made preliminary studies in the use of Oregon drug plants, such as hydrastis, ginseng, and belladonna, preparatory to the establishment of a drug garden. Two drug trade conferences were held during the biennium, in connection with the annual convention of the Oregon Retail Merchants' Association, and two surveys with reports

In Pharmacy.

were made, one on Retail Methods and Practices and one on Operating Costs in Oregon Drug Stores.

AGRICULTURAL EXPERIMENT STATION

The program of investigations in the Agricultural Experiment Station has increased very considerably during the past biennium and threefold since 1920. This was made possible partly through slight increases in State appropriations, but chiefly through increase in the Federal Purnell Fund and through additional cooperation obtained from various departments of the United States Government. The results of developments thus made possible have greatly exceeded the investment involved. Through cooperation with the U. S. Department of Agriculture, which has been extended in many fields, especially during the past biennium, Federal bureaus and offices have assigned funds and research workers to cooperate with the Station staff in studying problems that are important to Oregon but significant also to larger regions of the country or to the states as a whole. As a consequence, Oregon has become a much more important factor in the solution of general as well as strictly local agricultural problems.

Federal cooperation in projects previously undertaken has been continued in nearly all cases and in some cases expanded. Cooperation with various bureaus is thus being continued in forage crop investigations, potato diseases, white pine blister rust, seed laboratory, cereal investigations, methods of irrigation, economics of irrigation, soil survey, and raw milk studies. New cooperation has been established in the occasional diagnosis of special agricultural problems, such as livestock diseases, spray residue, etc., and in the establishment of such projects as bulb diseases, "curly-top" of truck crops, perennial canker and related diseases, strawberry investigations, ground water in the Willamette Valley, standardization of butter, and in economic and feasibility surveys of such important reclamation districts as the Ochoco, Warm Spring, Tumalo, and Grants Pass. Oregon has profited greatly through the cooperation of the Federal Government in each of these various projects, but more especially through that of the Division of Agricultural Engineering, working in conjunction with the office of the State Engineer, in conducting economic and feasibility surveys of these several reclamation projects, with the assistance of an outstanding engineer. A new branch experiment station, for which the 1927 Legislature

made appropriation, was established at Pendleton, through the cooperation of the Office of Dry Land Agriculture, beginning July 1, 1928.

Cooperation with state commissions and other agencies has also been very effective in handling problems involved in the marketing of fruit and milk, and in plant and animal diseases.

Some of the outstanding achievements of the biennium, as briefly summarized in the report of the Director, appended hereto, are the control of strawberry root-weevil, a pest which seriously threatened to ruin the growing of strawberries in Oregon; the discovery of the "curly-top" virus, which has been the cause of tremendous losses in the growing of vegetables, such as sugar beets, squashes, beans, and tomatoes; the demonstration that the breaking of tulips is caused by an infectious mosaic disease, one of the oldest on record, which can be controlled by methods readily available; the development of a means of attacking coccidiosis in poultry, which promises to control this most damaging disease of domestic fowls; and the perfecting, after many years of study, of measures for the control of infectious abortion in dairy cattle, a baffling disease which has brought losses upon Oregon dairymen varying from one to two million dollars a year. The method of control for infectious abortion, worked out by the Station during eight years of effort, and applied with complete success in the College dairy herd, has been accepted by the State Livestock Sanitary Board as the means of eradicating this dread disease throughout the dairy sections of the state.

Outstanding accomplishments.

In addition to these accomplishments, particular attention is called to the constructive work of the Station in assisting fruit growers to meet successfully the critical emergency that confronted them during the past two years because of the embargo on fruit bearing a certain residue of poison spray used to combat insects and diseases. Concerning this serious problem and its solution, the following is quoted from the Director's report:

Spray residue emergency met.

"The most outstanding accomplishment of the biennium has been the development of what appears to be a fairly satisfactory practical solution for meeting the requirements of the trade as to the removal of spray residue from fruit. The problem in this connection came as an emergency during the winter of 1925-26, when fruit was denied release for sale in eastern markets and shippers were compelled to unpack and further clean the fruit at great expense in terminal markets. About the

same time Great Britain indicated that American fruits, especially apples, must not carry in excess of .01 grain of arsenious oxide per pound of fruit.

"Early in 1926 the Oregon Agricultural Experiment Station staff began a study of the situation with a view to finding a solution for the spray residue problem. . . . When the real emergency came during the harvest of 1926 the preliminary laboratory tests had already indicated that perhaps water solutions of hydrochloric acid would be the safest and most generally serviceable.

". . . Acting upon this suggestion, a considerable amount of Oregon fruit was treated in a water solution of hydrochloric acid to remove residue. The results were fairly satisfactory.

"The Station, the growers, and the equipment manufacturers continued their efforts following the close of the season, and by the harvest season of 1927 there were a number of practical commercial machines on the market. The Agricultural Experiment Station continued with harvesting, storage, and cleaning *tests running into thousands* and including all known phases of the problem and prospective ways of meeting them.

"The outcome is that the Oregon fruit industry is facing the harvesting and marketing of a large fruit crop in 1928 with real confidence that the pack will be one of the best, if not the best, ever harvested as regards quality, freeness from residue, and general appearance. There is confidence that international and national requirements will be met, and by methods which are economically feasible.

"The value of Station findings in this connection has been estimated in millions of dollars. A better measure of the value is the actual fact that the greater part of the fruit crop was practically embargoed until a solution of the problem was found."

Aggregate benefits amount to millions.

In summarizing the economic benefits to Oregon of the accumulated results of Station work, the Director's report gives a somewhat detailed estimate showing that the aggregate gains amount to the massive sum of from five to ten million dollars a year. Concerning these large benefits, the Director says:

"There is justification for increasing rather than decreasing these estimates at the present time. In judging their soundness one must bear in mind the magnitude of the industry—more than $100,000,000—the many highly specialized crops, the fact that much of the production is surplus which must be marketed in distant markets in competition with products grown nearer consuming centers. Practically all crop varieties and cultural methods of growing them in Western Oregon are largely the product of the Experiment Station; methods for effectively controlling a host of insect and plant disease pests have been worked out by the Experiment Station, without which—or some such control—there could be no commercial industry; much of improvement through use of fertilizers, including the use of sulfur on alfalfa, fertilizers and cover

crops for orchards, lime for the coast region, is the result of Station work; results in late years relative to harvesting, storage, and processing for market have been of timely economic importance; likewise, results the past few years in the control of diseases of dairy cattle, sheep, and poultry are of vital consequence to these industries."

The requirements of the Experiment Station are summarized in the Director's report, pp. 206-212, appended hereto, and are further discussed in the section of this report on College needs. Special emphasis is placed on the imperative need for land. Several hundred acres must be procured at once in providing for Station work of far-reaching importance.

EXTENSION SERVICE

The work of the Extension Service has grown consistently in breadth and effectiveness throughout the past biennium, as shown by the summarized report of the Director appended hereto and by more detailed reports and bulletins issued through the Extension Service. Work of this division of the College, under the several projects—county agent work, 4-H Club work, animal husbandry, dairying, horticulture, poultry, farm management, agricultural economics, etc.—involves the closest possible cooperation with the various phases of agriculture throughout the state and an intimate and intensive study of the industry as presented in the findings of the experiment stations, the extension services, and the United States Department of Agriculture.

4-H Club work.

An indication of the sound growth of 4-H Club work among the boys and girls of Oregon is the steadily mounting percentage of members completing all of their projects. In 1914 this was only two percent; in 1920, 42 percent, and in 1927, 81.4 percent. The benefits of 4-H Club work in instilling the spirit of achievement are in almost direct proportion to the percentage of completions. Seven counties in the state, as well as the city of Portland, now employ full-time club leaders. The effectiveness of such leaders is evidenced by the fact that the seven Oregon counties employing club leaders in the past five years have enrolled practically as many members as all the remaining counties combined and have actually completed more work than the other 29 counties. In the year 1926 the percentage of club members completing their club projects was 89.8 percent in counties having club leaders, as compared with only 64 percent in counties without club leaders.

The practical efficiency of 4-H Club work is illustrated by the winnings of club members, competing in open competition on the same basis as adult exhibitors, in livestock classes at the Oregon State Fair. In the two years of the past biennium, 1926 and 1927, they won 3 grand championships, 11 championships, 27 first places, 29 second places, 29 third places, 30 fourth places, and 26 fifth places.

Statewide agricultural program.

One of the most notable achievements of the past biennium was the working out, through county and commodity conferences, of the practical application of the statewide agricultural-economic program adopted in 1924. Twenty-one out of Oregon's 36 counties held local conferences and worked out a local program articulated with that of the state. Twenty of these counties published reports, each of which constitutes an authoritative program for agriculture in that particular county and district.

Concerning these conferences, together with others such as the great wheat conference at Moro and the dried prune conferences in the Willamette Valley, data for which were gathered from many sources throughout the country and the world, Director Maris states in his report:

"At least four thousand farmers and bankers, business and professional men interested in farming have taken part in the conferences listed above. While the task upon which we have made this beginning is not complete and while changing conditions will give rise to needed changes in the programs from time to time, yet it is true that our agricultural resources have been quite thoroughly surveyed from the standpoint of both production and marketing, and programs have been adopted that represent the combined judgment and experience of practical producers and professional agricultural workers.

"These programs are the most complete and adequate answer to the question 'How can we best use and develop the agricultural resources of Oregon?' They should therefore be observed and supported by every agency concerned with agricultural welfare.

"Oregon was the first state to follow the methods herein described for the development of agricultural programs. Many states, particularly in the West, have since followed a similar procedure, but no state has as yet proceeded as far on a state, county, regional, and commodity basis, as Oregon."

Agricultural Outlook Conferences.

In the field of agricultural economics notable work has been done, chiefly in cooperation with the Agricultural Experiment Station and the School of Commerce. Agricultural Outlook Conferences, starting at Eugene in March, 1927, were subsequently carried into 10 counties, with a view to considering the various factors tending to influence production

and marketing and to plan future breeding and planting operations accordingly. Special commodity reports were compiled and issued on the dairy industry, clover seed production, peppermint oil, and prunes. An example of the practical efficacy of these conferences and reports is that of peppermint, as sketched in the Director's report, the restraining effect of accurate data preventing a large overproduction of peppermint acreage when the price of peppermint oil suddenly went up to $12 a pound, though the average price for a long period of years was but $2.56 a pound.

Through the department of Agricultural Economics, the Extension Service has been compiling data for Oregon on the current market price of standard products and issuing this information monthly through a mimeographed circular, "The Agricultural Situation." This goes to all Oregon farmers enrolled as "cooperators," to the newspapers, and to a limited list of other interested people. A more immediate effort to get the gist of the agricultural situation, current market news, and other outlook information into the hands of farmers is made through the weekly "Farm Market Review," sent out through the county agents, the weekly papers, and the radio. "Through this service," writes one newspaper editor, commenting on the project, "one of our subscribers disposed of a car-load of potatoes at top prices when otherwise he would have been all at sea." "We believe this type of information to be of the utmost importance to the farmers of the state, and it is of great service to us in dealing with the agricultural problems of our bank," writes an executive officer of a great metropolitan banking institution.

For information regarding extension funds and the opportunities for enlarged service of great importance to the state, reference is made to the Director's report, pages 254-256.

NEW COLLEGE BUILDINGS

College building program delayed.

During the war period only the most urgently needed building operations could be undertaken. As a consequence, the institution was inadequately prepared even for a normal enrollment of students following the Armistice. The great increase of students following the war, however, due partly to the natural resumption of their studies by those who would ordinarily go to college, but due also to the large number of others who were encouraged to get a higher education by witnessing the leadership of educated men during the

war and by the educational bonuses provided for veterans, both by the State of Oregon and by the Federal rehabilitation agencies, put upon the College, along with other state institutions of higher learning, a burden that demanded immediate relief, if educational standards were to be maintained. This relief was promptly voted by the people of Oregon, by an overwhelming majority, in the May elections of 1920, which increased the millage tax for the state institutions of higher learning by amounts that were deemed adequate to provide maintenance and an annual margin for new buildings. Since the income thus voted by the people would not be available until 1921, and the financial difficulties of the state institutions of higher learning were being aggravated from month to month, a special provision was embodied in the law making available for 1920 funds equal to what the new millage tax would have yielded on the basis of the assessed valuation for 1919. This was provided as an emergency fund to relieve the accumulated needs of the war period.

It was estimated when these millage measures were established that a margin of income, above cost of maintenance, would be available each year for the construction of necessary buildings to keep up with the expanding service the institutions are rendering to a rapidly growing commonwealth. During the past biennium, however, as indicated in the introduction to this report, no margin from the millage income has been available for buildings. Accumulated needs of a growing institution, only partly cared for from year to year by the diminishing balances of the millage income, at last found no funds at all available from usual sources to meet even the most imperative demands. The causes of this situation are discussed under College Finances.

Buildings for teaching and research.

In this emergency, following the adjournment of the 1927 State Legislature, the College resorted to a resident tuition fee of $12 a term, or $36 a year, to supplement the non-resident tuition fee of $50 a term, or $150 a year, in order to provide funds for the buildings most urgently needed. The first of these was a Poultry Building, in which, along with the laboratories and classrooms for investigational and instructional work in poultry husbandry, laboratories have also been provided temporarily for the department of Veterinary Medicine. The building, which is located along the Agricultural Mall, is of brick and terra cotta construction, three stories high, 53 feet by 128 feet. Its cost was $106,571.45.

The second of the new buildings paid for from student fees was the Physics Building. Attached to the Mines Building, but not communicating with it, the new structure conforms in architectural design to the Mines and Engineering buildings. It is constructed of red brick with terra cotta trimmings, has three stories, and extends 169 feet north and south and 85 feet east and west. It comprises floor space aggregating 32,700 square feet and cost $148,914.92. This building provides permanent quarters for the departments of Physics and Highway Engineering and for the new College broadcasting station KOAC. The third of the new structures financed from tuition fees was the new range of Greenhouses on the northwest campus. There are five unit houses of steel and glass, with curvilinear eaves, in the range, and an attached octagonal administration unit, with basement and two stories, built of brick, that accommodates the oil-burning heating plant, the workrooms, office, storerooms, etc. The extreme length of the greenhouse group is 218 feet and the extreme width 177 feet. The glass-enclosed area comprises approximately 21,000 square feet and provides facilities for research and instruction in the School of Agriculture and experimental work of various kinds. The cost was $62,050.45. A fourth building, a Dry Kiln, required for work in research and instruction in the School of Forestry, was completed in the early fall of 1928, and cost, including equipment, $6,025.80. Thus a total of $323,-562.62 has been invested in these four important buildings all financed from student fees.

In addition to these buildings, immediately needed for teaching and research purposes, two other buildings, each financed, like the three described above, through other sources than tax income, have been built during the biennium. The Men's Dormitory, the first of the two to be completed, was financed through a bond issue to be retired over a term of years from dormitory income. This method of financing such buildings as dormitories at the state institutions of higher learning was made possible by an enabling act passed by the State Legislature at its session of 1927. The Memorial Union was financed through voluntary contributions and subscriptions made by students, alumni, faculty, and friends of the institution. Both the Men's Dormitory and the Memorial Union are described below.

The urgent need for a residence hall for men students, mention of which was made in the preceding biennial report, was met

during the past year by the construction of the new dormitory for men, completed and ready for occupancy in September, 1928, at a total cost, including furnishings, of $468,682. The new dormitory stands at the corner of Jefferson street and Cauthorn avenue, just west of Forestry, facing northeast toward the new Memorial Union and the west quadrangle and southwest toward the men's recreation fields. Irregular in shape, to permit ample light and air exposure, the building is 619 feet long and from 35 to 99 feet wide, three to five stories in height. It is essentially fire proof, built of reinforced concrete, faced with ruffled brick and trimmed with cast stone. While constituting a single structure of handsome, unified design, the new building is in reality five distinct, non-communicating residence halls separated by firewalls. Weatherford Hall, a five-story tower unit accommodating 48 men, is flanked on the left by Poling and Buxton halls, accommodating 76 and 72 men respectively, and on the right by Hawley and Cauthorn halls, accommodating 72 and 80 men, making the total capacity 348 men.

Men's Dormitory comprises five halls.

The Memorial Union Building, costing, with present equipment, $607,778, was begun in May, 1927, and completed in October, 1928. A monument erected in honor of the soldier dead of the College, it houses the various undergraduate activity groups, the alumni organization, the student publications, and the graduate manager; it provides social and recreational facilities for faculty and students. It has complete facilities for serving meals—cafeteria, tea rooms, special dining-rooms and banquet halls. In general, it serves as a center for campus life.

Memorial Union is campus community center.

This project, a student union building, first proposed by the student body, was selected as the most fitting type of memorial to the College men whose lives were sacrificed in the World War and the Spanish-American War. Not only will the beautiful rotunda, through its mural paintings and other memorials, express the institution's most sacred memories of its heroic dead; but the entire building, through its daily service to student life, becomes a highly practical monument.

Three stories and a mezzanine floor mount above the ground dimensions of 102 by 286 feet. The whole is surmounted by an ornamental terra cotta dome. The frame is of reinforced concrete and steel with outside walls of Oregon-made, red tapestry brick, trimmed with cast stone. The roof, where exposed to the

elements, is of copper, as are all flashings, gutters, downspouts, and Kalamein doors. The building is entirely fireproof, class-A construction throughout.

Executive control of the Union is vested in two boards. The Board of Governors has charge of finances and construction; it is composed of seven members—four alumni, two students, and one regent. The Board of Directors has charge of building activities; it is composed of four student members, one faculty and one alumni member, and the graduate manager.

A general manager is appointed by the Board of Governors. He is responsible for all financial affairs of the Memorial Union, for the orderly conduct of the building, and has charge of employees. The administration of the Union is responsible to the Board of Regents of the College for the proper conduct of its affairs.

COLLEGE FINANCES

The appended report of the College Treasurer contains an account in detail of the receipts and expenditures during the biennium. Separate reports are given for Resident Instruction, the Agricultural Experiment Station, and the Extension Service. It is important in considering College finances to keep in mind the fact that these divisions of the College organization are separately financed and have been from the time of their establishment.

The income from the Federal Government for Resident Instruction—that is, for the training of students on the campus—is received under the Morrill Acts of 1862 and 1890, and the supplementary act of Congress known as the Nelson Amendment of 1907. For the work of the Experiment Station, appropriations are likewise received from the Federal Government under what are known as the Hatch Act of 1887, the Adams Act of 1906, and the Purnell Act of 1925. The Purnell Act is similar to the Hatch and Adams acts, except that in the Purnell Act provision is made for home economics as well as for agricultural investigations. Federal appropriations for agriculture and home economics extension work are provided for under the Federal Smith-Lever Act of 1914 and the Capper-Ketchum Act of 1928.

Resident Instruction funds distinct from those for investigation and extension.

The State Legislature, likewise, has made separate provision for the support of each of these divisions. For Resident Instruction a law was passed by the State Legislature in 1901, providing a continuing annual appropriation for operation and maintenance.

This law was amended from time to time, increasing the amount of the appropriation as the needs of the College required. In addition, special appropriations were made at recurring sessions of the Legislature for the construction of buildings and the purchase of land and equipment. In 1913 the Legislature passed a law, effective in 1915, providing a millage tax levy for the support of Resident Instruction and repealing the continuing appropriation for that purpose. In addition to the income under this millage tax law, special appropriations for particular purposes were provided at different sessions of the State Legislature until 1920, when the second law was approved by the people, providing an additional millage levy for the general support of Resident Instruction. Under the terms of this act the income thereunder was made available for building construction and other capital investment, as well as for the expenses of operation and maintenance.

In 1911 the State Legislature made appropriations for agricultural investigations covering the different fields of horticulture, farm crops, soils, animal husbandry, dairy husbandry, and poultry husbandry. Since that time other appropriations have been made by the Legislature for certain special agricultural investigations. These funds have been provided by the State, supplementing the appropriations from the Federal Government to meet the increasing need for investigation and research in advancing the interests of agriculture. In addition, to assist in the solution of agricultural problems peculiar to different regions of the state, eight branch experiment stations have been established by the State Legislature and funds provided for their support. Three of these are supported in part by the Federal Government.

The Extension Service in agriculture and home economics is organized and financed under an act of the State Legislature passed in 1913, and various acts supplementary thereto, under which the Federal Government, the State, and the various counties cooperate in the support of this work.

In the introductory statement to the report of the Treasurer, page 257, will be found a discussion of these various acts and the purpose for which the appropriations thereunder are provided. In connection with that statement, particular attention is called to the fact that none of the appropriations for one division can be utilized in support of another. All the work of Resident Instruction, of the Experiment Station, and of the Extension Service must be paid for from funds provided respective-

Funds for one division not available for purposes of other divisions.

ly for these divisions. In cases where the time of members of the staff is divided between the work of two of these divisions, only the time devoted to each division can be paid for from the funds provided for that division.

Additional information desired regarding the financing and operating of these divisions will be found in other sections of this report and in the appended reports of the Director of the Agricultural Experiment Station and the Director of the Extension Service.

It is important, however, in this connection, that attention be called to the fact that under the provisions of the various State and Federal laws it has always been necessary to provide from the Resident Instruction funds the room required on the campus for the administrative work of the Experiment Station and the Extension Service organizations, and for the extensive laboratory work of the different divisions of the Experiment Station.

Resident instruction funds must provide room for station and extension work.

In considering College finances, also, it should be noted that the extent of the work of the Experiment Station and of the Extension Service is dependent upon the amount of available funds. In a state as large as Oregon, with such diversity of climate and other conditions, the demand for assistance in the solution of agricultural problems and in the application of scientific principles and business methods in agricultural practice is so great that available funds from all sources are never such as to make it possible to respond to all these demands. In other words, the work of these divisions is measured by the funds available for their support. But with the funds provided, each of these divisions is rendering the best possible service, having in mind the improvement of economic conditions and the advancement generally of the interests of the state.

The financial problems involved in the administration of Resident Instruction funds, however, are vastly more complicated. While Experiment Station and Extension Service funds are provided for specific purposes and no part of them may be used for any other purpose, it is necessary, in the case of Resident Instruction, to meet all other financial needs of the institution, including both instruction of students in the various curricula of the College and provision of facilities not only for instruction but also, as already pointed out, for Experiment Station and Extension Service. The accommodations which must be provided

Financial problems of resident instruction are complicated.

may include any one or all of such facilities as lands, buildings, laboratories, and office space. Briefly, therefore, Resident Instruction funds must meet all the various needs of the institution excepting the concrete projects in research and extension for which special funds are provided by the Federal Government or the State. As the research and extension programs of these two divisions are expanded, increased demands are made upon the Resident Instruction income for necessary accommodations. With increase in student enrollment, moreover, which is inevitable in a rapidly developing state like Oregon, together with increased instructional costs due to needs for more advanced and hence more expensive types of instruction, constantly increasing burdens are placed upon Resident Instruction. In other words, as the state expands in population, industries, and activities, moving toward a more complex organization, the demands on the College, for instruction and service, correspondingly increase.

Permanent support necessary for efficiency.

The income of any state-supported college or university, especially an institution of applied science, maintaining a program adapted to both present and future needs, ought therefore to combine the elements of permanence and flexibility. Unless such an institution can be administered on a constructive business basis, impairment of the efficiency of its work must result. The great industries for which America has been distinguished have owed much of their success to long-time plans and carefully determined budgets. Such an industrial enterprise outlines its policy for a period of years and makes up a budget providing for all the different projects according to the nature of the business and the character and extent of its operations. An educational institution on its financial side should be regarded as a great business enterprise, and everything about it should be as strictly managed in accordance with modern business principles as is the great industrial or commercial plant. But this is impossible in a college or university that is chiefly dependent on periodical appropriations for support, especially if such appropriations are made to extend over merely a two-year period. It is important that permanent funds be provided, since it is necessary to know at least approximately for some time in advance what the income will be in order that definite plans may be made for the future, thereby insuring the highest standard of efficiency in the work as well as the most advantageous and economical development of the plant.

Such funds, granted on a fairly permanent basis, are now provided by statute in twenty-one states. In some of these states the provision is by an assigned special tax, but in seventeen states, maintaining a total of twenty-three institutions of higher learning, the law provides for a millage tax on the property of the state. In some states the millage tax funds are for maintenance only, special appropriations being made for buildings and other improvements. In four states a millage tax has been provided especially for building purposes. In most cases the millage is applied toward general support, including building construction as well as operation and maintenance.

Millage tax support prevails in many states.

The advantages and disadvantages of the millage tax plan were discussed at length in the Biennial Report of the College for 1910-1912. Briefly, some of the advantages are: (1) A millage tax income places the institutions of higher learning on a more stable and business-like basis, with an assured income that should increase with the growth of the state. (2) Boards of regents and institutional executives are free to devote their time and energy to the constructive projects of their institutions, rather than to campaigning for funds. (3) It relieves the state of the embarrassing and expensive contentions that usually arise at recurring sessions of the Legislature over competing appropriations for the different institutions, with attendant controversies regarding the respective value of these institutions. And finally, (4) it enables the governing boards and executives to know in advance from year to year approximately what their income will be, and then to plan their expenditures wisely and systematically. This is one of the most fundamental and far-reaching advantages of the millage tax. Sustained progress in campus development, curricula building, faculty permanence, service to the state, and all other essential elements of success in the conduct of a state institution of higher learning are more definitely and securely fostered by this method of support than by any other.

Advantages and disadvantages of millage tax.

The principal disadvantage, particularly in a rapidly developing state with increasing population, where policies of evaluating state property for taxation are not yet scientifically determined, is that the increase in millage tax income may not run parallel with the increase in property values or in institutional requirements.

When the millage tax plan was adopted in Oregon, it was assumed that the growth of the College would correspond, within reasonable limits, to the growth of the state, and that as the state developed there would be proportionate increase in tax valuation of state property, and a corresponding increase in the millage tax income. Unfortunately, however, the assessed value of Oregon property has not run parallel with the increase in Oregon wealth or with the development of the College.

Assessed valuation has not run parallel with wealth in Oregon.

The extent to which this is true was discussed at length in the last biennial report. Bringing certain information up to date, however, attention may be called to the fact that while the wealth of Oregon increased 112.6 percent between 1912 and 1928* the assessed valuation increased only 24 percent. The increase in student enrollment at the College was 217.6 percent, or more than nine times the increase in assessed valuation, and, therefore, in the millage income. Conditions have been more nearly normal since the passage of the second millage law. But even during this period, the increase in property value of the state has been nearly three times the increase in assessed value, and the increase in student enrollment has been 51 percent greater than the increase in millage income.

Enrollment increase is nine times greater than millage increase.

As noted above in the discussion of College Buildings (page 46) the emergency appropriation included in the second millage measure as voted by the people in 1920 was used in large part for buildings most immediately and seriously needed. The normal income from the second millage measure became available for the first time in 1921. Following its usual policy of rigid economy in operation and maintenance, the College, in the face of excessively high costs and unprecedented increases in enrollment, made the most of the situation and endeavored to save each year a margin for the development of the College plant. Entirely dependent upon the millage income for building construction, except for the amounts derived from non-resident tuition, the Board of Regents made plans for caring for the needs of the institution in the order of their urgency, as funds could be anticipated for this purpose.

Millage tax only source of state funds for building.

Thus between 1921 and 1927 a total of $616,913 was made available through annual margins saved from the millage income for College buildings, an average of less than $100,000 a year.

*Based on reports furnished by the United States Bureau of Foreign and Domestic Commerce.

To this amount was added during the seven years $132,055 derived from non-resident tuition fees, making a total for the entire period of $742,551.

Notwithstanding the economy exercised—the utmost consistent with efficiency—the unavoidable increase in the cost of maintenance, due to increase in student enrollment and other normal demands upon the institution, gradually reduced each year the margin of millage income available for building construction. Yet with each year's increase in student enrollment and in obligations for service devolving upon the institution, there has been corresponding increase in the need for additional room. In other words, while the sums that could be saved from the millage income for building purposes were gradually diminishing, the needs for room were steadily increasing. In the last biennial report it was estimated that for the year 1927 the amount available for building construction would not exceed $32,000. But this estimate, as noted in the report, made no allowance in the operating budget for emergencies. As a matter of fact the entire millage income was required in meeting the necessary expenses of maintenance, with no margin available for buildings. The millage tax income for the College for the year 1929, moreover, will be less by $2,262.93 than for 1928. It is obvious, therefore, that under these conditions it has been impossible to provide additional room as required.

Margins available for building construction diminish. None in 1927.

The College is consequently much below the average among the land-grant colleges in the amount of capital investment possible during recent years. For the five-year period 1922-1927 the average increase in valuation of institutional plant for the sixty-nine land-grant colleges and universities, even including those for colored students, was 48.5 percent,* while the increase in valuation of the College plant for this period was 36.9 percent.

It was this situation which forced the Board of Regents, as anticipated in the biennial report of 1924-1926,† to establish, beginning in September 1927, a resident tuition fee, the proceeds of which, along with the income from non-resident tuition fees, should be available for meeting the most pressing needs of the institution for buildings. From the funds thus made available, as discussed under New Buildings, a number of the most urgently needed College buildings have been provided.

Resident tuition helps provide buildings most urgently needed.

*U. S. Bureau of Education Bulletin, 1928, No. 14, p. 9.
†Page XXXVI.

Another factor that should be taken into account in considering the cost of instruction at the College is the fact that the technical work distinctive of land-grant colleges is the most expensive kind of educational work. In addition to the regular instructional staff, lecture halls, laboratories, and library facilities required in the general subjects comprising the work of a non-technical institution, it is necessary in the case of technical courses to provide special buildings, extended and expensive equipment, large tracts of land, and a much larger instructional staff. Laboratories, shops, barns, orchards, greenhouses, gardens, farms, livestock, and many other features not found or required in general education work are essential in a technical institution. Even the pure sciences taught in many institutions not offering technical courses require laboratory and other equipment much less elaborate and expensive than are required for work in applied science. In time of staff members, moreover, the work of a technical institution makes special demands. For example, out of 29 members on the staff of the School of Agriculture the equivalent of eight full-time members is required for supervision of the College barns, farms, orchards, livestock, caring for special correspondence, and meeting appointments throughout the state. All this service, unavoidable in a land-grant college, is in addition to the work of instruction and not officially comprised within the Experiment Station or Extension Service organizations. Technical education, in short, costs much more than general education not only for capital investment but also for operation and maintenance.

Land-Grant college work most expensive.

The National Council on Education, for instance, reports that "agriculture is the most expensive curriculum," with engineering and other technical divisions following in order. Similarly, the Society for the Promotion of Engineering Education in its report for November, 1926, giving data on comparative costs per student in engineering and non-engineering courses, lists ten representative institutions in which the average cost per student is as follows:

Agriculture	$423
Engineering	380
Architecture	357
Chemistry	322
Liberal Arts	237

On account of varying conditions affecting student costs in the several institutions, comparisons based on averages, while a

fair indication of relative costs of different curricula, are nevertheless not so convincing as are comparisons of curricula costs within a single institution in which the administrative and other general costs are the same. Such studies as those made at the state universities of Minnesota and Illinois, land-grant institutions comprising both technical and general curricula, reveal even more strikingly the comparative costs of technical and non-technical work. The University of Minnesota* in its report on the cost per student in the different major curricula of that institution, making allowance for proportional cost of general overhead, gives the following comparative costs per student:

Agriculture	$590.58
Mines	504.00
Engineering	464.88
Pharmacy	421.60
Science, Literature and Arts	219.75
Business Administration	166.05

From the President's report of the State University of Illinois for 1925 the following comparative costs per student are quoted:

Agriculture	$472.36
Engineering	439.89
Liberal Arts and Sciences	199.37
Commerce	170.02
Education	254.15

Despite the preponderance of technical curricula at Oregon State Agricultural College, however, student costs at the College are much less than the average in the state-supported colleges and universities of the United States. Taking five representative land-grant colleges, for example, the following are computed from statistics published by the United States Bureau of Education† as the respective student costs for regular undergraduate and graduate students, including Federal and State funds: Purdue University (Indiana), $359; Iowa State College, $398; Kansas State Agricultural College, $377; the State College of Washington, $473; Oregon State Agricultural College, $335. Student costs at the College have been computed, as indicated, on the basis of regular students only, not taking into account summer session enrollment and enrollment for the various short courses, nor is allowance made for the cost of maintaining the building space used by the Experiment Station and the Extension Service.

*University of Minnesota Bulletin No. 7, Report of Survey Commission V.
†U. S. Bureau of Education Bulletin, 1928, No. 14.

Increase in student enrollment, therefore, while involving an increasing drain upon the resources of any educational institution, places especially heavy burdens upon the income of a land-grant college, with its technical curricula. But increased enrollment is not the only source of legitimate demand upon the income of the College. Since the passage of the millage measure in 1920 a vast amount of work has been added to the service program of the College, with consequent demands upon resident instruction funds for lands and buildings, laboratories and office space. While some of the work has been developed voluntarily in response to urgent requests of large numbers of citizens, through organizations or otherwise, the greater part of it has come about through projects established by state or national legislation. This legislation has been initiated, as a rule, through organized effort seeking to protect the industries of the state against the ravages of disease, insect pests or other evils which can only be combated by organized scientific effort. Some of these projects have been established at the College through the expansion of the work of the United States Department of Agriculture, in response to the needs of Oregon, and have entailed upon the College the usual obligation to provide accommodations for the work.

Expansion of service program makes heavy demands on resident instruction funds.

All of these various enterprises, whether of investigation or extension, are directed to satisfy serious needs of the state in the protection of established industries or the development of new ones, and the obligation of the College to care for them is inescapable. Space in College buildings devoted to the work of the Experiment Station and the Extension Service, inadequately cared for as they are at present, involves more than 50,000 square feet of room, or approximately 700,000 cubic feet, requiring heat and electric current, in addition to repairs, janitorial services and the like. All this involves additional financial burdens upon the millage income in the same way as does increase in student enrollment.

Though inadequately housed, Station and Extension occupy 50,000 square feet of room.

COLLEGE NEEDS

In the appended reports of the deans, directors, the librarian and other officers will be found information in detail regarding the needs of the College for land, buildings, and other facilities necessary for carrying on the work of the institution. Funds for buildings have never been adequate, the requirements of the institution having always been

College plans adapted to conditions.

greater than could be met by funds available. It has been the policy of the College, however, to adapt its plans to conditions in the state in such way as to make the most of the situation.

To this end, in providing necessary room for its work, the College has adopted a plain but substantial type of building, thus obtaining the most room for the least expenditure of money. The unit plan of construction, utilizing available funds for erecting one or more sections of a building that when completed would prove adequate to its purpose, has been adopted in the case of several of the more important buildings. Agriculture Hall, for example, was built in units over a period of six years. Thus most of the College buildings are good, enduring structures, representing excellent value for the money, but neither elaborate nor fire-proof. Conditions are such, however, that in the interest of safety as well as efficiency, certain buildings now needed must be of class-A construction.

Plain buildings, unit construction used to obtain most room for least money.

As indicated in the biennial report two years ago, there is urgent need for more land for experimental purposes. Since then, the need for land has grown more acute. After a careful study of the needs, the Director of the Agricultural Experiment Station and the Dean of the School of Agriculture, having made a thorough investigation, recommended the adoption of a program whereby 873 acres of land would be either rented or purchased, to be used for instructional and experimental work in farm crops, horticulture, and soils. The Director of the Experiment Station in his report, pages 206 and 207, explains more fully the program recommended.

Land needed.

Since only about 100 acres of land owned by the College is available for Agricultural Experiment Station work, and since owners of rented land have refused to renew rental agreements, the need for land for experimental plantings has become imperative. Then, too, in order to hold the present Federal cooperation in forage crop investigations, more field land is necessary. With the thought of meeting the more pressing needs for the coming year, a careful survey was made of available land and a second report submitted, covering 363½ acres of land near Corvallis, consisting for the most part of Willamette silt loam, the type of soil most urgently needed. The cost of the land covered in this second report is $61,800. Purchase of this tract would provide some of the land most immediately needed. It would not adequately

meet all requirements, even for the present. Additional tracts should be purchased as promptly as money can be made available. The actual needs, as indicated above, include a total of 873 acres.

Lessened millage income makes drain on student tuition fund.

The only source of income available to the institution for land and other capital investment since 1920, except student tuition fees, has been the balances left in the millage fund after the costs of maintenance have been met. As already noted, in order that balances might be available, every effort has been made to keep operating expenses as low as possible. Since 1927, however, no margin could be saved from millage funds, and building construction has accordingly depended solely on income from tuition fees. The millage income for 1929 being actually less by $2,262.93 than in 1928, it follows that some portion of student tuition fees must be used for maintenance, leaving less available for buildings.

Building needs met by student tuition income.

As already indicated, student tuition for both resident and non-resident students was placed in a fund to be used during the years 1927-28 and 1928-29 exclusively for building construction. These fees are estimated for the two years at $333,442. Among the buildings described in the last biennial report as those most immediately needed, the following have been constructed during the biennium out of student tuition fees: the Physics Building, Greenhouses, and the Poultry Building (caring temporarily for Veterinary Science also) at a total cost of $317,536.82. In addition, a Dry Kiln for experimental work in lumber manufacturing, constructed at a cost, including equipment, of $6,025.80, makes the grand total for building construction out of student tuition fees $323,562.62.

Urgent building needs still unprovided for.

The buildings listed in the report of 1924-1926 as among the most immediate institutional needs, but that are still unprovided for, are the laboratory addition to the Chemistry building, a recitation building, a Dairy and Animal Husbandry building, a Farm Crops Laboratory and Seed Storage building, an Agricultural Engineering building, and a student infirmary. At the time that report was prepared, it was contemplated that in the proposed addition to the Chemistry building provision would be made for the department of Chemical Engineering. The growth in the work of that department, however, has necessitated a revision of the plans,

locating Chemical Engineering or industrial chemistry in a building by itself, adjoining the Mines Building on the west, corresponding with the Physics Building on the east.

Considering building needs in the order of importance to the student body, the building that should come first would be the student infirmary, but on account of the urgent need for more room both for instructional and Experiment Station work, it would seem necessary that precedence in order of construction be given to other buildings. As emphasized elsewhere in this report, additional room must be provided at once for the Experiment Station. It has become necessary, moreover, after long delays, that many rooms belonging to the technical schools, but in use temporarily by general departments, be vacated for use of the technical divisions to which they belong, thereby relieving serious congestion in several of the schools.

Additional room must be provided for Experiment Station.

The School of Forestry, for instance, is in urgent need of additional room; and properly to care for the work of this school, such additional room must be provided without delay. In order to obtain this space, it will be necessary to make provision elsewhere for the School of Vocational Education, a large part of the work of which is now housed in the Forestry Building.

Further needs for room that cannot possibly be met under conditions now obtaining on the campus are illustrated in the School of Basic Arts and Sciences, where most of the service departments are assembled. No special building is provided for the accommodation of these departments, which serve the needs of all the technical schools by providing instruction in the sciences and arts fundamental to all degree curricula offered at the College. It has always been necessary, therefore, for these departments to use whatever rooms might be made available, even temporarily, in Agriculture Hall, the engineering buildings, Forestry, Commerce, the Library, and Home Economics. Classes in English, for instance, meet in seven different buildings. Fourteen different instructors in service departments hold classes in the Home Economics building, which is already crowded with the necessary activities of the School of Home Economics itself.

The Service departments need permanent quarters.

Conditions as reported by Dean Smith in his report, page 80, although somewhat better than in immediately preceding years, because of relief afforded by the new Physics Building, are still urgently in need of improvement. Rooms now used by

service departments in different buildings of the technical schools, but needed by these schools for their own use, must soon be relinquished. This involves providing new classrooms elsewhere for the service departments. In addition, it is imperative that certain work in science, chemistry in particular, be provided with suitable modern laboratories as well as with lecture and classrooms, storerooms and offices.

Rooms used for instruction and administration should be restored to Library.

The College Library, as noted in the report of that department, has insistent need for rooms in the Library Building originally designed for seminar and research purposes but necessarily occupied, for lack of other accommodations, as offices and conference rooms by the Dean of Women, and the Dean of the School of Basic Arts and Sciences, and as offices and classrooms for certain sections of the English department. These rooms should be turned over at once to the Library to serve the needs for which they were originally planned and are now so seriously needed; but there is no other suitable space to which may be transferred the important administrative and class work they now accommodate. The Library, among other immediate needs, must be provided with additional steel stacks and afforded certain changes in the building to adapt it to present demands, which are much heavier than ever before.

Home Economics must find room for development.

The School of Home Economics, in developing its work to meet the demands for scientific instruction and research in nutrition, institution management, child care, textiles, and other similar fields, has reached the limits of its present facilities, and the Dean of the School is recommending the completion of the third unit of the Home Economics Building and the provision of additional accommodations for the nursery school and home management courses. Laboratory and classroom space is needed especially for nutrition, including animal feeding experiments, for textiles, institution management, and child care.

Engineering and Agriculture have imperative need for new room.

In Engineering, as stated in the report of the Dean of the School of Engineering, the most important needs are for modernizing the forge and machine shops and for rebuilding the wood shop, with provision for new drafting rooms, and a research laboratory. In Agriculture the needs are explained briefly in the reports of the Dean of the School of Agriculture and the directors of the Experiment Station and the Extension Service.

The most significant and immediate needs are for a new Dairy-Animal Husbandry building to house all divisions of the work of the departments of Animal Husbandry and Dairy Husbandry, including dairy manufactures; more adequate office and laboratory accommodations for the work of the Experiment Station and Extension Service; a modern Agricultural Engineering building, suitably located for practical laboratory and field work; and a Seed Laboratory and Storage building. Present quarters for the dairy manufactures work in the Dairy Building are both inadequate and unsuitably located for most effective service to the dairy industry. The Dairy Building, however, located as it is in the center of the campus, could be remodeled and enlarged for use of the School of Vocational Education, thus solving the housing difficulties of this school and affording temporary accommodations also for certain of the service courses now going begging for room about the campus. The construction of a new Dairy-Animal Husbandry building, moreover, would enable the School of Agriculture to release a number of rooms in Agriculture Hall for use of the Experiment Station, which needs at least a fifty percent increase in the amount of room it now occupies.

Chemistry and Chemical Engineering need new fire-proof buildings.

One of the most imperative needs of the entire institution is for fire-proof accommodations for the different types of work in chemistry—a new wing to Science Hall for use of General Chemistry and Agricultural Chemistry, and a separate building, adjoining Mines, for Chemical Engineering. The latter, a degree-granting division of the College, though comparatively new, enlists the interest of some of the most alert and aggressive students. In its function of helping to develop the industries of the state and the Northwest, it is one of the most important departments of the institution. It is housed in the attic of Science Hall, one of the oldest and most congested buildings on the campus, but the only one now available for this particular type of work. The space occupied by Chemical Engineering is not only inadequate but involves a serious fire hazard. In spite of every precaution, two expensive fires have occurred in the building during recent years. The only wise course to pursue in caring for this work is to provide a modern fire-proof building, as soon as funds can be made available. In constructive service to the industries of the state the department would pay substantial dividends on such an investment.

All these enumerated needs, as well as others not mentioned, are vital to the continued progress of the institution and its ser-

vice to the state. Under present financial conditions, however, since the millage income, as already indicated, not only has been entirely consumed for maintenance of the institution during the past biennium, but will be actually less in 1929 than in 1928, it follows that these needs, many of them already long deferred, must be cared for, to whatever extent possible, out of the income from student tuition fees.

Respectfully submitted,

W. J. KERR,
President of the College

December 15, 1928.

Appended Reports

REPORT OF THE SCHOOL OF AGRICULTURE

To the President of the College:

Sir: I have the honor to submit the report of the School of Agriculture for the biennium ending June 30, 1928.

Organization. The School of Agriculture includes the following eleven departments: Agricultural Education, Agricultural Engineering, Animal Husbandry, Dairy Husbandry, Extension Methods, Farm Crops, Farm Management, Horticulture, Poultry Husbandry, Soils, and Veterinary Medicine.

The department of Agricultural Education is administered jointly by the Deans of the School of Agriculture and the School of Vocational Education. The instructional work in Agricultural Economics, so important in modern agricultural education, is given in the department of Economics and Sociology in the School of Commerce, while that in the physical and biological sciences in their relation to agriculture is given in the departments of Bacteriology, Botany and Plant Pathology, Entomology, Chemistry, Physics, and Zoology in the School of Basic Arts and Sciences.

Each department is responsible for the resident instruction, experiment station, and extension work within its special field. Only the resident instruction work, however, will be discussed in this report, experiment station and extension activities being covered in the respective reports of the directors of the Agricultural Experiment Station and the Extension Service.

The staff. The staff in Agriculture, exclusive of clerical assistance, comprises 64 persons classified as follows: deans, 1; professors, 19; associate professors, 4; assistant professors, 8; instructors, 6; departmental extension specialists, 6½; departmental experiment station specialists, 8½; seed analysts, 1; fellows, 10.

Of these, one gives full time to administration, fifteen give full time to extension or experiment station duties, and one to the seed laboratory. Approximately one-sixth of the time of the remaining 27 members of the staff is devoted to experiment station work and one-seventh to miscellaneous administrative duties. Since 10 of the remaining members are half-time fellows, there is available for instructional duties in the School of Agriculture an equivalent of the full time of 27 persons, of whom one was absent on sabbatical leave during 1926-27 and one during 1927-28.

Changes in staff.

Resignations:

Ruth, Charles Curtis, M.S., Associate Professor of Farm Crops, October, 1926.

Mitchell, George Evans, B.S., Instructor in Farm Crops, February, 1927.

Stover, Raymond Luther, M.S., Teaching Fellow in Dairy Husbandry, June, 1927.

Jarvis, John Francis, M.S., Teaching Fellow in Dairy Manufacturing, June, 1927.

Russell, Clive Ernest, M.S., Research Fellow in Horticulture, June, 1927.

Larson, Harold William Emanuel, M.S., Research Fellow in Soils, January, 1928.

Smith, David Clyde, M.S., Teaching Fellow in Farm Crops, June, 1928.

Bell, James Carscallen, M.S., Instructor in Horticulture, June, 1928.

Ryall, Albert Lloyd, M.S., Teaching Fellow in Horticulture, June, 1928.

Appointments:

Perry, Russell Lawrence, B.S., Instructor in Agricultural Engineering, September, 1926.

Smith, David Clyde, B.S., Teaching Fellow in Farm Crops, September, 1926.

Ryall, Albert Lloyd, B.S., Teaching Fellow in Horticulture, September, 1926.

Larson, Harold William Emanuel, B.S., Research Fellow in Soils, September, 1926.

Phaanum, J. Warnick, B.S., Teaching Fellow in Horticulture, June, 1927.

Wertman, Albert Parken, B.S., Teaching Fellow in Dairy Husbandry, August, 1927.

Miller, Ross Herbert, B.S., Teaching Fellow in Animal Husbandry, September, 1927.

Kuhlman, Gustav Weston, M.S., Assistant Professor of Farm Management, September, 1927.

Greene, Erline, B.S., Instructor in Landscape Architecture, September, 1927.

Oveson, Merrill Mahonri, B.S., Teaching Fellow in Soils, September, 1927.

Steele, John Henderson, B.S., Teaching Fellow in Dairy Husbandry, October, 1927.

Tieh, Tim Min, B.S., Research Fellow in Soils, 1927.

Lutz, Jacob M., B.S., Teaching Fellow in Horticulture, June, 1928.

Promotions:

Donham, Charles Rumpel, D.V.M., Instructor in Veterinary Medicine to Assistant Professor of Veterinary Medicine, July, 1926.

Chappell, Vincent, M.S., Associate Professor of Dairy Manufacturing to Professor of Dairy Manufacturing, July, 1927.

Hartman, Henry, M.S., Associate Professor of Pomology to Professor of Pomology, July, 1927.

Schuster, Carl Ephraim, M.S., Associate Professor of Pomology to Professor of Pomology, July, 1927.

Shaw, James Niven, D.V.M., Instructor in Veterinary Medicine to Assistant Professor of Veterinary Medicine, July, 1927.

Leaves of Absence:

Powers, Wilbur Louis, M.S., Professor of Soils, during 1926-27.

Oliver, Alfred Weaver, B.S., Assistant Professor of Animal Husbandry, during 1927-28.

Service to the state by staff members. Under the head of Miscellaneous Administrative Duties, mentioned above, may be grouped many kinds of extra-curricular duties, including management of the college farms with their herds and flocks of more than 500 pure-bred animals, representing 6 breeds of cattle, 4 breeds of horses, 4 breeds of sheep, 3 breeds of hogs, and 1 breed of goats, operation of the college creamery, horticultural products plant, the college greenhouses, and many kinds of service which are performed by the Agriculture faculty for citizens of the state and which are necessarily charged to Resident Instruction because of the lack of a special fund with which to meet the cost of this type of work.

The head of the department of Agricultural Engineering, for instance, participated in the program of the convention of the American Society of Agricultural Engineers; addressed the Oregon Retail Hardware and Implement Dealers Association; assisted the Western Lumbermen's Association in the publication of a farm book of plans which will aid in selling northwest products; assisted in editing three booklets written to show the use of west coast lumber in the erection of farm buildings, which will have a national distribution; under auspices of West Coast Lumber Trade Extension Bureau traveled through the central western states in the interest of sales of west coast lumber, addressed a number of groups of implement dealers and farmers at various retail houses in Oregon; and, assisted by staff members from other departments, conducted a one-week short course for some fifty public utility men.

To the Animal Husbandry staff must be credited numerous conferences and cousultations with farmers who visited the College in search of information. In fact, the work of the head of the department is becoming more and more that of a consultant on livestock matters. This form of activity is growing from year to year, not only in time required but in opportunity to render worth while service. The department conducted à heavy correspondence, judged at various livestock shows, prepared numerous press articles, radio talks, etc.

The head of the department also prepared manuscripts for two bulletins, "Wintering Stock Steers" and "Influence on the Method of Wintering on the Cost, Weight and Quality of Finished Steers;" represented the livestock industry at the Columbia Basin wheat conference at Moro; represented the Oregon Wool Growers' Association at two hearings be-

fore the Secretary of Agriculture on the question of fees for grazing in the national forests; prepared a major article on "Travels in the Sheep Country" for the National Wool Growers, an article on "Range Land Values and Stockmen's Budgets" for the National Wool Growers, article on "Range Land Values" for the Journal of Land Economics; traveled 8,000 miles through ten western states studying range and livestock conditions; and assisted the Oregon Cattle and Horse Raisers' Association in the perfection of a marketing plan and in the employment of a marketing agent.

Another member of the staff prepared the manuscript for a bulletin on "The Cost of Raising Sheep on the Farms of the Willamette Valley" and inspected the work of the Range Experiment Station of the United States Department of Agriculture at Dubois, Idaho. A third member of the staff prepared the manuscript for a bulletin on "Feed and Care of Brood Sows and Growing Pigs," and supervised the ton litter contest for the Oregon State Fair Board, while a fourth member transacted the business of the Oregon Stallion Registration Board, and made one 500-mile trip to Eastern Oregon on behalf of that Board.

The Animal Husbandry staff attended numerous miscellaneous meetings and conferences outside of Corvallis and judged livestock at several fairs.

The staff of the Dairy department has performed similar services in the field of dairying. The head of the department served as Secretary-Treasurer of the Oregon Dairymen's Association and as President of the Oregon Creamery Operators' Association. He also judged dairy cattle at a major fair or exhibit in California, Oregon, Washington, and in British Columbia. The Professor of Dairy Manufacturing served as Secretary-Treasurer of the Oregon Buttermakers' Association and of the North Pacific Cooperators' Creamery. He also managed the Dairy Products Show at the Pacific International Livestock Exposition. A third member of the staff is supervisor of advanced register testing for Oregon. A member of the staff accompanied the dairy judging team which competed in the student contest in judging dairy cattle and dairy products at the National Dairy Show in Detroit in 1926, and at Nashville, Tennessee in 1927. Nation-wide recognition was obtained as a result of the work of these student dairy judging teams. By state law the department is charged with the responsibility of testing and certifying to the accuracy of more than 10,000 pieces of testing glassware used by the creameries of the state each year.

No member of the staff is more fully occupied with miscellaneous service to the farmers of the state than is the head of the department of Farm Crops. In addition to a very heavy correspondence and numerous conferences and consultations with farmers and extension workers, preparation of numerous press articles, radio addresses, etc., he judged all farm crops at the State Fair, at the Pacific International Show, and at various county and local fairs. He is also Secretary of the State Highway Planting Committee. He served as a member of the committees making economic surveys of the Ochoco and Tule Lake projects. He attended the National Wheat Marketing Conference at Chicago, at the request of the U. S. Bureau of Agricultural Economics. He made

numerous addresses in many sections of the state. Other members of the staff assisted in preparing for and conducting the first hay grading school given in an agricultural college in the United States. A second hay grading school at Corvallis and Portland was put on jointly by Oregon State Agricultural College and the U. S. Bureau of Agricultural Economics. The staff also trained the student judging team that won the student crop judging contest at the Pacific International Livestock Exposition in 1926, and also judged the crop exhibits at a number of fairs and corn shows.

The head of the department of Farm Management prepared for publication a manuscript on a four-year study of "Cost and Efficiency in the Production of Prunes." As Secretary of the Committee on Prune Marketing Organization, he assembled material and prepared the report published under that head. As project leader he conducted a "Poultry Cost and Farm Organization Study" and prepared "Progress Report No. 1" on this work. Under his general supervision a year's work on four other investigational projects was completed: "Forage Cost Project," "Strawberry Cost Project," "Apple Price Study," and "Pear Cost and Farm Organization Study." He prepared the survey forms for the "Goat Cost Study," participated in the Agricultural Outlook conference, and prepared reorganization plans for several farms. In his capacity as adviser to the State Land Settlement Committee, he prepared lease and sales contracts and obtained and established operators on the State Land Settlement Commission farms at Roseburg and Prineville, bringing these projects a step nearer completion.

During the year 1927-28 the members of the staff of the department of Horticulture gave 22 radio talks, prepared more than 100 press articles, and delivered 40 addresses before horticulturists and other interested groups. The head of the department, acting as Secretary, wrote the report of one county economic conference, prepared the manuscript for a bulletin, "The Cranberry in Oregon," prepared an article on "The Horticultural Industry," prepared an article on "The Cranberry Industry of Oregon" for the American Fruit Grower Magazine, and another on "What the Experiment Stations mean to Oregon Horticulture" for The Oregon Countryman and The Alumnus, attended a joint meeting of Northwestern Horticulturists, Entomologists, and Plant Pathologists and the American Pomological Society, and managed the Western Oregon itinerary of the American Pomological Society trip.

Another member served as Secretary of the Western Walnut Growers' Association, presented two papers before the annual meeting of the Northwest Horticulturists, Entomologists and Plant Pathologists, presented a paper at the annual meeting of the Western Nut Growers' Association, gave two talks at the annual meeting of the Oregon State Horticultural Society and submitted a paper entitled "Sterility in the Filbert" to the International Conference on Sterility, held in New York City during the summer of 1926. He also contributed popular articles to the American Fruit Grower, Fruits and Garden, Better Fruit, Salem Statesman, Pacific Homestead, Oregon Countryman, Canners' Journal, and Oregon Farmer.

A third member of the staff judged the juvenile garden exhibit at the State Fair, prepared and distributed a number of mimeographed arti-

cles, submitted articles to the Market Growers' Journal, American Produce Grower, Oregon Farmer, Pacific Homestead, Oregonian and Oregon Countryman, delivered a lecture to boys' and girls' club workers in annual session at Corvallis, read a paper before the State Horticultural Society at its annual meeting, and gave six addresses before the Canners' School. He attended growers' meetings at Rainier, Toledo, Troutdale, The Dalles, and Sutherlin. He attended the Yamhill County Economic Conference and drew up the report on vegetables. Another staff member prepared the manuscript for two experiment station circulars: "Studies Relating to Harvesting Italian Prunes for Canning and Fresh Fruit Shipment" and "A Preliminary Report on the Hydrochloric Acid Dipping Process and its Effect on Fruits," and was coauthor of the station bulletin entitled "A Progress Report on the Removal of Spray Residue from Apples and Pears." The following articles were also contributed to publications: "Time of Picking Affects the Canning Quality of Prunes," The Canner; "Recent Experiments on the Harvesting of Prunes," Better Fruits, August 1927; "Removal of Spray Residue from Apples and Pears," coauthor, Better Fruits, January 1927; "Harvesting Bosc Pears in the Rogue River Valley," Proceedings Oregon State Horticultural Society, 1927. Addresses were given on "Harvesting Prunes" before the Traffic Association meeting at Milton-Freewater and at Walla Walla, July 1926; on "The Apple Industry" and "The Removal of Spray Residue," Corvallis Chamber of Commerce; on "Removal of Spray Residue" before conferences at Portland, Wenatchee, Hood River, Medford, Salt Lake City, Walla Walla, Yakima, and canners' short course in Corvallis; on "Harvesting Small Fruits" before Oregon State Horticultural Society meeting at Salem; on "Harvesting Cherries and Prunes" before meeting of the Northwest Canners' Association at Portland and before the Yakima District Horticultural Association meeting; on "Storage of Apples and Pears" before a meeting of Benton county horticulturists.

Another member of the staff of the Horticulture department prepared 20 articles which were mimeographed and sent to the commercial canners of the Northwest, and 2 articles which were sent to some 3,600 prune growers; wrote 8 articles for trade magazines on the general subject of commercial canning; participated in the program of the Northwest Canners' Association and served as chairman of its Technical Section; addressed fruit growers at Walla Walla on the subject of canning; made 20 trips to different parts of the state on prune standardization work and many other trips to aid orchardists with their fruit drier problems. Another member of the staff prepared 6 articles on commercial canning and related subjects for trade magazines and participated in the program of the Annual Bottlers' Convention. Another member of the department staff discussed landscaping plans with groups of citizens at Tillamook, Medford, Astoria, and Lebanon, and assisted in laying out the school grounds at Marshfield; served as a member of the Landscape Advisory Committee of the State Highway Commission; gave three addresses before the Little Garden Club of Portland.

The head of the department of Poultry Husbandry is a member of the American Council of the International Association of Instructors and Investigators in Poultry Husbandry, was awarded a plaque for ser-

vice in connection with the World's Poultry Congress at Ottawa, Canada, judged the poultry show in connection with the county fair at Maui, T. H.; addressed the agricultural students at the University of Hawaii; served as director of the National Poultry and Egg Association and as director of the National Poultry Science Association. Also served as secretary-treasurer of the Oregon Accredited Hatchery and Breeders' Cooperative, and as secretary of the Oregon Poultrymen's Annual Convention for the summers of 1927 and 1928, and carried a large amount of correspondence and consultation work.

The staff of the department of Soils, in addition to work done in connection with soil and economic surveys of the Warm Springs Project, the Ochoco Project, the Grants Pass Project, Grande Ronde Valley Drainage Survey, Coos Drainage District, and the Willamette Valley Soil Survey, made recommendations and reports to the State Reclamation Committee, participated in the program of the International Soil Congress, Oregon Reclamation Congress, the State Drainage Association, Oregon Nut Growers' Association, the Western Division of the American Association of Agronomists, the Northwest Fertilizer Association, the Southern Oregon Irrigation meeting, the Oregon Bankers' Association Agricultural Short Course, the Rural Electric Service Short Course, Western Society of Irrigation Specialists, Portland City Club, Chambers of Commerce at La Grande, Baker, Prineville, Salem, and Bend, gave radio lectures almost weekly, and prepared weekly press articles. The head of the department served as secretary-treasurer of the Oregon Irrigation Congress and the State Drainage Association. Another member of the departmental staff participated in the program of the State Horticultural Society and of the Nut Growers' tour, while two members were on the program of the Western Society of Soil Science at Oakland, where six technical papers were submitted. Four papers were also prepared for the International Soil Congress which met at Washington, D. C., June, 1928. Two were sent to the Western Society of Agronomy meeting at Fort Collins, Colorado.

The following bulletins, circulars, and technical articles also have been prepared by the Soils department staff: Report, "Soil Survey of Marion County;" "The Economic Limit of Pumping for Irrigation;" "Drainage and Improvement of White Land and Similar Wet Land;" "Sulfur in Relation to the Soil Solution;" "Production of Adequate Barnyard Manure by Fermenting Straw;" "The Soil Solution as a Nutrient Medium for Plants;" "Lysimeter Study;" "Replaceable Bases in Some Oregon Soils;" "The Effect of Hydrogen Ion Concentration on the Growth of Certain Plants;" "A Study of the Colloidal Factors of Certain Soils Having Restricted Drainage;" "Crop-producing Power of Limited Amounts of Essential Nutrients in Soils;" "Relation of Calcium-ion Requirements of Alfalfa;" "Calcium Concentration of Soil Solution;" "Loss of Nutrients in Drainage Water;" "Replaceable Bases in Oregon Soils;" "Methods of Comparing the Hydrogen-ion Concentration;" "Relation of Fineness of Grinding to Sulfur Oxidation in Soils;" "Water Requirement as an Indication of Irrigation Requirement;" Report, "Grande Ronde Soil Survey with Maps," edited for publication; Report, "Lane County Soil Survey with Map," edited for publication.

The head of the department of Veterinary Medicine is a member of the Oregon State Livestock Sanitary Board, which has charge of the administration of the state laws concerning livestock sanitation; vice-president of the American Veterinary Medical Association; member of the Committee on Intelligence and Education of the American Veterinary Medical Association, which recommends to the Association the educational standards which shall be maintained by veterinary colleges whose graduates are to be admitted to the Association and inspects these various colleges to see that these standards are being maintained. He is also a member of the committee on infectious abortion of the National Research Council. He is junior author of two technical papers on Treatment for Liver Fluke Infestation in Goats. He is also secretary-treasurer of the Oregon Veterinary Medical Association. Another member of the staff is vice-president of the Oregon Veterinary Medical Association. A third member is senior author of a technical paper "A Treatment for Liver Fluke Infestation in Goats." Three members of the departmental staff collaborated as authors of the motion-picture film, "Salmon Poisoning in Dogs," first shown before the American Veterinary Medical Association at its 1927 meeting in Philadelphia.

It should be noted that the above list includes only the activities of the members of the resident instruction staff in Agriculture. Some of these, however, devote part time to Agricultural Experiment Station and Extension duties. No mention is here made of the activities of full-time Experiment Station or Extension specialists, nor of resident instruction staff members in departments outside the School of Agriculture.

Curricula. Only minor changes in the general Agriculture curricula have been made during the biennium.

The extension of rural electric power lines, the rapid increase in the use of gas and electric power on the farm and in the farm home, the growing complexity of farm equipment, and the need for more and better farm conveniences have brought about the need for a new type of engineer, the agricultural engineer. That this need is recognized and that an attempt is being made to meet it is indicated by the fact that 38 of the land-grant institutions now provide some opportunity for training in agricultural engineering, while 12 of the leading ones offer opportunity for professional training through major curricula.

The department of Agricultural Engineering at this institution formerly was a service department for the various departments of the School of Agriculture, the School of Vocational Education, and the department of Industrial Arts. At the beginning of the academic year 1927-28 the department was authorized to offer major work leading to the degree of Bachelor of Science in Agricultural Engineering, and a full four-year curriculum was authorized.

A new department of instruction has been organized. Agricultural extension work is perhaps the most difficult of all forms of instruction, but while abundant provision is made at this and other institutions for training teachers in methods of classroom instruction, no opportunity has hitherto been offered here for those who desire to enter the field of

extension work to receive the needed training in special methods of extension work.

The desirability of providing such training has been recognized and during the biennium a plan has been evolved in conference with Director Paul V. Maris, of the Extension Service, whereby this training may be provided at a nominal cost by utilizing a portion of the time of members of the Extension staff for resident instruction work.

Under this plan Director Maris, in addition to his duties as Director of Extension Service, assumes charge of the resident instruction department of Extension Methods. The course, which is to be open only to senior and graduate students, will include an intensive study of the history and present organization of extension work and the most successful methods of training extension specialists, county agricultural agents, home demonstration agents, boys' and girls' club leaders, etc.

Student enrollment. As predicted in my last report, the prospects for an increase in enrollment of Agriculture students continue to improve with the improvement in the economic conditions of agriculture. This is indicated by the fact that while the freshman registration for the biennium 1924-1926 totaled 160, for the biennium 1926-1928 the total was 200, an increase of 25 percent. It is true that the total enrollment in agriculture still continues to decline slightly because of the small registration of beginning students two or three years ago. That this annual decline is growing smaller is shown by the fact that the decline in senior registration was 36 percent; in junior, 32 percent; and in sophomore, less than 6 percent.

Research. Most of the research work in Agriculture is done, of course, by members of the Agricultural Experiment Station staff. A comparatively small amount, however, is done by members of the resident instruction staff who are not connected with the Experiment Station, and by graduate students.

This division of our work, I believe, could be materially developed by providing graduate work leading to the doctor's degree. A committee of the Agriculture faculty was appointed during the biennium to study the feasibility of offering such work by the School of Agriculture, and reported in part as follows:

"Work leading to a doctor's degree can be offered in the general field of animal and plant science, with major problems provided in the field of animal husbandry, dairy husbandry, agricultural chemistry (nutrition), soils, and horticulture.

"The committee has studied various reports on the requirements for the doctor's degree and familiarized itself with the credit requirements as indicated in representative catalogues of graduate schools. Academic courses have been developed around several major problems, using the present course facilities at this institution."

It is recommended that the School of Agriculture be authorized to offer graduate work leading to the doctor's degree at an early date.

Increased facilities for instruction in Agriculture. Progress has been made during the biennium in the development of extensive improvements in the facilities for resident instruction in agriculture. The necessary extension of the campus westward to the Agricultural Mall at 30th Street has forced the development of plans to locate all barns and other agricultural buildings, except Agriculture Hall, to the westward of that street. In pursuance of this plan, a tract of 140 acres of land immediately west of the college farm has been purchased and forms the first unit of a new dairy farm on which will be built the new group of dairy buildings.

New Poultry Building. The new Poultry Building, the first of the new buildings to be erected to the west of Agricultural Mall, was built in 1927. It is a three-story brick and stone structure, 50 feet by 128 feet, well provided with necessary laboratories for judging, incubation, fattening, dressing, egg grading and handling, together with modern cold storage facilities in addition to classrooms and offices for the staff. A tract of land at the rear of and adjoining the Poultry Building has been set aside on which to develop a new poultry plant as funds become available. The cost was approximately $110,000.

New Greenhouses. Early in the spring of 1928 a new range of greenhouses was erected at a cost of approximately $62,000 to meet resident instruction and experiment station needs. This building is strictly modern in every detail, of the curvilinear type of steel and glass construction, resting upon brick walls. The hot-water heating plant uses oil for fuel. One house, 33 by 100 feet, is used for teaching purposes, space being assigned to different departments as required. The remainder is used by the Agricultural Experiment Station.

Needs. The School of Agriculture is greatly in need of a seed storage building for the safe preservation of valuable seed crops. A new dairy building for instruction in the manufacture of dairy products on a modern basis, including the utilization of by-products such as casein, milk powders, milk sugar, condensed skim milk, etc., is imperative if the College is to be of greatest service to the dairy industry. It should include a refrigeration plant adequate for all needs of the School. This situation was fully explained in my biennial report of two years ago. A new dairy barn, conveniently located between the pastures and the new dairy building, is also a serious need of the School. An agricultural engineering building, suitably located for practical laboratory and field work on a modern scale, has become a necessity to meet the new demands of this important phase of agriculture. These serious needs will involve an expenditure, as noted in the last biennial report, of approximately $220,000.

Respectfully submitted,

A. B. CORDLEY,
Dean of the School of Agriculture.

REPORT OF THE SCHOOL OF BASIC ARTS AND SCIENCES

To the President of the College,

Sir: I have the honor to submit the following report for the School of Basic Arts and Sciences, covering the biennium ending June 30, 1928.

Organization and policy. Twelve departments—Art, Bacteriology, Botany, Chemistry, English, Entomology, History, Mathematics, Modern Languages, Physics, Public Speaking, and Zoology—constitute the School of Basic Arts and Sciences. As its name implies, this unit exists to furnish students registered in the various technical schools of the institution with foundation work needed in non-technical subjects.

As set forth in detail in previous reports, the organization of these departments as a separate unit is in the interest of administrative economy and effectiveness, as it is obviously cheaper to handle all of the chemistry or English or history for the institution in one unit than to scatter it among the several technical schools, and it is also educationally more effective to bring all of the work in any one field under a single control than to have it subject to varying standards. The aim of the organization is to relate the non-technical work as closely as possible to the interests and vocational preparation of the students, while maintaining these basic courses in science and the arts on a plane of excellence thoroughly standard. Obviously the work must be adequate for the technical superstructure proposed, valid on transfer to other institutions of recognized standing, and within limits imposed by the technical requirements of the various curricula, calculated to contribute to education for life and citizenship.

A distinct field. The School of Basic Arts and Sciences exercises a distinct function in the educational world. Only those oblivious to changes that have taken place even within the last twenty-five years can think of education in terms appropriate a few years ago. These changes affect both the liberal and the technical fields. President Frederick B. Robinson, of the College of the City of New York, speaking at the triennial convention of the Phi Beta Kappa Society, called attention of the delegates to the fact that a *liberal* education in the days of Abraham for men leading a tribal life in close touch with all the other members of the tribe was necessarily one thing and different from a liberal education in the time of Pericles and the Athenian ascendency, and that a liberal education today must necessarily be a different thing from a liberal education desired for living in the middle ages, in the days of John Harvard, or of President Charles W. Eliot. President Robinson was emphasizing the fact that in a scientific era other studies than those formerly known as the humanities could serve to acquaint a man with his environment and free his mind to range without restriction of petty interest or narrowing prejudice in a world unlike that with which educated men of former eras had concern.

If the aim and scope of a liberal education have been modified by the scientific developments of recent decades, the character and place of *technical education* in the scheme of things have changed far more. In fact the change affecting technical education is as spectacular as that of Cinderella in the fairy tale when she was lifted from her drab and grimy existence among the ashes to the sudden splendor of princely association and leadership. Scholarship so long patronized and despised by the world of fashion and finance, now under the name of *productive research* or preparation for it, is recognized as the valued ally of business and industry. When one recalls the difficulties technical education has had to gain a hearing from traditional humanists, it is hard to realize that it is just the technical and industrial aspects of education which now attract public attention and support. These changes have taken place so rapidly that many people do not yet realize *the place obviously held today by technical education in a world committed to industrial development.*

The functions of an education are twofold: first, an education should make an individual a master of the economic and physical forces in the world to such an extent that he is economically independent; second, an education having made a man a free master in the world, should enable him to be at home in the fullest sense of that word in the world of which he has made himself the master. It would be easy to develop both of these ideas, but unnecessary, so obvious is it that an education should lead to economic independence and to such ability and appreciation as will enable one to use that economic independence with understanding, sympathy, and enjoyment.

Technical education inevitably aims at economic independence through such control of the physical resources of the world as will yield to the individual a livelihood in return for productive work. The *School of Basic Arts and Sciences* offers courses indispensable to the technical work, as this today rests upon solid scientific foundations. *The place in society and the state, however, to which a technical education today entitles the possessor calls for an increasing emphasis upon subjects such as English and history and language that will contribute to one's capacity for being at home in the world, the second aim of education.* To present these and other similar subjects in the course of a technical education is not to duplicate the work of a liberal arts college, but to do something quite distinct, although altogether significant. It is important to the commonwealth that those who are to develop the industrial and economic resources of today shall have besides technical training the educational bases for ample, unprejudiced thinking and intelligent, significant living. Beyond the presentation of prerequisites for technical courses, therefore, the School of Basic Arts and Sciences aims at relating and humanizing knowledge for its usefulness in the lives of men and women not purposing to be scholars in the traditional sense, but technical experts capable through breadth of view of assuming leadership. This is the distinctive work of the School of Basic Arts and Sciences.

Relation of courses to technical curricula. Courses in the School of Basic Arts and Sciences are offered either as requirements or electives in the curricula of the various technical schools. The biological sciences —bacteriology, botany, entomology, and zoology—are fundamental to

work in agriculture and home economics, while the relation of the mathematical and physical sciences—mathematics, chemistry, and physics—to engineering and industry are evident. The very term, "Industrial Arts," one of the curricula in the School of Engineering, calls attention to the place of applied art in a technical institution. Back of commercial and industrial products lie study and training in the principles of form and color and design, in the history of art movements, and appreciation. Applied art in its various forms with the necessary basic studies in form, color, and design finds a place in the requirements of various of the technical schools —in engineering and industrial arts work as already pointed out; in commerce in courses in advertising, posters, and window display; in agriculture in the work in landscape gardening; and in home economics, particularly in applied design, household decoration, and the crafts.

Science is the property of no one people or language. To keep abreast with modern times and to pursue researches necessary for industrial progress, a command of foreign languages is desirable. A command of English, of course, is indispensable to complete efficiency, of English both written and spoken. Wholesome habits of reading and an ability to contribute to the community life are also aimed at by the departments of English and Public Speaking. Some may still think of history as a memorizing of facts and dates. Rather, history promotes intelligent living through a fuller comprehension of our relation to other nations of the world, and our ability to interpret the present in the light of past experience. Those who are to control the destiny of the country need to develop a sense of the place this country occupies in history, its relation to other countries and the past. If those who control are likely to be industrial and economic leaders, technical education must make place for training in history.

Standards maintained. Continued rigid enforcement of entrance requirements, placement examinations for entering students in English and mathematics, and other factors contributing to the maintenance of high standards discussed in the last biennial report, have been powerfully supplemented by the operation of the sabbatical leave of absence for faculty members under terms which allow members of the staff to continue their studies without cost to the institution and the state. The stimulus given to the faculty by this plan is hard to overestimate. Old and valued members of the staff whose financial situations and family responsibilities have held them academically stationary for years have eagerly taken advantage of the opportunity to renew their contacts with progressive scholarship and to complete their work for higher degrees. One staff member already holding the Doctor of Philosophy degree has combined the provision of sabbatical leave with a Guggenheim fellowship for foreign travel and is devoting the next year to advanced researches under one of the most widely recognized scientists in Europe. Another man, the head of a department, a recognized leader in his field, has spent the past year in graduate study, aiming to secure for himself the degree of Doctor of Philosophy, which in his case because of his acknowledged position in his profession might seem to be of minor significance. As a matter of fact, the example of these and other men who are not satisfied to rest on past accomplishments is tre-

mendously stimulating to the other members of the department and the staff in general. Another valued teacher availed himself of sabbatical leave and then requested an additional year of leave without assistance in order that he might complete his work for the doctorate. Today, notwithstanding the brief time that the plan of sabbatical leave has been in operation, five departments in this school—English, Mathematics, Botany, Chemistry, and Modern Languages—have availed themselves or are availing themselves of the privilege. Probably nothing in recent time has contributed more to stimulate the intellectual and professional interests of the faculty than the adoption of the plan for sabbatical leave. It puts into the hands of the ambitious the means, and takes away from the sluggish the last alibi. There remains now but the working out of some Retirement system for the development of thoroughly modern and efficient departments.

Among several departmental devices for maintaining standards and promoting efficiency, a system of theme-filing in operation in the English department may be briefly mentioned. It is obvious that in dealing with fourteen or fifteen hundred students in composition courses conducted by a great many different instructors, the maintenance of similar standards calls for supervision and system. Dr. John M. Kierzek, conducting this work, during the past year has introduced a system found effective in the University of Minnesota, that of having the themes of all students filed in a theme room where they are open to the inspection of any member of the teaching staff. This permits all members of the department to observe how the themes are marked by other members of the department, to get suggestions from their work, and to make suggestions of their own where such suggestions seem likely to be useful.

In general a far closer correlation exists between lecture, recitation, and laboratory work within the several departments and between the work of the different departments and the work of the technical schools than is commonly to be found. Particularly in the departments of mathematics and physics in their relation to the Engineering work, correlation has been worked out through special faculty committees.

Enrollment in departments. The number of students taking work in the various departments depends partly on the electives chosen by students, but principally on the requirements of the different curricula. The last year of the past biennium shows an increase in enrollment over that of the last year of the preceding biennium in all departments except Chemistry, Mathematics, and Zoology. In Mathematics a slight decrease of an average of fifteen students a term during the biennium is to be explained on the basis of fewer students entering deficient in certain special requirements, and hence under no necessity of completing these prerequisites. A shift from one year to another in certain curricula is responsible for the decreases in Chemistry and Zoology. Outstanding increases occurred in the departments of Art, History, Modern Languages, and Physics. The average increase per term in the last year of the present biennium over the registration for the last year of the preceding biennium is for Art 131, for History 119, for Modern Languages 113, and for Physics 145. During the preceding biennium Physics had shown a decrease, so that the present increase brings about an equalization, but in

the other three departments the preceding biennium had shown a very similar increase, recognized by the appointment to each of these departments of an additional instructor. It is obvious, however, that that relief merely met a condition of the past, and the present increase calls for additional assistance in these departments. A consistent increasing interest in Art, History, and Modern Languages covering not one, but two biennia and outstripping increased assistance provided as the need seemed to demand is significant when it is considered that the major interests of these students are of necessity in one or another of the various technical schools.

Faculty. During the past biennium no considerable change has occurred in the general character of the staff through resignations and additions. During the year 1927-28 resignations affected the holders of one Ph.D. degree, eleven master's degrees, and ten bachelor's degrees. Additions brought to the staff one holder of the Ph.D. degree, eleven holding the master's (one of whom has since earned his Doctor of Jurisprudence degree), and twelve holding the bachelor's degree. In 1928-29 resignations affected four holding the Ph.D. degree (one on leave of absence only), seven master's, eight bachelor's, and one holding no degree (in the Art department), while additions brought to the staff two holding the Ph.D. degree, seven master's, nine bachelor's, and none with no degree. The staff for the beginning of the present biennium numbers ninety-two, of whom eighteen hold the Ph.D. degree, one the Litt.D., one the Doctor of Jurisprudence degree, twenty-two the master's degree, thirty the bachelor's degree, and one no degree. In addition there are one Ph.D. and several master's on leave of absence. Among those holding bachelor's or master's degrees are some old and valued members of the staff who belong to a period in academic training when less importance was attached to the advanced degree. These and others whose peculiar work, such as art, follows academic lines less closely than that of some of the other departments are generally possessed of training and experience in excess of what would be required for one of the higher degrees.

Activities and services of the staff. Professional improvement and public service have occupied the members of the staff very generally. Through graduate study either during the summer or on leave of absence during the year, through travel, through research and publications in periodicals and book form, staff members have been active to advance themselves professionally. Through lectures and addresses, given in person in various parts of the state or over the College radio, through serving as officers of scientific and professional organizations both state and national, through chemical analyses and bacteriological tests, and in the case of those members of the staff who are also members of the Experiment Station staff, by serving in many expert capacities incident to the investigational program of the institution, staff members have rendered service to the commonwealth in addition to the regular performance of their instructional duties.

Facilities and needs. A long-felt want has been met by the completion of the new Physics Building. Congestion has been so acute in the

Physics department that, for example, certain work for years has had to be conducted in part in the hallway of an Engineering building, as there was no other space in which to conduct it. The new Physics Building provides adequate facilities for the work and it gives further relief in housing, at least temporarily, the offices and classrooms of the History department, until now inconveniently and inadequately housed, at times in several different buildings. The work in Botany has also been greatly strengthened by the erection of the new greenhouses. Laboratory and greenhouse, however, have great limitations as sources of knowledge about plants and the department of Botany and Plant Pathology looks forward to the time when a botanical and pharmaceutical garden may serve, not merely to supply the needs of the students, but also to add to the attractiveness of the campus and the interest of visitors from all over the state. An insectary for the rearing of insects for class work under outdoor conditions is a standing need of the Entomology department, as is also increased laboratory space for research. The Chemistry department is well equipped, but sorely in need of additional and different quarters. The best of equipment suffers when inadequately housed. Additional lecture, recitation, laboratory, and office space, and more research laboratories are urgently needed. Space and protection from interruption are indispensable to research and that development which the competent instructor requires. The department urges that steps be taken for the erection in the near future of a new wing, "so that our laboratories can be brought up to date, and means be provided for encouraging advanced work both by instructors and students." In like manner the work in English suffers from the fact that in the absence of any general recitation building the work is now scattered through a number of buildings. The condition has improved somewhat; whereas during the last biennium the work was given in eleven buildings it is now restricted to seven. Such distribution of offices and classrooms, however, makes difficult supervision and complete departmental understanding.

In reporting on so comprehensive a unit as the School of Basic Arts and Sciences, I have found it impossible because of the limitations of space to do more than set forth the aim of the organization and to call attention in a general way to conditions under which the work is carried on. It has been impossible to call attention to the valued work of individual members of the staff. In view of the generous support and sympathetic comprehension of the administration and the state at large concerning the needs involved in a program for sound, broad, technical education for the young people of the state, it has been unnecessary to do more than to suggest some of the more pressing needs for the continued prosecution of the work along the most efficient and progressive lines.

Respectfully submitted,

M. ELLWOOD SMITH,
Dean of the School of Basic Arts and Sciences.

REPORT OF THE SCHOOL OF COMMERCE

To the President of the College,

Sir: Below you will find a report on the School of Commerce for the biennium 1926-1928.

Historical. Commercial courses were introduced into Oregon State Agricultural College in 1868. When the College became wholly a state institution in 1885, the elementary courses in commercial training, in conformity with the provisions of the Morrill Act, were continued down to 1898, when a regular two-year curriculum was established. It was soon apparent, however, that those engaged in commercial pursuits needed just as broad training as those entering any other profession or vocation. Accordingly, in 1900, the courses were extended to regular degree work. The first class was graduated in 1904. Since then nearly one thousand students have received diplomas from the College as Bachelors of Science in Commerce. The Commerce work was organized into a School in 1908. In 1914, the Board of Higher Curricula approved the curriculum offered in Commerce and defined the scope of the School, including courses leading to the bachelor's degree, together with graduate work in Agricultural Economics and Rural Sociology. Data concerning the steady growth of the School and other important statistics are found below.

Organization. The School of Commerce comprises five distinct departments: (1) Finance and Administration, including Accounting, Auditing, Advertising and Selling, Practical Banking, Business Organization and Management. (2) Economics and Sociology, including Agricultural Economics and Rural Sociology, and a special course in Marketing and Rural Leadership affording opportunity to major in Agriculture and minor in Business Practice, and vice versa. Work leading to an advanced degree may be pursued in this department. (3) Political Science, including courses in citizenship and general courses in Government and Business Law. (4) Secretarial Training, including Stenography, Typing, Office Training, and Secretarial Studies. (5) Commercial Education, a joint department with the School of Vocational Education, affording preparation for teaching.

Curricula in Commerce. In the junior year, the student may begin specialization in one of the following: (1) Accounting and Management, (2) Advertising and Selling, (3) Agricultural Economics, (4) Banking and Finance, (5) Commercial Education, (6) Economics and Sociology, (7) General Business, (8) Government and Business Law, (9) Markets and Marketing, (10) Real Estate, (11) Secretarial Training. In addition to the foregoing options, a liberal range of general electives is offered, so that in the junior or senior year, men may elect minors in Agriculture, Forestry, or Industrial Arts, while women may elect minors in Home Economics or in one or more of the service departments.

Minors in Commerce. As shown in Table III below a large share of the work in the School of Commerce consists of service for other

schools and departments. In order properly to assist the students in selecting courses best suited for their needs seven minor groups of electives have been arranged as follows: Agriculture, Home Economics, Engineering, Physical Education for Men, Physical Education for Women, Industrial Journalism, and more general electives in Basic Arts and Sciences.

Graduate courses. Course sequences leading to the degree of Master of Science in Agricultural Economics and Rural Sociology are outlined especially for graduate students. The aim is to make the graduate work in this field fit students for positions as county agriculturists, positions as research and extension workers in the United States Department of Agriculture, especially in the Bureau of Agricultural Economics, teachers in colleges and rural high schools, managers of cooperative marketing organizations, as well as for rural leadership in general. Students are also prepared for civil service examinations in this general field.

Commercial education. The School of Commerce is expected to occupy the field of Commercial Education in the state because no other public institution of college grade offers practical courses in Secretarial Training and Accounting. At present it is difficult to supply the demand for properly trained teachers due to the inducements offered in other fields of employment. That progress has been made in this field is shown by the fact that there are at present upward of two hundred teachers of commercial subjects in the Coast states who have all had training in the School of Commerce.

Growth of the School. The growth of the School of Commerce is due largely to the relation which this division of the College sustains to other divisions of the institution. It is now a fixed policy of the School of Commerce that a student may major in Commerce and minor in any other division or vice versa, major in another school and minor in Commerce. The enrollment for the biennium was as follows:

TABLE I. ENROLLMENT BY CLASSES

	1926-27	1927-28
Senior	126	121
Junior	84	82
Sophomore	451	410
Freshman	498	512
Special	25	21
Graduate*	3	4
	1187	1150

*In Agricultural Economics and Commercial Education (Vocational Education).

Attention is called to the small enrollment of special students. A large percentage of sophomores are really juniors, but fail to satisfy the requirements for Junior Certificate in time to receive junior classification.

TABLE II. REGULAR ENROLLMENT

Year	Enrolled in Commerce	Year	Enrolled in Commerce
1909	144	1919	525
1910	150	1920	652
1911	134	1921	828
1912	145	1922	935
1913	143	1923	917
1914	160	1924	891
1915	170	1925	1,093
1916	173	1926	1,139
1917	212	1927	1,184
1918	298	1928	1,146
		Total	11,039

TABLE III. CLASS ENROLLMENT FROM OTHER DEPARTMENTS

Year	Number enrolled	Year	Number enrolled
1912	216	1921	2,535
1913	395	1922	2,957
1914	729	1923	3,127
1915	1,015	1924	3,185
1916	995	1925	2,838
1917	1,096	1926	2,770
1918	725	1927	3,227
1919	2,926	1928	3,371
1920	2,332		
		Total	34,439

TABLE IV. GRADUATES, CLASSES 1908 TO 1928

Year	Graduates	Year	Graduates
1908	14	1919	8
1909	19	1920	29
1910	12	1921	51
1911	21	1922	74
1912	8	1923	95
1913	12	1924	65
1914	12	1925	94
1915	17	1926	109
1916	19	1927	126
1917	25	1928	121
1918	12		
		Total	943

TABLE V. RESIGNATIONS

Name	Position	Date of resignation
C. I. Butterbaugh	Instructor in Accounting	1926
R. W. Coleman	Instructor in Accounting	1927
Walter R. Robertson	Lecturer in Accounting	1927
Hector Macpherson	Professor of Economics and Sociology	1926
J. F. Page	Assistant Professor of Economics and Sociology	1927
Victor P. Morris	Instructor in Economics and Sociology	1926
Roy R. Hewitt	Associate Professor of Political Science	1927
R. M. Lockenour	Assistant Professor of Political Science	1928
Russell E. Ewing	Instructor in Political Science	1927
E. Mabel Maginnis	Assistant Professor of Secretarial Training	1928
Barbara Gamwell	Instructor in Secretarial Training	1927
Kathleen Meloy Laughlin	Instructor in Secretarial Training	1927
Freda Carbaugh	Instructor in Secretarial Training	1928
Ruth Slottee	Instructor in Secretarial Training	1928
Margaret E. Peabody	Instructor in Secretarial Training	1927

TABLE VI. APPOINTMENTS

Name	Position	Date of appointment
E. E. Bosworth	Associate Professor of Accounting	1926
Curtis Kelley	Assistant Professor of Accounting	1927
Milton N. Nelson	Professor of Economics and Sociology	1926
L. R. Breithaupt	Marketing Specialist	1926
G. O. Gatlin	Marketing Specialist to succeed Mr. Hurd, deceased	1927
Robert H. Dann	Assistant Professor of Economics and Sociology	1927
Victor P. Morris	Instructor in Economics and Sociology	1926
Wm. H. Belden	Instructor in Economics and Sociology	1926
Merritt M. Chambers	Assistant Professor of Political Science	1927
Wilbur P. Riddlesbarger	Instructor in Political Science	1927
Margaret E. Peabody	Instructor in Secretarial Training	1926
Barbara G. Gamwell	Instructor in Secretarial Training	1926
Kathleen Meloy Laughlin	Instructor in Secretarial Training	1926
Lucy C. Moore	Instructor in Secretarial Training	1927
Adelaide D. Heald	Instructor in Secretarial Training	1927

Activities of staff members. The activities of the staff members may be divided into three groups—teaching, research, and extension. Commerce staff members are doing their full share of extramural activities in the form of extension lectures, commencement addresses, and other extension activities. Such service is being performed with commendable esprit de corps. The work of the biennium has been characterized by a very fine morale and spirit of service within the entire staff.

The growing importance of Economics and Sociology as a foundation for business training is being recognized more and more. This is manifested by the increased demand for service from members of the Economics and Sociology staff. Dr. Nelson has developed an excellent organization in this department, which is best evidenced by the growing demand for members of that department and also by the growth of the graduate work. The relationship between the agricultural staff and the department of Economics is very cordial and a spirit of effective cooperation is noticeable.

Two of the major extension activities of the biennium have been conducted by members of the department of Finance and Administration: (1) the American Institute of Banking classes in Salem, Albany, and Corvallis, carried on by Dr. Schmitt, Professor Irvine, and others; (2) the Oregon Retail Merchants' Conventions and the Business Institutes, important activities which are mentioned at length elsewhere in this report.

Achievements of graduates. It is evident that a complete list of achievements of the nearly 1,000 graduates of the School of Commerce would be out of the question in this report. Based on the most accurate data available, 717 Commerce alumni in 1927 were engaged as follows: Accountants 30, secretaries and stenographers 20, merchandising 59, specialty salesman 28, commerce teachers 139, managerial positions 44, banking positions 49, journalists 7, lawyers 21, agriculturists 41, county agents 4, advanced students 25, housekeepers 93, unclassified 157.

Service to the state. The major service of the School of Commerce is, of course, performed through students who go out into every corner

of the state spreading the principles of better business methods and rendering services which make for greater prosperity and better citizenship. When it is remembered that 11,039 have been enrolled as regular students in nineteen years, that 943 have graduated since 1908, and that in seventeen years 34,439 class enrollments from other schools have been instructed in better business methods, the service of the School of Commerce to the state is apparent. The contact of instructors and students with business interests of the state through lectures, books, bulletins, and other publications, business institutes and conferences, is also a very great service and of far-reaching influence.

New courses established. The following new courses in Commerce were established during the biennium:

Thesis and Graduate Study (in Agricultural Economics and Rural Sociology), Modern Economic Theories, Cooperative Marketing Organizations, Land Taxation, Rural Community Organization, Economic Development of Agriculture, Credits and Collections, Property Management, Real Estate Finance, Real Estate Law.

Vocational guidance. Great stress is being laid on directing the students into the proper courses so as to save time and disappointment to the student and to insure the greatest benefit to the citizenship of the state. This is accomplished:

(a) Through correspondence and publications before the student comes to the campus.

(b) Through Freshman Week.

(c) Through segregation of freshmen into groups:
  (1) Those emphasizing accounting and management.
  (2) Those emphasizing secretarial training
  (3) Those emphasizing merchandising

(d) Upper classmen have the choice at the beginning of the junior year to enter upon any one of eleven different programs as follows: Accounting and Management, Advertising and Selling, Agricultural Economics, Banking and Finance, Commercial Education, Economics and Sociology, General Business, Government and Business Law, Markets and Marketing, Real Estate, Secretarial Training.

(e) Personal conferences with the students in the Dean's Office and with the Advisers.

Oregon Retail Merchants' convention. The second of a series of four conventions at the College scheduled in 1926 by the Oregon Retail Merchants' Association, was held last February. The general subject of the last convention was "Cost of Doing Retail Business in Oregon in 1926." The result of the investigation in connection with this convention is set forth in a bulletin entitled "Operating Costs in Retail Merchandising." The Retail Merchants' Association has resolved to carry out the original program and to meet at the College the next two years, continuing the investigation in retail costs.

Business institutes. Pursuant to a resolution of the Oregon Retail Merchants' Association, the School of Commerce, in cooperation with the Extension Service, undertook an experiment in extension service to the merchants, beginning with a business institute at Baker, March 15, 1928. Recognition of the great commercial and community value of this first institute was both immediate and general. In response to requests and needs in other cities plans were made for a series of institutes in various parts of the state, including Marshfield, Dallas, Klamath Falls, Medford, Grants Pass, and Roseburg. While attendance in each of these places has not been large, probably due to the fact that it was found feasible to hold institutes only during the month of August, the expression of appreciation has been general.

The success of this enterprise is due in very large part to Professors Vance and Bosworth and to the Extension Service for its cooperation. I recommend that the month of August be designated every summer as an institute month. While the season is not fortunate because of the absense of many business persons on vacation, it is practically the only time possible when the service of our specialists is available and it is the opinion of leading merchants that the attendance will grow steadily as the value of the institute becomes better known.

Extension lectures. The demand on the School of Commerce for Extension lectures has steadily increased. This is especially true in the departments of Economics and Sociology and Political Science. It has reached the point where it will soon be necessary to make some definite allowance in the instructor's time, if he is to be able to continue this activity. The importance of such lectures need not be emphasized and they should be increased rather than diminished. It is an open question, however, whether or not such lectures should be free to the communities or whether a charge should be made covering the expense to the instructor and suitable encouragement for such work in the form of an honorarium. This is done in most other institutions and it seems that it would be only fair encouragement to the instructors involved. Under any circumstances, the Extension Service should have complete charge of such lectures so as to compile pertinent statistics covering these activities and in order to schedule them properly with a minimum cost of both time and money.

Research. The plan outlined in my last report to develop a course of study to be known as senior research in Agricultural Economics and Rural Sociology has been realized in great part. Last year there were nine students engaged in research under the direction of competent specialists. The projects which had been outlined by Dr. Dreesen, Dr. Mittelman, and Mr. Wm. H. Belden, have been completed and either have been published or are about to be published. "A Study in the Ratios of Assessed Values to Sale Values of Real Property in Oregon," a bulletin by Dr. W. H. Dreesen, has received a great deal of favorable comment from the press of the state, as well as from competent authorities, and promises to be a basic contribution to the solution of the tax problem of the state. Mr. G. O. Gatlin, Extension Marketing Specialist, has written a bulletin on "Factors in the Organization of Cooperative Marketing Associations." The following bulletins will be completed dur-

ing the present month: "Prune Canning in the State of Oregon," by Wm. H. Belden, and "Willamette Valley Wool Prices and Net Returns Through Cooperation," by Dr. E. B. Mittelman.

The department of Finance and Administration has just issued in cooperation with the Extension Service a bulletin on "Operating Costs in Retail Merchandising in Oregon, 1926," by Ball, Bosworth, Vance, Haley, Irvine, and Ziefle.

Projects for the coming biennium are in process of development.

The most urgent need exists for the further development of graduate and research work in Agricultural Economics and Rural Sociology. As time goes on, we shall probably be requested to do advanced work in cooperation with other schools and departments, especially in Economics and Sociology.

There is urgent need for an assistant to Mr. Breithaupt to develop the basic statistics, both current and historical. In this connection attention is called to the desirability, as a means of increasing efficiency by sharper differentiation of functions, of developing the department into two or three distinct branches and providing sufficient funds for research to develop properly the fields of Economics and Sociology.

Donations. In 1927 Mr. Adolphe Wolfe of Portland, Oregon, established two prizes for the purpose of promoting scholarship and research in Commerce. The award is made annually to the juniors and seniors in Commerce who in the opinion of the Commerce faculty give the greatest promise of business leadership. The award is divided into two or more prizes for men totaling one hundred dollars and two or more prizes for women in like amount, according to the merits of the contestants. Participation in an essay contest under rules prescribed by a faculty committee is required of candidates for the award. In awarding the prizes, character, scholarship, participation in student activities, and qualities of leadership are considered.

For several years the student Chamber of Commerce has made an annual donation to the School, chiefly for the purpose of beautifying the building. A great number of pictures, some of considerable value, have been placed in the halls, classrooms, and offices. Last year, through the cooperation of the Art department of the College, the Chamber of Commerce was able to obtain a sun dial of fine artistic merit, which will be placed in the center of the walk leading to the Commerce Hall entrance. This gift was accepted by the Board of Regents at its May meeting and will be placed during the next academic year.

In the spring of 1928 the American Bankers' Association established a foundation providing for a number of scholarships for the purpose of assisting worthy students to obtain thorough training in the field of banking and finance. Oregon State Agricultural College was fortunate in being awarded one of these scholarships. The scholarship provides $250.00 annually as a loan without interest to a student in finance, in either the junior or senior year. The benefits of the scholarship may go to one individual for two consecutive years. Appointment is made on recommendation of a committee consisting of the Dean and heads of the

departments in the Commerce staff and one prominent banker in the state.

Needs and recommendations. The improvement in office space for the department of Economics and Sociology, requested in my last biennial report, was completed last summer. With this addition of office space and with the releasing of rooms in Commerce Hall by student and alumni organizations moving into the new Memorial Union Building, it will be possible to organize the work in Economics and Sociology and the work in research and extension with greater efficiency. It will likewise be possible to organize the office space for the department of Finance and Administration more satisfactorily.

A good start and substantial progress have been made during the biennium on our program of business and industrial research. The publications issued by the department of Agricultural Economics and Rural Sociology, as listed under Research, are concrete evidence of some of the results achieved. The accumulation of data not yet published also constitutes a definite asset. The value of the business institutes, which have utilized results of research projects to some extent, is further evidence of the immediate response to the work thus far accomplished. But the wide demand for this sort of work, and the serious need for a vigorous and thoroughgoing program to get at the facts and to analyze and interpret them, have been very keenly emphasized by all the contacts we have made during the biennium. The field is rich in opportunity, and the results obtained in our comparatively meager beginning are but morsels of the possibilities easily within reach. The plan to develop a bureau of industrial research and to publish a quarterly or monthly periodical as an organ for such research, was recommended in my last biennial report. As yet, this plan has not been fully realized, but the entire Commerce staff is working on the problem and it is hoped it will be possible to report important progress during the next biennium. It is hoped that correspondence and other extension courses will be developed as rapidly as conditions will permit. The School of Commerce is in a position to render important service in this phase of investigation and extension.

Respectfully submitted,

J. A. BEXELL,
Dean of the School of Commerce.

REPORT OF THE SCHOOL OF ENGINEERING AND MECHANIC ARTS

To the President of the College,

Sir: To submit herewith the biennial report of the School of Engineering and Mechanic Arts for the period ending June 30, 1928, is the honor of the Dean.

The close of the year 1926-27 marked an epoch in the history of the School of Engineering. It was then that Dean Grant Adelbert Covell, for thirty-eight years the guiding spirit of engineering work at the College, closed his great career as the pioneer of engineering education in the Pacific Northwest. Several months before his death, he had the satisfaction of seeing his plans for organized investigation in engineering finally realized through the establishment, by the Board of Regents, of the Engineering Experiment Station with special provision for graduate research in Engineering. Thus to the upbuilding through the years of strong undergraduate training and curricula, was added at last an organization for engineering research and for advanced professional study. Almost coincident with the death of Dean Covell was that of Professor H. C. Brandon, Professor of Industrial Arts and Director of Shops, who had served the institution in this capacity for fourteen years. Thus the biennium marked the close of the careers of these two men who had given their best resources to the development of the School of Engineering. It marked the beginning also, largely through the efforts of Dean Covell, of organized facilities for the development of graduate work and for engineering service to the state, through both research and extension.

Those services and educational functions which are performed by the School of Engineering are grouped in large part about the curricula and the organization developed for the efficient and successful undergraduate training. The curricula of the school are designed to provide training in four fields leading to the baccalaureate degrees of Civil (general or highway options), Electrical, and Mechanical Engineering, and Industrial Shop Administration.

Curricula. The curricula in the School of Engineering have been planned for the purpose of preparing engineering graduates for entrance into technical and professional fields and of giving them a comprehensive and thorough training which will facilitate their advancement into administrative and professional positions. More or less unified curricula in which sequences of scientific, technological, and humanistic studies are pursued concurrently throughout the entire period of training are offered in each of the major divisions. During the past year these curricula have been revised for the purpose of establishing stronger continuity and coherence throughout the entire four-year period of training.

The curricula in Civil, Electrical, and Mechanical Engineering have an interesting similarity of organization and pattern. The first year, which is common to the three curricula, is devoted largely to tool courses; the second emphasizes those elementary principles of science and technology peculiar to each of the major divisions; the third is devoted to the elemental applications of principles in a more or less basic way,

and the senior year emphasizes broad applications in the general fields of practice.

The Civil Engineering curriculum has been reorganized primarily for the purpose of introducing more work in the general field of materials and construction. Three new courses have been added, one in Structural Engineering Laboratory, one in Estimates and Costs, and another in Construction Administration. Through the courtesy of Mr. G. B. Herington, executive secretary of the Associated General Contractors of America, Portland Chapter, and his executive board, lectures in the last-named course have been given to senior Civil Engineering students by the executive secretary.

Extensive changes have been made in the curriculum of the Industrial Arts department. The former curriculum has been replaced by two curricula which are identical in the first two years and differentiated in the last two. One curriculum, that in Industrial Arts Education, is administered jointly by the schools of Vocational Education and Engineering, and the other, Industrial Shop Administration, is administered by the Engineering School. These curricula have been designed for the purpose of training two classes of men, one who aspire to become industrial arts teachers and supervisors, and the other those who desire to prepare themselves for industry and for advancement to administrative and executive responsibility in it, but who do not desire to go deeply into the physical and mathematical sciences applied in the design and research of civil, mechanical, and electrical engineering. The curriculum in Industrial Shop Administration is quite unique in its pattern of organization. It provides a sound and thorough training for a large number of men who do not possess the inclination to pursue the abstract training and thinking of the engineering curricula, but who, nevertheless, have mechanical and human abilities and interests and desire to prepare themselves for shop management and administration.

In order to accomplish this reorganization in curricula the courses offered by the Industrial Arts department were materially changed. The new work is already attracting wide attention, as evidenced by the registration in these courses at the summer session this year and by requests concerning the coming summer.

Organization. At the beginning of the biennium the school organization included the four degree-granting departments of Civil, Mechanical, and Electrical Engineering and Industrial Arts, and three minor departments, Mechanics and Materials, Hydraulics, and Highway Engineering. The organizations of the departments of Electrical, Mechanical, and Highway Engineering, and the department of Mechanics and Materials, have been retained in their original forms. The department of Hydraulic Engineering has, however, been merged with the department of Civil Engineering, where the work offered in Hydraulics occupies an important place in the curriculum of the junior and senior years.

The department of Industrial Arts has been coordinated with the School of Vocational Education by the appointment of the departmental head to the position of Professor of Industrial Arts Education in the School of Vocational Education, which position he fills concurrently with the positions of Professor of Industrial Arts and Director of Engineering Shops in the School of Engineering. This reorganization has been effected for the purpose of more closely relating training in the depart-

ment of Industrial Arts to the educational requirements of the various states in which graduates are employed as instructors.

The work of the freshman year has been grouped in one division of General Engineering, which is administered by instructors from the three major departments of Electrical, Mechanical, and Civil Engineering, acting as a committee.

Faculty. There have been several changes in the personnel of the Engineering faculty. Two deaths have occurred, five resignations have been accepted, and seven appointments have been made. The deaths are recorded in the obituaries and the resignations are as follows: Professor S. H. Sims, head of the Civil Engineering department, 1927; Professor J. R. DuPriest, head of the Mechanical Engineering department, 1927; Assistant Professor L. E. Brigham, of the Hydraulic Engineering department, 1926; Mr. A. C. Coonradt, of the Mechanical Engineering department, 1927; and Mr. A. A. Boettcher, of the Mechanical Engineering department, 1928. The respective vacancies left by these men were filled by the reorganization already recounted and the following appointments: Professor G. B. Cox, head of the Industrial Arts department, 1927; Professor F. G. Baender, head of the Mechanical Engineering department, 1928; Mr. F. Merryfield, instructor in Civil Engineering, 1926; Mr. A. A. Boettcher, instructor in Mechanical Engineering, 1927; Mr. E. C. Starr, instructor in Electrical Engineering, 1927; Mr. B. E. Wilcox, instructor in Mechanical Engineering, 1928, and Mr. R. F. Newton, instructor in Mechanical Engineering, 1928.

Promotions made during the biennium include those of H. S. Rogers, from Professor of Hydraulics and Irrigation Engineering to Dean of the School of Engineering and Mechanic Arts, 1927; D. R. Smith from Assistant Professor of Civil Engineering to Associate Professor of Civil Engineering, 1926; G. W. Holcomb from Instructor in Civil Engineering to Assistant Professor of Civil Engineering, 1927; A. E. Ridenour, from Instructor in Foundry Practice to Assistant Professor of Foundry Practice, in the department of Industrial Arts, 1927.

Leave of absence has been granted to Assistant Professor Morris Wenk for the academic year 1928-29.

Plant and equipment. The congestion in class and drawing rooms which has been experienced during the past biennium will be in part relieved by the removal of the departments of Physics and Highway Engineering from Apperson Hall. This change will release the entire second floor for the School of Engineering. This space will be in large part occupied by laboratories and classrooms of the departments of Electrical Engineering and the offices of the Dean of Engineering. It will now be possible also to segregate the freshman engineering drawing work in the buildings of the Engineering School.

This relief meets the immediate needs of the Civil and Electrical Engineering departments for room. It does not, however, relieve the classroom congestion of the Mechanical Engineering and Industrial Arts departments nor will it provide for the growth of the freshman engineering classes and the room necessary for the courses in drawing and engineering problems. The congestion in this work makes the planning of a satisfactory schedule very difficult.

Plans must be prepared for the construction of a unit in which the freshman drawing and problems can be more closely segregated and in which the Industrial Arts department can be given adequate class and office room. This can probably be accomplished by the rebuilding of the wood shops with the addition of a second story.

The shops of the Engineering School are equipped and operated for two separate purposes: first, to provide a basic training in industrial technology for students in Electrical and Mechanical Engineering, and second, to provide a training for students in Industrial Shop Administration and Industrial Arts Education. Students in the engineering departments are given instruction not so much for the purpose of developing skill in the trade manipulating process as for the purpose of developing understanding and appreciation of manufacturing processes and the possibilities and limitations of such processes.

The wood shop is fairly well equipped for instruction in pattern and cabinet making. Some of the equipment, however—e.g., the planer—is becoming obsolete. New spraying equipment for finishing furniture will be added during the coming summer. This equipment will make it possible to carry the projects begun in the cabinet shop to their logical completion and will add materially to the interest of the work.

The foundry is reasonably well equipped for casting, but is crowded during part of the school year. There is little opportunity to accommodate more students than at present. The anticipated growth of the Engineering School and the Industrial Arts department demands a solution of the problem of expansion which indicates the desirability of taking over some of the room now occupied by campus maintenance departments.

The forge shop is inadequately equipped for instruction in manufacturing processes which are in current use. Hand forging, for which we are at present equipped, has been superseded by drop forging, annealing, heat treating, and welding. Castings are also in many ways being replaced by welded shapes. The forge shop is equipped with some meager facilities for welding and heat treating, but these must be expanded if the instruction of the department is to be illustrative of modern industrial processes.

The machine shop, while not limited in its facilities to the extent the foundry is, nevertheless needs a material reorganization and replacement of obsolete equipment if it is to serve its function for the teaching of modern industrial methods.

The laboratories are differentiated from the shops by the purpose of the instruction given in them. Shop instruction is directed toward an understanding of more or less standardized practices, and the development of a certain amount of manipulative technique. Laboratory instruction, on the other hand, is devoted primarily to the scientific measuring, recording, and explaining of the performance of materials and machines. The present equipment of our laboratories has been well selected and is arranged and housed for effective use. The scope of advanced undergraduate, graduate, and research work is, however, limited in all departments by the equipment available.

The Electrical Engineering laboratories will be extended by the addition and partial equipment of the standards and telephone laboratories in Apperson Hall during the coming summer.

In order to take the place which it deserves by its size and the efficiency of its training, the School of Engineering should very materially reorganize and equip its shops and laboratories within the next four years.

Students. According to a report by the United States Bureau of Education under date of May, 1928, the School of Engineering is eighteenth in size of 148 engineering colleges recorded, and is the second largest school west of Iowa and Minnesota, that of the University of California being the largest. The decline in registration below the after-war peak of 1921-22 reached its lowest point in 1924-25. Since then there has been a gradual increase about paralleling the increase in enrollment in the institution. The total enrollment of students during the first and second years of the biennium was respectively 689 and 698, and the numbers graduated were respectively 91 and 94. These students come in large part from the state of Oregon. The distribution of those registered within the departments of the School has been much more uniform since the development of the common freshman year. While in the past, fifty percent of the enrollment has at times been in the Electrical Engineering department, the experience of last year indicates a more thoughtful selection of courses by engineering students, with the result that Electrical Engineering enrollment is only slightly larger than the enrollment in Mechanical and in Civil Engineering.

Graduates. The graduates of this School enter a wide variety of positions in technical, administrative, and professional fields. Their experience indicates that their training has been thoroughly effective. Among the 1928 graduates, one passed the highest Civil Service examination written by any man in the United States; one received a very coveted fellowship at the University of Illinois; another received a fellowship at the California Institute of Technology; seven were employed by the General Electric Company of Schenectady, New York and Fort Wayne, Indiana; two were employed by the Bell Telephone Laboratories of New York City; two were employed by Westinghouse Electric and Manufacturing Company, of Pittsburgh; and many others were engaged for a wide variety of work before the end of the senior year. More than three-fourths of the entire class were definitely engaged for satisfactory positions before their graduation.

Successful records in years of early experience as well as in those of advancement and responsibility are confined to the graduates of no one department. Within the biennium a graduate in Civil Engineering took highest place in Civil Service examination for junior engineers, a graduate in Mechanical Engineering made the highest record in a technical examination given for a group of engineers very carefully selected from the leading institutions of the United States by the Chief Engineer of the General Electric Company, and a graduate in Electrical Engineering was sent to the patent office of the General Electric Company in Washington, D. C., for a training course and a four-year course in law at George Washington University.

The record of those who have been in service from five to fifteen years is no less distinguished. One graduate is Pacific Coast manager

of the largest appraisal company in the Northwest, one is a successful contractor in the city of Portland, another is head of the Civil Engineering department at the University of South Dakota, one is production manager of the Iron Firemen, another is production manager of a pump company, another is assistant laboratory director for the Ethyl Gas Corporation, one is electrical supervisor for the Southern Pacific Company, one is superintendent of tests for the Portland Electric Power Company, etc.

An illustration of how graduates are supplying the need for technically trained men in the Northwest is found in one of the large electrical power companies, where thirteen men in responsible positions are graduates of this institution. Another example is found in the construction of the Bull Run dam, where six of the engineering staff in charge of the concrete tests and of the inspection and supervision of construction are former students of the College and where the general gravel and plant foreman for the contractors is also from this institution. During the past year we have received many complimentary statements concerning the training exhibited by our graduates from members of large corporations and government bureaus.

Graduate study. Graduate study in Engineering is particularly desirable and necessary for those who contemplate a life work in research, designing, or education. In early days of industrial development much dependence was placed upon the individual and the ingenious inventor, but with the increased size and complexity of modern industry, random discoveries of a mechanical nature have given way to systematic research. This development is creating a demand for men who have been carefully and purposefully trained in the exploring of new fields, in the developing of new methods, and in the designing of new machines. Such men can best be developed by a continuation of training beyond the undergraduate period.

About one out of every eight graduates in engineering is returning to college to do graduate work. A similar ratio applied to our institution would indicate a probable enrollment of twelve or more graduate students in engineering each year. If some of these were extending their training over a period of two years by participation in the work of the Engineering Experiment Station the enrollment would be probably as high as eighteen. That we will obtain such an enrollment within the next few years seems not at all improbable. During the past year we have had an enrollment of four and the coming year will probably see an enrollment of about eight.

In order to prepare for these students and provide for individual interest in specific fields of endeavor standard course descriptions for each department are presented in the 1928-29 catalogue. Major work for the master's degree in Civil, Mechanical, and Electrical Engineering and in Mechanics and Materials is offered. The demand for such work is rapidly growing.

Engineering Experiment Station. The organization and development of the Engineering Experiment Station marks a new period in the history of the School of Engineering. It gives an opportunity for direct

service to the industries and people of the state; it is a source of inspiration and development for the Engineering faculty; and it provides encouragement for graduate students in the Engineering School. In May, 1927, the Engineering Experiment Station was established under the directorship of the late Dean G. A. Covell, with Professor S. H. Graf as Assistant Director. After Dean Covell's death the organization was made integral with that of the School of Engineering by the appointment of Dean H. S. Rogers as Director of the Engineering Experiment Station and Professor S. H. Graf as Director of Research, in May, 1928.

The objects of the Engineering Experiment Station are to conduct original research, to verify experiments, and to compile data which will improve the efficiency and economy of industry and construction, which will extend the actual and potential value of state resources, which will stimulate industry in scientific methods, and which will develop a general appreciation of these methods by the public. During the year 1927-28 two research assistants devoted half time to the study of research projects under the direction of faculty members. The projects already under way have been selected because of their economic importance to the state. They are:

Project 1. Investigation of Some Typical Oregon Concrete Aggregates.

Project 2. Tests on and Discussion of Industrial and Domestic Fuels in Oregon.

Project 3. Mathematical Analysis and Experimental Study of Fittings Used in Timber Construction.

Project 4. Tests on Concrete Drain Tile and Investigations of Dry Mixes Used in Their Manufacture.

Project 5. An Investigation of Lightning and Its Relation to Forest Protection.

Extra-mural contacts. The professional contacts of the School of Engineering have been very well developed. Each of the founder engineering societies has its own student branch in the institution and each holds joint meetings with student chapters once a year. During the past year excellent programs were presented by students before the Oregon sections of the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, and the American Society of Civil Engineers. These contacts provide excellent opportunities for Engineering students to become acquainted with the men and the work in engineering fields of the state. Many influential and prominent engineers, not only of Oregon but from all parts of the United States, have addressed the Engineering student body during the biennium. Members of the staff have participated actively in professional organizations.

Professor Graf has been president of the Portland Chapter of the A. S. M. E.; Professor Cox has been chairman of the Manual Arts Section of the Oregon State Teachers Association; Professor McMillan has been chairman of the A. I. E. E. Committee on Student Activities for the Northwestern States, a member of the Overhead Systems Committee of the National Electric Light and Power Association, and of the Program Committee for the 1928 Pacific Coast Convention of the A. I. E. E.;

Dean Rogers was elected a member of the Executive Council of the Society for the Promotion of Engineering Education at its national convention in June.

A number of papers and talks were personally presented before the professional groups by staff members. A list of these follows:

Am. Soc. M. E. Oregon Section, Portland—Report of national convention at New York and inspection of research facilities in a number of eastern institutions, Professor S. H. Graf.

American Vocational Association in Los Angeles—Address to Industrial Arts Section, Professor G. B. Cox.

Oregon State Teachers Association—Address Manual Arts Section, Professor G. B. Cox.

Am. Inst. E. E. Pacific Coast Convention—"Characteristics of Neon Gas Signs," Joint Paper by Professor F. O. McMillan and Mr. E. C. Starr.

Oregon Technical Council—Address on "Engineering Education," Dean H. S. Rogers.

Oregon Drainage Association—Paper, "Tide Gates," Dean H. S. Rogers.

Northwest Concrete Products Association—Paper "Some Drain Tile Test Results," Professor S. H. Graf.

Papers—First and Second Reports "Research Fellowship Progress," Mr. G. W. Gleeson.

Bulletins and publications. During the past year several bulletins and technical articles have been published by the members of the Engineering staff. A list of these is as follows:

College Bulletin "Shall I Choose Engineering?" H. S. Rogers.

Bulletin No. 1, Reprint Series Engineering Experiment Station "Methods of Live Line Insulator Testing," F. O. McMillan.

"Methods of Live Line Insulator Testing and Results of Tests with Different Instruments" 1927 Proceedings of the Technical Section of the Northwest Light and Power Association, F. O. McMillan.

"Methods Used in Investigating Corona Loss by Means of the Cathode Ray Oscillograph" December, 1927, Journal of the American Institute of Electrical Engineering, E. C. Starr and W. L. Lloyd, Jr.

"Electrified Areas in Water for the Protection of Fish at Diversions from Natural Streams." Bulletin published by U. S. Bureau of Fisheries, F. O. McMillan.

"Pin-Type Insulator Capacitance Tests" May, 1928, Electrical World, A. L. Albert.

"A Progressive Program of Engineering Education" February, 1928, Wiley Bulletin, John Wiley and Sons, Publishing Company, H. S. Rogers.

"Facilities for a State-Wide Engineering Service," November, 1927—Oregon, The State Magazine, H. S. Rogers.

"Organization and Administration of Engineering Courses" June, 1928, Journal of Engineering Education, H. S. Rogers, Published in Bulletin Form as a Reprint.

Some of these publications represent a great deal of independent research by faculty members and are a source of valuable information to the industrial public.

General Engineering Extension service. During the past biennium courses for automobile machinists have been offered each winter in the city of Portland. These have had an enrollment of from fifteen to twenty men. A course for manual training teachers which was offered by the Industrial Arts department drew an enrollment of about twenty-five. Both types of work seem to have been very successful and satisfactory to those taking them. There are numerous requests for the continuation and expansion of this work. One short course was also given in the department of Mechanics and Materials, through the cooperation of the Portland Cement Association, upon modern methods of designing and controlling concrete mixtures. It attracted an attendance of from forty to fifty persons to the institution.

There is a large amount of work of a miscellaneous nature which the School of Engineering has performed as direct service to the state. This includes such things as direct counsel concerning water supply systems, welding and forging demonstrations, lectures to boys' and girls' 4-H clubs, and advice to drainage districts, etc. While each of these miscellaneous services has been somewhat limited the aggregate has been a very real service to the state.

Needs and requirements. The more immediate needs of the School of Engineering are for equipment in the forge and machine shops and for further developments of the laboratories. To provide for the modernizing of the shop and development of advanced work and research in the laboratories about $75,000 should be available within the next three or four years. The rebuilding of the wood shop to relieve the unsatisfactory conditions in the Industrial Arts department and to provide additional space for the freshman drawing and problems will require an appropriation of about $40,000.

The last biennial report contained a record of efforts to develop a high-voltage laboratory in cooperation with the electrical power companies. It is still anticipated that this project will ultimately be developed. The research which can be accomplished in this laboratory will be of value to the industry and the industry has confidence in the Electrical Engineering staff to carry out such research.

There is a need in the state for extension courses of a trade continuation and of an institute nature. These can be offered with some additional assistance to the Engineering staff and with appropriations for expenses. The amount immediately required would not exceed $5,000.

Obituaries. After an illness which began in March, 1927, when he suffered a stroke of paralysis, which confined him to the hospital and to his home for several months, with varying hopes and misgivings regarding his recovery, Dean Grant Adelbert Covell suffered death from heart

failure on November 20, 1927. Dean Covell came to the College in 1889, to organize and develop the work in engineering, a building for which was under construction, where the Library now stands, when he arrived. Twelve students was the registration in engineering during Dean Covell's first year; he lived to see more than eight hundred enrolled in the School. One assistant helped him launch the work that in time enlisted the services of a staff of forty men and women under his supervision. The one building that welcomed him when he came, which later burned down and was replaced, has been succeeded by seven buildings grouped as a unit in the northeast section of the campus and equipped for effective engineering service. He became Dean of the School of Engineering when it was organized in 1908 and developed the curricula of the School to such an extent that Walton C. John, specialist in charge of Land-Grant College statistics, United States Bureau of Education, in discussing engineering curricula in an official bulletin of the Bureau following the War, selected those of the College along with those of the school of engineering of Harvard University as typical, "composed of a suitable grouping of foundation and supporting subjects in the humanities and the pure sciences, combined with a larger grouping of engineering or technical subjects."

On the organization of the graduate work in Engineering and the establishment of the Engineering Experiment Station in the spring of 1927, Dean Covell was advanced to the position of Dean of Graduate Engineering and Director of the Engineering Experiment Station.

Dean Covell's death was mourned by hundreds of alumni scattered throughout the world, and by many friends in the College community who honored and loved him.

In October of 1927 Professor H. C. Brandon, who was on special leave of absence, died after a prolonged illness since the spring of 1925. Professor Brandon had been in the employment of the institution since October, 1913. As Professor of Industrial Arts and Director of the Engineering Shops he had rendered worthy service to the institution and the state. His death was lamented by many friends and alumni of the College.

Respectfully submitted,

H. S. ROGERS,
Dean of the School of Engineering
and Mechanic Arts.

REPORT OF THE SCHOOL OF FORESTRY

To the President of the College,

Sir: I have the honor to submit the following report covering the work of the School of Forestry for the biennium, 1926-1928.

Curricula. Following the policy of the School of Forestry to be responsive in the highest possible degree to the requirements of the great timber industry of the state, a degree curriculum in Lumber Manufacture has been established. The objective is to give the young men who are interested in any phase of lumber manufacturing, basic training which will enable them to be of use in increasing the efficiency of this industry. Particular stress is being placed upon technical operations incident to lumber manufacture, such as kiln drying and lumber grading, upon the construction and organization of plants and upon lumber merchandizing. Due to the peculiar requirements of the forestry profession, it has been found desirable to enlarge the scope of work in forest surveying and mapping. Beginning with the year 1928-29, there will be a sequence of courses in this subject under the designation, Forest Engineering, from the first term of the freshman year to the third term of the sophomore year. These courses will include all the details of covering the ground and mapping it, according to the most approved forestry practices.

Students. The total registration for the year 1926-27 was 162, and for 1927-28, the number was 172. This represents an increase of 11 percent over the preceding biennium. Judging by the character of the work done, there is a consistent improvement in the ability and preparation of students entering the School. As an evidence of a fine esprit de corps among the students, each contributes a day of labor each term in the development of the School of Forestry arboretum. This has made possible a development which, due to lack of funds, could not otherwise have been made.

Graduates. In 1927, the School graduated 18 students, 5 in logging engineering and 13 in technical forestry. In 1928, 17 were graduated, 5 in logging engineering, 2 in lumber manufacture, and 10 in technical forestry. This number of graduates represents an increase of 17 percent over the biennium, 1924-1926. As an evidence of the character of training received by graduates of the School, it may be noted that 11 took the Forest Service examination for junior forester, the highest professional grade in this country, and that 9 passed the examination. This represents a showing better than that made by any other forest school in the United States.

Achievements of graduates. The first class, numbering four, graduated from the School in 1910. Early classes were very small. Due to the brief period since the establishment of the School, outstanding success on the part of any considerable number of graduates is hardly to be expected. Many of these men, however, are rendering marked service to the timber industry. One man is a forest supervisor in the Federal service and has charge of more than a million acres of forest land. Two are

deputy forest supervisors, while many hold responsible positions as technical foresters in the Federal organization. Two graduates are deputy state foresters. One has supervision over private forest protection work in Oregon. Two are professors of forestry. One is a bank president and another a bank cashier in lumber towns. Two men have done exceptional work in forest entomology. One man is at the head of one of the largest logging operations in the Northwest, with 550 men under his direction. Two hold responsible positions as logging superintendents. Two are production managers for large sawmills. At least ten are acting as logging engineers for logging companies. A recent check discloses the fact that more than 80 percent of the graduates of the School of Forestry are engaged in some occupation related to the timber industry.

Faculty. The normal expansion of the work of the School has made necessary the addition of one half-time instructor during the biennium. Due to the teaching load carried by the faculty, proper participation in research has been impossible. As a stimulus to professional growth, research work is without equal. It is to be regretted that the faculty cannot be enlarged sufficiently to make participation in forest research feasible.

In lieu of research, sabbatical leave is being employed to raise professional standards. Professor Patterson, head of the department of Logging Engineering, will be on leave the year 1928-29 to take advanced work at Stanford University. The following year another professor will go on leave for the same purpose. It is the objective of the School to employ no one above the rank of instructor who does not hold, at the least, a master's degree from some recognized educational institution. One professor, now holding a master's degree, has for his objective a doctor's degree within a few years.

Service to the state. By reason of membership on the State Board of Forestry, the Dean of the School has been able to get out publications, through the Board, giving information concerning the timber industry of the state, and the methods which should be employed in perpetuating it. Service has also been rendered by virtue of membership on a commission appointed by the Secretary of Agriculture, the purpose of which was to study recreational problems in the National Forests of Oregon and to formulate a recreational policy which might be followed by the secretary in dealing with recreational problems. In addition, the Dean of the School has served on a special forest taxation committee of the Portland Chamber of Commerce. He is also a member of the Research Council of the Northwest Forest Experiment Station. By lectures, by correspondence, and by personal advice, considerable service has been rendered citizens of the state in matters relating to the care of forest properties and in the proper utilization of them. This field of service could well be materially expanded. In line with the policy of many other forested states, Oregon should employ an extension forester to bring forestry information and practices directly to the people.

Facilities. A forest nursery with an annual capacity of 500,000 forest seedlings is now under full operation on the School of Forestry arboretum tract. This nursery is financed jointly by the Federal Forest Service and the State Board of Forestry, and is under the supervision of the Dean

of the School of Forestry. The nursery, which is located only seven miles from the School, provides, without cost to the College, a splendid laboratory in all phases of forest planting stock production. A tract of 260 acres of forest land, covered with second-growth Douglas fir, furnishes an opportunity for studying the problems of tree growth. Within the year, it is expected that final action will be taken transferring to the State of Oregon 77,000 acres of forest located south of the mouth of the Umpqua river. By law, this forest is to be under the technical management of the School of Forestry. It will furnish an excellent field for study by advanced students interested in forest working plans. A research kiln is being completed, and will be ready for use with the opening of the year 1928-29.

Oregon's forest resources and the lumber industry. Since Oregon is the foremost timber state in the Union, it is fitting, as a matter of industrial policy, that the state should be concerned in the continuation of the forest industry. The forest area of Oregon approximates 23,000,000 acres. More than 10,000,000 acres is privately owned. The greater part of the forest area of the state is unsuited to any other use except the production of tree crops. The annual production of wealth on account of the forest industry exceeds $150,000,000. About 65 percent of the industrial pay-roll of the state is met by the industry, and, in normal times 47,000 men are employed in some branch of it. To be of service to this great industry, in every proper way, is the objective of the School of Forestry. The extent of the forest resources of the state and the magnitude of its lumber industry indicate the degree of responsibility of the College in financing the work of the School of Forestry to the end that the industry may be served in proportion to the interests involved.

Research. During the biennium, there was a meager beginning in forest research. An allotment of $650 made possible the employment of a research fellow, who devoted his time to a study of kiln problems in Oregon. A commercial fellowship, for one year, was created by a timber company which resulted in a very valuable piece of work covering the proper seasoning of tan bark oak for use in furniture-making and for high grade finish. Aside from the initiation of a few studies in the rate of tree growth, in cooperation with the Northwest Forest Experiment Station, no other research work has been done.

With the opening of the next college year, a research kiln, fully equipped, will be ready for use. This equipment will be particularly serviceable both in instructional and in research work. It will also serve as a means of demonstrating proper lumber seasoning practices to the operators of small sawmills.

Need for research. As has been indicated above, Oregon has a greater interest in forestry than any other state. It is more dependent than any other state upon its forest resources. The future economic welfare of the state depends, to a high degree, upon the perpetuation of the industry. Hence, Oregon is vitally concerned in so using its forest resources that the largest continued return will be derived from them. This can only be accomplished through a solution of the problems of

utilization by research. Forest research is in its infancy. Due to the unusual time element involved, and to the rapidity with which the standing timber of the state is being depleted, it is imperative that research be initiated without delay.

Possibilities of research. Under present conditions the School of Forestry can do a limited amount of research work with small annual allotments. The School has an area of 360 acres of easily accessible forest land. The Federal Forest Experiment Station, located in Portland, will cooperate with the College to a limited degree, in planning and prosecuting research work on this tract. The School can do a limited amount of independent research work here. The kiln equipment affords an opportunity for valuable research work. Certain types of research work can be done on the state forest, although the distance from the College, 120 miles, is too great for the type of work requiring frequent attention. Additional forest land is needed and definite financial support for research is required.

Research problems. The following research problems, listed in the 1924-1926 biennial report of the School of Forestry, are outstanding among those requiring early attention. Because of their importance, they are again called to the President's attention:

(1) *The growth rate of Douglas fir on varying site qualities.* After a quarter of a century of effort on the part of the various forestry agencies of the nation, owners of forest lands in Oregon are beginning to show an interest in holding their cut-over lands for a second crop of timber. One of the first questions asked by a timber-land owner deals with the rate of growth in volume on his lands. His whole financial operation must be based upon reasonable assurance regarding this fact. This points to a field of investigation well worth the support of the state, since at least five million acres of privately owned Douglas fir lands are involved.

(2) *The effect of thinnings in natural stands.* Under European forestry practice large incomes are derived from thinnings made in growing forests. In Oregon there are now thousands of acres of thrifty young forests, especially of Douglas fir. A series of thinnings in such stands should be made, at different ages and in varying amounts, to determine the volume of material which can be removed and the effect of such removal, in accelerated growth, on the remaining stand. This is a problem in forest management which has a distinct bearing upon the extent of private participation in reforestation. It is a problem intimately connected with the financial returns from the investment in timber growing.

(3) *Density of stand in relation to volume growth.* This involves the whole question of density in forest plantations and in young stands, regenerated naturally. Planting costs are in direct proportion to the number of trees planted per acre. The proper spacing for maximum volume growth has not been determined for the various qualities of site in this state. In addition to this, and a part of this study, is the question of cost in thinning out very young stands. This whole matter of density

of stand and maximum volume yield is intimately connected with the financial side of reforestation.

(4) *Natural versus artificial reproduction of Douglas fir.* This problem involves the costs of planting as compared with the costs involved in leaving seed trees and the cost incident to the delay in starting the new forest crop because of the period of time required for satisfactory natural seeding.

(5) *Fall versus spring planting under various site qualities.* The number of surviving plants bears a direct relationship to cost. Investigation along this line is related to the whole problem of reforestation.

(6) *The durability of Oregon woods under varying conditions of use.* The users of wood desire this information. The farmer and the hop raiser want to know the material best suited for use as posts and poles. They desire to know the cost involved in treating posts and poles with preservatives, together with the effect upon durability of the material.

The problems listed are among those most pressing for solution. They are of a character such that their solution can be undertaken by the School of Forestry. From the very nature of the case, it is evident that long periods of time will be required before definite conclusions may be made. This is an added reason for beginning the investigative work without delay.

Graduate work. The college year 1927-28 was the first time in the history of the School of Forestry that men were recommended for advanced degrees. Two only were granted. Under present conditions many of our students go to other institutions for advanced work. The School of Forestry should be able to provide graduate study for such of its students as desire to take it and to offer such work to those who desire to enter from other schools. It is the definite policy of other institutions to assist worthy and qualified students to do advanced work, by granting teaching and research fellowships. The recent adoption of this policy at this institution and its extension to the School of Forestry will help to relieve major professors of an excess teaching load and enable them to render increasingly valuable service along research and graduate lines. With the flood of students to institutions of higher learning and the resultant keen competition among professionally trained men, the bachelor's degree is coming to mean less as a measure of training. Real professional leadership must come more and more from the group which has had the advantage of the training of graduate years. It follows that this institution, if it is to maintain its prestige as a trainer of leaders, must give additional consideration to graduate work.

Publications. During the past year, the Dean of the School has revised Bulletin 2, "Oregon's Commercial Forests," a publication of 80 pages, issued by the State Board of Forestry. Numerous technical articles have been prepared for professional forestry magazines, and numerous addresses have been delivered. There is need, in addition to all this, of a series of forestry bulletins to bring to the people of Oregon a realization of the extent of the forest resources of the state, the means of utilizing these resources to the best advantage, and the methods which

should be employed in making the forest industry a permanent one. It is the responsibility of the College to provide for the issuance of such information.

Developments in other states. In the School of Forestry in the University of Idaho, a forest experiment station has been established in connection with the forest school. The forest industry of Idaho is keenly interested in the work of the experiment station and is giving a limited amount of financial support.

The University of Washington forest school has recently received $40,000 with which to purchase timber-land to add to its demonstration and experimental forest.

At the University of Michigan, the forest school has been expanded to the school of forestry and conservation, including in the scope of the school the conservation of the fish and game of the state as well as the recreational features of the forest. Research appears to be one of the principal objectives of this as of other forest schools.

Recommendations. (1) Provision should be made for a definite program of forest research, having a scope commensurate with the forest interest of the state. This program should contemplate cooperation with the Northwest Forest Experiment Station. Initial annual expenditures, not covering land purchase, amounting to $5,000 should be made.

(2) Funds should be provided for the employment of an extension forester, in cooperation with the Federal government under provisions of the Clarke-McNary Act. To secure the benefit of this cooperation, an annual expenditure by the College of $1,500 is needed.

(3) The School of Forestry should be enabled to issue a definite series of bulletins dealing with the forest resources of the state. Cooperation with the Extension Service and the Experiment Station of the College should, if feasible, be enlisted in this project. An annual allotment of $1,000 for this purpose should be made.

(4) In order that scientific forestry practices may be demonstrated and that forest land for research purposes may be provided, the College should enter upon a definite program of forest land purchase, looking toward the acquisition of an area of at least 3,000 acres for the purposes indicated. It is estimated that an expenditure of $3,000 annually for a period of 15 years would provide the land needed.*

(5) The graduate work of the School of Forestry should be encouraged by the addition to the staff of a full time instructor or the equivalent, a procedure which would enable professors to give the needed time to graduate students and to research work. An annual allotment of $2,000 for this purpose is needed.

Respectfully submitted,

GEO. W. PEAVY,
Dean of the School of Forestry.

*Since this report was written the Blodgett tract of 2,400 acres located in Columbia county has been donated to the College by Mr. John W. Blodgett of Grand Rapids, Mich.

REPORT OF THE SCHOOL OF HOME ECONOMICS

To the President of the College,

Sir: As Dean of the School of Home Economics, I have the honor to submit the following report for the biennium ending June 30, 1928.

The School as a factor in the development of the State and Northwest. The School of Home Economics, through its yearly enrollment of five hundred students and its service courses each year approximating three hundred registrants from other schools, continues to be recognized as not only one of the largest schools on the campus but one of the largest divisions of Home Economics in the United States. In addition to its major students, the School during this biennium has greatly increased its service to women and men students of other schools through especially adapted courses and lectures. It is the aim of the School to extend its courses and its services to all students. During the past biennium the standard of work has been raised and changes in courses made to conform with changed demands of the homemaker. For example, an increasing emphasis is being placed upon the responsibility of the homemaker as an intelligent consumer, a wise purchaser, and less time is spent in preparing her to produce garments and food. More emphasis is placed upon equipping her to understand mental and physical growth and needs of children and less on the details of housekeeping. Knowledge and judgment in the administration of the homes of a country and not its inventions nor its buying power determine its success. The School of Home Economics is making a contribution not only to the State of Oregon and the Northwest but also to many other states and foreign countries through the service of its graduates, a service not to be measured in dollars and cents but in health, happiness, and efficiency of citizens.

Curricula. Home economics is a profession that builds on woman's natural ability and through it offers an outlet for special talent. A study of home economics equips a woman for intelligent and happy living and at the same time affords her the opportunity of earning her own way, of being independent. Along with its general training, which looks toward a broad and satisfying outlook on life and an increased capacity for living, home economics prepares a woman, according to her interests and abilities, to enter any number of worthy types of work. More than that, new opportunities are presented every day, waiting only upon the originality and enterprise of the capable woman. Home economics training opens the door of the business world, if that is where special talent tends, or it leads through unlimited avenues of social service. Yet it prepares a woman for a genuine, wholesome leadership in her own community and develops greater efficiency and appreciation in homemaking as a profession.

Training in homemaking is fundamental in all the work, but a distinct curriculum, the General Curriculum, provides especially for those whose main object in attending college is preparation for home life. Courses in English, art, history, modern languages, science, and the

other departments of general training, supplement the technical courses in this curriculum, which aims to provide a liberal as well as a technical education. The true homemaker not only must be trained in the science, the art, and the economics of the household, but also must have a well rounded personality, with intelligent interests, trained judgment, and cultivated tastes, enabling her to solve successfully the rapidly changing problems of the modern home, with its complex social and civic relationships.

In the Professional Curriculum, which prepares for the more technical pursuits, the work is largely prescribed for the first two years. In the junior and senior years the student may specialize in some particular field, such as the teaching of home economics, institutional management, or commercial work. Each of these in turn offers a variety of possibilities. Teaching positions include the teaching of home economics in secondary schools, colleges, universities or other institutions of higher learning.

Facilities for work. The work of the Home Management House has been strengthened by the addition of a graduate student of experience and training as a fellow who will give half time to the supervision of the work in one of our houses. This relieves the head of the department from residence in one of the Home Management houses so that time can be used in starting a new course in "Control of Personal and Family Finances" which is to be open to students who are not registered in Home Economics. It will also give the head of the department more time to devote to the work of supervision of sorority finances and to an increasing number of graduate students.

With the opening of the Memorial Union Building, facilities for training institutional workers will be greatly strengthened. With the equipping of a textile laboratory this fall, graduate as well as undergraduate courses in textiles and clothing will be improved.

Graduates and graduate work. During the biennium graduate work has been greatly increased. Fifty Home Economics graduates, representing twenty-five colleges, were registered the past summer in our classes. Of the 748 summer session students, the majority were enrolled in Home Economics classes.*

Each year the School of Home Economics has a large graduating class. For several years this number has been in the eighties. The total number approaches 1400 and they are found in almost every state and several foreign countries. Most of them are in their own homes. Others are holding leading positions in various professional fields such as administrators and teachers in colleges, universities, normal schools, and public schools; extension workers or state leaders; home demonstration agents; specialists in nutrition and clothing; institutional directors of colleges, cafeteria directors of public schools, hospital dietitians; social service workers; commercial demonstrators; directors of home economics in foreign countries.

*Since the summer session registration is not by schools the exact percentage cannot be given.

Research. Through the aid of the Federal Purnell Act, an excellent start in home economics research work has been made possible during this biennium.

Our study of "Present Use of Time by Farm Homemakers" was begun December 1, 1925. The problem involved is mainly that of securing information as to the relative importance of the tasks which make up the homemaker's work day, and of the factors which seem to influence the proportioning of her time. It is hoped that some suggestions for the more efficient use of time may come out of the study.

There are two aspects of the term "homemaker" to be considered. One has to do with the character of the homemaker's job and its influence on her personal activities; the other has to do with time required for homemaking in various situations. and this involves a study of the extent and nature of help received in the household, as well as that of the time given to homemaking by the homemaker herself.

So far as the household is concerned, there are two aspects of the term "farm," the location of the house, and the occupation of the chief income earner of the family. Most (but not all) Oregon farmers live in the country. The study aims to bring out the differences in time distribution in country homes and those not in the country; also between those in which the chief occupation of the income earner is farming, and those in which it is some other occupation.

Records totaling 547, each kept for a week, have been classified. Of these 311 came from country homes where the chief occupation of the income earner is farming; 72 are from country homes where the occupation is not farming; the remainder are from homes not in the country where the chief occupation is other than farming.

The study is intended to show the distribution of time during "normal" weeks, and is therefore of value chiefly as a study of daily and weekly activities.

This is but the beginning of Home Economics research at the College. It is hoped that the growth in projects and funds will be such that soon the field of Home Economics will be enriched and developed greatly by scientific facts added to the body of subject-matter, as has been accomplished through agricultural research.

Staff. No additional staff members have been added to the School of Home Economics during the past biennium, although many more students have been served. This has been possible as a result of reduction of laboratory periods from three to two hours in length.

The head of the department of Household Administration was invited to teach in Columbia University summer school in the summers of both 1927 and 1928.

Many staff members have availed themselves of summer study in Columbia University, the University of Chicago and other colleges, including Oregon State.

Several leaves of absence have been granted for travel and study. The head of the Clothing and Textiles department and Vice-dean of the School is returning in early September after a year's trip around the world.

Professor Sara Watt Prentiss, a graduate of the College who is in charge of Child Care and Training, has been granted a Rockefeller Scholarship for a year of further study on a sabbatical leave in this rapidly developing field.

The Dean of Home Economics was one of the home economics women of the United States, the only one west of Kansas, chosen by the United States Bureau of Education to aid in the Land-Grant College Survey. The northwest territory was assigned her.

One book on Household Marketing has been written by a Home Economics instructor and is now in the hands of the publisher.

A scientific monograph on Chinese Student Homes has been completed by the Dean of the School of Home Economics and is ready for publication.

Needs and approximate cost. For two years it has been necessary to house the Nursery School in the second Home Management House. By making use of the porch, living-room, and another small room of this house during the coming year, this can be done again. While this will be far from satisfactory so far as both the Nursery School and the Home Management House are concerned, it will make it possible to continue the work of the Nursery School until more adequate quarters can be provided, which must be within a year if we are to keep pace with other schools of our standing. Since this is the logical institution in this part of the country to develop a strong Nursery School, we are in a strategic position to make some outstanding developments in this line when proper facilities are provided.

During the Summer Session most of our students taking Child Care and Nursery School courses are graduate students from a distance. Because of the crowded condition of the Nursery School in summer session, we cannot use the Covell House as a Summer Session Home Management House. Twenty-three more persons than we could accommodate applied for residence in the Home Management House during the last summer. If we hope to do our Nursery School work adequately and accommodate even a reasonable number who apply for Home Management House residence we must have the Covell House released for the exclusive use of the Nursery School and we must be provided with two other Home Management Houses which can be used during the Summer Session.

During the year 1926-27, which was the first year Home Management House was made a required course, we were barely able to accommodate all of our seniors without overcrowding. During 1927-28 more than half of our groups were overcrowded, thus hampering the work of each overcrowded group. All but one of the Summer Session groups were our own students graduating at the end of Summer Session. There was, therefore, no place for students from other states. We should begin construction of two Home Management Houses at once so that we may have these houses available for Summer Session and the regular year and thus release Covell House for Nursery School purposes only. This must be done if we hope to develop these two courses and keep pace with other institutions. The Covell House could continue to be used for the Nursery School until such time as construction of another build-

ing is begun on this site. If the entire house could be used for Nursery School it would be quite adequate for the present.

Since Withycombe Home Management House, which has been used for twelve years, has always been considered as temporary quarters, little has been spent upon this house except the annual upkeep. This house has never been adequately heated and the kitchen is most inefficient. If this house is to continue to be used as a Home Management House these faults should be corrected. The house could be placed on the college heating system and the kitchen remodeled by utilizing the waste space of an unused breakfast room.

The cost of these two improvements would be very low considering the value they would add to the work and the comfort of the residents of the house.

With the development of graduate work and fellowships offered in the Foods and Nutrition department, more space devoted to experimental animal feeding is needed. At present, the small room used for undergraduate animal feeding problems is barely enough to accommodate the students in the required course in nutrition, leaving no space for graduate and thesis problems. Another adjoining room is a fundamental need in the development of graduate nutrition.

Since the application of heat in cookery has become much more accurate and scientific, based on carefully controlled experiments, and since new means of controlling temperature are now a part of the most modern electric ranges, it is necessary that the food laboratories be equipped with these accurately controlled ovens. We can no longer teach "approximate temperatures" by housewife tests but must speak in definite centigrade degrees of temperature. This progress in making cookery still more a science requires the modern types of electric ranges, and this, in turn, means new electric lines installed in the east wing of the Home Economics Building. The present sources of power have been tapped to a point beyond actual safety, according to the Superintendent of Light and Power. Until new lines are provided, the department cannot install the modern electric equipment so badly needed. As soon as this additional source of power is obtained, plans will be made for exchanging the old electric ranges for modern types and adding more electrically operated small equipment.

We must recognize that Home Economics is a "growing subject." Scientific Nutrition and the Evaluation of Foods, now a recognized science, is constantly being recast as scientific research points the way. A changing emphasis means changing methods and changing needs in a nutrition department attempting to interpret this progressive science.

The completion of the third wing of the Home Economics Building would give the School more rooms adapted to its needs and would relieve the overcrowding on the campus by aiding in housing other departments.

Respectfully submitted,

AVA B. MILAM,

Dean of the School of Home Economics.

REPORT OF THE SCHOOL OF MINES

To the President of the College,

Sir: I have the honor to submit the following report of the School of Mines for the biennium ending June 30, 1928.

During the present biennium the enrollment in the School of Mines has shown a gratifying increase over the last similar period and this may be interpreted as reflecting new interest in our mineral resources. Another indication of this same interest is the large number of inquiries from people in Oregon and other states regarding the mineral possibilities here. The staff members have done much to stimulate this interest and have rendered valuable service in personal contacts throughout the state.

Organization and policy. The School of Mines comprises the departments of Geology, Metallurgy, and Mining Engineering, offering a four-year curriculum in Mining Engineering. Thorough work is given in the fundamentals relating to engineering, including all of the basic sciences. The students thus receive adequate training in geology, mining, and metallurgy to enable them to make good in the commercial world. In addition to the work outlined certain courses are offered which are elective outside the School of Mines. Among these electives certain courses in geology are proving very successful and the enrollment shows a marked increase. These so-called service courses are expected greatly to enlarge our field of usefulness.

With our laboratory facilities, our available technical staff, and a host of problems awaiting consideration, the matter of extra-curricular activities, such as graduate work, research, and commercial applications, is of increasing importance. The Oregon Mining Survey, a successor to the Oregon Bureau of Mines and Geology, is planned to meet this situation and with a reasonable appropriation should become one of the indispensable activities of the state.

Curricula. Careful consideration has been given to the arrangement of subject-matter offered, and the courses as outlined are comparable to those given in other mining schools of recognized standing. As new conditions arise in the mining engineering world new schedules are prepared, and the latest developments are given thorough consideration. Well-equipped laboratories, to which new equipment is being added constantly, enable the students to keep abreast of modern practice.

Students. During this biennium the student enrollment has increased from 38 to 52. This places our School of Mines among the larger ones of the country. If one were to consider the number of students who elect subjects in the School of Mines but who do not major in this work, the total number served would probably exceed 450. Strict adherence to high standards limits the enrollment but greatly improves the quality of work done.

Graduates. Graduates totaled 8 in 1927 and 8 in 1928. These students have all obtained employment and are a credit to the College and

the state. A list of their affiliations would show important and responsible positions in the mining industry in widely scattered localities in this and other continents.

A few examples of positions held by recent graduates will indicate how readily these men have adjusted themselves to the practical demands of the mining industry, some of them in positions of distinction. According to present knowledge, one of the 1918 graduates has a responsible position with the Standard Oil Company with headquarters at Buenos Aires, Argentine. One of his classmates is in charge of important research and laboratory work for the Federal Lead Company in Missouri. A graduate of 1922 is metallurgist for a large smelter in Salt Lake City. One of the 1925 class is rated as an outstanding authority on frozen gravel dredging and is located at Nome, Alaska. Two other graduates are with the Bethlehem Steel Company, one as superintendent of one of their largest mines, the other in charge of some important mill operations. Some have continued on into research work, either in college or with government bureaus and are preparing themselves for certain highly specialized fields.

Facilities for work. The Mines Building is adequate, in most respects, to meet the housing needs of the School, but at present several other departments are using some of our classroom and laboratory space. With further growth it may be necessary for these other departments to be assigned room elsewhere, permitting needed enlargements in our school work and other activities.

Service to the state. The Oregon Mining Survey succeeds the Oregon Bureau of Mines and Geology and serves as the official source of information on mining matters in the state. The Dean of the School of Mines is Director of the Oregon Mining Survey and thus brings the College into a very intimate relationship with mineral development throughout the state. This outside work is increasing and bids fair to become a major activity. In order to make this cooperation as efficient as possible there should be considerable travel throughout certain parts of the state and when funds are provided for this purpose by the legislature a larger service to the mineral industry can be realized. Hundreds of samples are sent in for examination and analysis. Much work of this kind is done gratis but a charge is made for assaying and analytical work to cover actual cost and to avoid unfair competition with professional men in business.

This work, which has been under way for only a short time, has reached a stage where it needs and merits considerable time and energy. In order to handle it properly, but without interference with our college work, additional funds should be provided by the state for part-time or full-time assistance. This extra, but very important, work is well justified and should pay big dividends, but its cost should be a separate budget item rather than an overload on another state activity (our state college) already taxed to the limit of its capacity. At present the mineral production of Oregon, including manufactured clay and cement products, totals about $7,000,000 a year. We have no inventory of these wasting assets and yet they are among our most important possessions. Once gone they cannot be renewed like farm products, the forests, or our fish reserves.

Research. At present our teaching staff devotes nearly all of its time to regular collegiate work and undergraduate problems. Some excellent work in broader state investigations has been done both by members of the present staff and others, and this reflects credit both on the individual doing the work and on the College. Many of these studies should be enlarged upon and many others undertaken. Some of the inquiries coming to us touch subjects on which we have little or no definite information. Many mineral occurrences, perhaps of commercial importance, we know nothing of. In other cases the available information is inadequate. Certain mining and metallurgical problems in Oregon are such that the College is a logical factor in their solution. Moderate annual expenditures along these lines might be expected to yield tangible results of considerable importance and the additional expenditure by the state would be small compared to the benefits realized. For instance, $10,000 per annum available for travel expenses, one or two graduate fellowships, and equipment and material, might make possible a preliminary survey of the situation and initial work on one or two concrete problems. Many commercial deposits may be easily available, others are perhaps inefficiently worked, in still other cases recovery losses may be unduly high. A careful study of these problems by staff members, either in the field, in our laboratories, or both, should assist in arriving at the best solutions under existing conditions. The relatively small additional expense for such research is certainly justified.

Graduate study. Oregon has many unsolved problems in connection with her mineral resource development. Perhaps most of these call for expert study and analysis. We are training young men to approach these and similar problems in a scientific manner. Some of these problems call for laboratory study and treatment with expensive apparatus and a freedom from commercial pressure. Slow, painstaking analysis is more economical than hurried cut-and-try methods. The School of Mines offers an ideal background for just such studies. If our own graduates, and others, now in practice are urged to bring their problems to our laboratories for study we might be able to hasten the solution of some of them. Scholarship and fellowship funds, in some cases to be duplicated by commercial applicants interested, offer a fertile field.

Recommendations. It is recommended that time and funds be allowed the staff members in order that they may acquire as much first-hand knowledge as possible of state problems; also that funds be made available for graduate study and other research work, especially where it pertains to our Oregon mineral industries. It is believed that the School of Mines may thus achieve its largest measure of usefulness, both in training and inspiring its students for real accomplishment and also in the material beneficiation of our great commonwealth.

Respectfully submitted,

JAS. H. HANCE,
Dean of the School of Mines.

REPORT OF THE SCHOOL OF PHARMACY

To the President of the College,

Sir: The following is a report of the School of Pharmacy for the biennium beginning July 1, 1926 and ending June 30, 1928, together with a statement of present conditions and needs for the future.

General statement. The two years covered by this report constitute a period of constructive development. The acquisition of the Oregon State Board of Pharmacy drug laboratory, the establishment of graduate work, the organization of Drug Trade Conferences, the employment of outstanding instructors, increase in attendance, and the strengthening of curricula are the chief factors which have had a bearing on this development.

Pharmacy Building. The new building is highly satisfactory. According to our plan of conducting two or more sections in the same laboratory, together with the installation of laboratory desks and other furniture in Room 109 (the Manufacturing Pharmacy laboratory) and use of the equipment in Room 104 (the laboratory now being used by the physical chemistry department) our building can take care of 450 to 500 students.

The Pharmacy Building has been much used for general recitation purposes. This condition is welcome so long as it does not trespass upon the necessities of Pharmacy students, but the time is at hand when such general uses must be limited.

Manufacturing Pharmacy laboratory. As the Pharmacy Building provided more space than the attendance in October, 1924, required, it was thought advisable not to equip immediately the Manufacturing Pharmacy laboratory, Room 109. In anticipation of future development, however, all plumbing, electrical conduits and other fixtures were installed up to the floor level or the wall level. All that is necessary to equip the laboratory, therefore, is to supply material constructed by the departments of Superintendent of Buildings, Plumbing, and Electricity. Our present needs urge me to recommend that this laboratory be equipped. In support of this recommendation I have already submitted floor plans, sketches, and cost of equipment, and I urge that this matter receive immediate attention. Estimates based on current prices of materials furnished by the Superintendent of Buildings, plumbing department and electrical department total $3,493.00. As stated in past reports, this equipment is not designed exclusively for work in Pharmacy. The desks are of standard make and could be used for any kind of scientific work.

Service courses. Since the establishment of the School of Pharmacy in 1898 it has been the desire of the druggists of the state that service courses be offered that relate to the use of drugs and chemicals in the home. Because of the lack of room and equipment this work could not be offered. We also desire to participate in the work of the Summer Session by offering Household Preparations, a course designed to teach

students how to make simple household remedies, and to use disinfectants, together with other useful information along the lines of the courses offered by practically every school of pharmacy in this country. As there are no prerequisites to this course all women students on the campus and townspeople would be eligible. If space is provided, I am confident that we would have a registration of at least 200 students each year.

Drug laboratory. In my last report I announced that the Oregon State Board of Pharmacy was considering the establishment of a laboratory in the Pharmacy Building for the purpose of regulating the manufacture and sale of medicinal substances in the state of Oregon and for other purposes. The laboratory was opened October 1, 1927, and is in charge of a competent chemist who is also a member of our instructional staff. It is located in Room 110, in close proximity to the fire-proof vault and the stock rooms. To date more than $4,000 has been expended for chemicals and equipment.

Since the laboratory is equipped with modern stock and apparatus, it is possible to analyze any pharmaceutical compound. In addition, because of this equipment, for the first time in the history of the School of Pharmacy we are in position to offer graduate work. Because of the equipment furnished by the laboratory, moreover, it is now possible for the School of Pharmacy to solicit manufacturing firms for research fellowships. This plan of conducting research has been practiced in eastern states for the past fifty years, and has been found to be economical both for the institution and the commercial firm. Before such fellowships can be solicited, however, it is necessary that the Manufacturing Pharmacy Laboratory in Room 109, adjacent to the Drug Laboratory, be equipped. The director can not leave his legal work to visit laboratories on the second floor. If the fellows could work in Room 109, which would be used entirely for pharmaceutical testing and analysis, the director could conveniently supervise the work of such fellows.

On October 1, 1927, official inspectors of the State Board of Pharmacy began to send samples for analysis. At the close of the biennium more than 1,000 of such samples had been analyzed. The results of later analyses showed marked improvement over those first received. This demonstrates the value of such inspection and analysis not only to the conscientious druggist, but also to the consuming public.

In addition to the general routine work of the laboratory and instructional work, the director is engaged in collaborative work with the United States Department of Agriculture, Division of Drugs; the American Association of Agricultural Chemists; and the revision committees of the U. S. Pharmacopoeia and National Formulary. He is doing considerable work on phytochemical research of drug plants indigenous to Oregon.

Model Drug Store. The demand of the practical phases of the drug business makes it incumbent upon schools of pharmacy to include in their curricula more courses dealing with the commercial side of pharmacy. Oregon was the first state in the Union to recognize this need and establish a model drug store. Incidentally instruction is given in sign card painting and window trimming.

Drug trade conferences. During the last biennium two drug trade conferences were held in connection with the convention of the Oregon Retail Merchants Association. In 1926-27 the topic was "Retail Methods and Practices;" in 1927-28 it was "Operating Costs in Oregon Drug Stores." Both topics were handled in such a way as to render constructive service to the drug industry.

O. S. P. A. Educational Fund. The Oregon State Pharmaceutical Association Educational Fund which was established in July, 1925, has assisted 37 students of the School of Pharmacy to complete their college work. The average of the loans granted is $95.81. To date $13,875 has been subscribed, subscriptions being paid in ten annual installments. The sum of $3,545 has been lent to students and all beneficiaries have promptly paid their loans.

Curricula. During the last biennium our curricula have been strengthened by the addition of more cultural subjects. We find, however, that there are still too many required courses. It is our aim to give the students more latitude in the election of courses, especially after the sophomore year. We are planning a number of options that will prepare students for work other than in the drug store. The delay in offering these options is due to the fact that for the past two years the faculty has considered the discontinuance of the three-year curriculum. When the three-year curriculum is discontinued, it will be possible to offer options that prepare students for work of a higher degree, such as pharmaceutical chemist in laboratories for the government, hospital technicians, science instructors, and for other lines of work.

New courses. During the past biennium the following new courses described in the College Catalogue have been offered: Phr 224, Model Drug Store Practice II, 3 credits; Phr 356, Microscopy of Drugs, 3 credits; Phr 454, Pharmacological Standardization, 3 credits; Phr 481, Toxicology, 3 credits; Phr 484, Quantitative Drug Analysis, 3 credits; Phr 601, 602, 603, Seminar, 1 credit each term; Phr 691, 692, 693, Thesis and Graduate Study, credit and hours to be arranged.

Undergraduate students. In the year 1926-27 the School enrolled 237 students; in 1927-28, 211 students. From a survey of conditions affecting enrollment the broadening of the field of service of thoroughly trained pharmacists and the excellent opportunities afforded in the allied professions, it appears that a gradual increase in attendance may be expected. From the latest report of the American Association of Colleges of Pharmacy on attendance in schools of pharmacy, Oregon State Agricultural College ranks fourth in the list of state-supported institutions and first on the Pacific Coast.

With an increased registration, together with the many new courses, relief must be sought by the employment of experienced instructors who have completed requirements for a higher degree. In addition, as is the custom of the larger schools of pharmacy and of other schools on the campus, it will be necessary to segregate our work into departments.

Pharmaceutical Association and Rho Chi. A very active club known as the Pharmaceutical Association exists in the School. The only re-

quirement for membership is registration in the School of Pharmacy. The association is instrumental in fostering a professional spirit among its members and in bringing to the campus men of prominence in the professions of pharmacy and medicine.

Rho Chi, the national honorary pharmaceutical fraternity, has been influential in raising the scholarship of students in Pharmacy. In addition to qualifying for membership in Rho Chi, many of these students have been elected to the all-college honorary, Phi Kappa Phi, and to other similar organizations.

Alumni. During the biennium 75 degrees in Pharmacy were conferred. This is the largest number of degrees conferred in any biennial period in the history of the School. In 1926-27, 8 Bachelor of Science degrees and 24 Pharmaceutical Chemist degrees were conferred. In 1927-28, 16 Bachelor of Science degrees and 27 Pharmaceutical Chemist degrees were granted. Of the 509 graduates of the School of Pharmacy whose vocation is known, approximately 47 percent are drug clerks, 21 percent are proprietors of drug stores, and the remainder are engaged as physicians, instructors in high schools and colleges, traveling salesmen, and in other pursuits directly related to pharmacy. It is gratifying to report that each year our graduates obtain good positions almost immediately after graduation. The opportunities for advancement to graduates in Pharmacy who have ability, industry, and integrity are ample. In order to keep our alumni in close touch with each other the School of Pharmacy publishes an annual alumni directory.

Graduate work. As stated, beginning with the next academic year we shall offer graduate work. This is possible first because of our well-trained and experienced faculty and second because of the availability of the State Board of Pharmacy Drug Laboratory. In regard to original problems Oregon presents a fertile field. Some of the problems we desire to take up, however, are impossible due to the lack of library facilities. Although the State Board of Pharmacy is willing to lend some of its equipment, such as polariscopes, spectroscopes and other apparatus for an occasional analysis, due to the lack of appropriation we do not have sufficient standard equipment, such as beakers, burettes, and other materials that are a part of every well-organized school of pharmacy. The small amount of money appropriated for equipment each year is necessary for buying apparatus for undergraduate courses. If the School of Pharmacy is expected to do its part in developing research and to qualify for fellowships by wholesale firms, it is necessary that the College appropriate at least $1,500 a year for equipment. Graduate work prepares students for important positions with wholesale drug firms, as chemists with the United States Government, and as research assistants in medical laboratories.

Curricula costs. In comparison with the costs of other schools of pharmacy in the United States, the cost to educate a student in Pharmacy at this institution is low. This is due largely to the plan of so organizing instructional work as to effect economy in the use of materials. Certain materials made in one course, for example, are used for laboratory samples in other courses.

Organization and policy. Because of the inducements offered to our instructors from other institutions and business firms, the School has been unable to hold its faculty. For this reason since 1914 no attempt has been made to change our plan of organization. The constant change of faculty is demoralizing to instructional work. There always will be changes until the College can pay salaries and offer inducements that are comparable to other institutions. The School has a definite responsibility to the state which maintains it. When the Dean is obliged to train a new set of instructors almost every year, however, it is impossible to attain the maximum results.

During the past year we were able to employ competent instructors who are not only well-trained and experienced, but are dependable and have the interest of the School of Pharmacy at heart. They have completed their work for a higher degree and naturally their interest is largely concerned with developing sound courses of instruction. The work of our graduates before state boards of pharmacy shows that our courses are thorough. It is my desire that these instructors be retained and that they be paid salaries commensurate with their line, work, and responsibilities. In addition, all of the members of the faculty have been trained to do research, and I recommend that facilities be provided by equipping the Manufacturing Pharmacy Laboratory in Room 109 and by appropriating at least $1,500 per annum for equipment. In most institutions instructors are required to do research to hold their positions. Naturally facilities are provided to do this work. In order that our instructional staff will have time for research all have been placed on a ten-month basis.

Resignations. During the past biennium the following resigned from the Pharmacy staff: Assistant Professor H. R. Lewton, to engage in business; Assistant Professor R. E. Terry, to accept a position with the University of Illinois, College of Pharmacy, and to do graduate work at the University of Chicago; and Instructor L. C. Britt, to matriculate in the University of Oregon Medical School.

Appointments. Appointments have been made as follows: Dr. F. A. Gilfillan, '18, who for two years was identified with the University of Florida, College of Pharmacy, returned to the College beginning with the academic year 1927-28 with the rank of Associate Professor. In addition Dr. Gilfillan spends part-time as Chemist and inspector for the Oregon State Board of Pharmacy Drug Laboratory. Dr. H. M. Burlage, Director of the Drug Laboratory, according to the agreement with the Oregon State Board of Pharmacy has the title of Associate Professor. He teaches the courses in Natural Products and Drug Principles and Pharmaceutical Testing, and is in charge of the students doing graduate work in the Drug Laboratory. Dr. Burlage's salary is paid by the Oregon State Board of Pharmacy. Ernst T. Stuhr, a graduate of the University of Nebraska, who received his master's degree from the University of Florida, College of Pharmacy, was appointed in 1927-28 with the rank of Assistant Professor. George R. Sigurdson, '28, and Frances R. Nielsen, '28, have been appointed fellows in Pharmacy. In respect to training, experience, and professional accomplishments, we have the best balanced faculty since the inception of the School of Pharmacy.

Drug garden. Since my connection with the College in September, 1914, I have recommended in every annual report that funds be appropriated for the establishment of a drug garden. The Pacific Coast states afford superior conditions for the growing of drug plants. Other schools of pharmacy in this region have been engaged in this work with good success for many years. As a result of experiments conducted several paying drug farms have been established. At Oregon State Agricultural College we have every facility for this work and I urgently recommend that you give consideration to this project.

One of the members of our staff had four years experience in managing the drug garden at the University of Nebraska and two years at the University of Florida. His thesis for the degree of Master of Science dealt largely with drug cultivation.

If an appropriation for the drug garden is made, we must also have a plot of ground and some space in the college greenhouses. Our work would deal largely with determining the best cultural conditions for such drugs as hydrastis, ginseng, belladonna, and others that not only command a good price, but that are also used most generally in the cure and alleviation of disease.

In addition, we should need a special room equipped with drying ovens, mechanical grinders, and other facilities. In anticipation of this work, Room 102 has been wired and otherwise prepared with such installations. The United States Department of Agriculture, Bureau of Plant Industry, realizing the optimum conditions that obtain in Oregon, would undoubtedly cooperate with us in our work. There is as much interest in drug cultivation as there is in growing trees and vegetables, and it would be our aim to conduct the work along the same lines as for similar projects on the campus. Even without facilities we have helped develop a paying peppermint industry in the Lake Labish section near Salem. If experiments could be conducted, I believe we could not only increase the yield of peppermint oil, but put out a product that would require but very little refinement. This is only one of the many valuable products that could be produced at a profit in Oregon.

Although during the college year our students would do most of the labor without cost to the College, we need a plot of ground located conveniently to the Pharmacy Building; a fund for preparing and cultivating the soil; tools; and during the summer the help of one man at full time. I therefore recommend that $400 be appropriated annually for a drug garden.

Out-of-state travel. The faculty in Pharmacy very rarely attend national pharmaceutical conventions. This is due largely to the fact that we do not have sufficient appropriations to make trips to the central states and east, where the conventions are held.

Attendance at these conventions would provide contact with individuals engaged in pharmaceutical instructional work. It would give our School and College a better standing. We should come in contact with individuals who could donate materials to the Model Drug Store, employ our graduates and establish fellowships. In the scientific sections we could increase our interest in research. Every school of pharmacy owes

something to a national organization and our faculty is as capable of helpful participation as any other. I therefore recommend that the appropriation for out-of-state travel be increased from $300 to $600 for the next biennium.

Recommendations for the biennium: (1) Equipping of Manufacturing Pharmacy Laboratory in Room 109 $3,493. (2) A cash register for the Model Drug Store $250. (3) Research equipment $3,000. (4) Appropriation for a drug garden $800. (5) Out-of-state travel $600. (6) Illustrated bulletin $800. (7) Repair of desk tops $250. (8) Covering basement floor with cork composition $742.23. (9) Iron gratings for lower floor stock rooms $40. Total $9,975.23.

Respectfully submitted,

A. ZIEFLE,

Dean of the School of Pharmacy.

REPORT OF THE SCHOOL OF VOCATIONAL EDUCATION

To the President of the College,

Sir: I have the honor to submit herewith the report of the School of Vocational Education for the biennium ending June 30, 1928.

Organization. The organization of the School of Vocational Education is such as will provide in the best way available at the present time for meeting the needs of two distinct classes of students. From the establishment of the department of Industrial Pedagogy in 1909 it has been the purpose of this division of the College to prepare as adequately as possible specialists in the various technical fields in which the College offers special curricula looking toward graduation. The state can not prosper permanently except as Agriculture prospers, except as Industry flourishes, except as Home Economics, Commerce, Business, etc., find a satisfactory place in the lives of the people of the commonwealth. Specialists in these subjects must have teacher-training preparation if the subjects are to make them of avail to the boys and girls of the state. Consequently, those young men and women of the state who are majoring in any one of these technical fields, find in this School an organization devoted to training them to teach their specialties.

In 1921, in further development of the work of the School in meeting the increasing demand throughout the state for teachers of vocational subjects, a degree curriculum in Vocational Education was established, permitting a range of technical electives according to the type of service in the vocational education field which the student may be preparing to enter. This curriculum affords training for supervisory and administrative positions demanding knowledge of a number of vocations, rather than of only one, together with a grasp of general problems in the vocational education field; for teaching combinations of vocational subjects, such as agriculture and manual training, home economics, and commerce; and for teaching a vocational subject in combination with related subjects, such as agriculture with science, manual training with shop mathematics, etc. In all small school systems where specialists can not be employed for all the vocational subjects, there is a demand for teachers of such combinations of subjects.

In planning the curricula three principles have been observed; first of all, every teacher should be a master of the subject-matter which he is to teach; second, every teacher should understand the minds of the pupils to be taught and the professional problems to be met; third, every teacher should have a broad and liberal education so that he may fill his proper place in the citizenship of community, state, and nation.

Facilities. Practice teaching in foods, clothing, typing and stenography, agriculture, and the industrial arts is done in the local high school, under the supervision of critic teachers employed jointly by the College and the local Board of Education. This arrangement represents extreme economy so far as space, equipment and expense are concerned. The Appointment Office of this School has in its files hundreds of letters

that speak highly of the excellent supervised teaching done in this way. Certain of the divisions of the College, however, such as the School of Home Economics, for instance, have grown to such an extent, and their graduates are in such demand over the entire West, that it is not possible for the local high school to provide sufficient facilities for practice teaching and yet run on a schedule made in the first instance with the convenience of the pupils in mind. There is great need for more facilities for practice teaching in typing, shorthand, accounting, foods, and clothing. At present, the practice teachers in agriculture and manual training are adequately cared for.

The offices and classrooms for the academic classes of this School are in the Forestry Building. With the opening of the new Poultry Building in the fall of 1927, the offices of the Dean, Appointment Office, and instructors in Education and Psychology were moved into quarters formerly used by the department of Poultry Husbandry, and the offices formerly used by them were taken over by the School of Forestry. Even now it is necessary to have the Appointment Office housed in the outer general office of the Dean, with the result that the appointment secretary has no possible privacy for her interviews with either students or prospective employers. Professor Brumbaugh has to use his classroom as an office, which makes the room not available for instructional purposes at such times as conferences with students are necessary. Professor Gibson, Mr. Schreiber, and Miss Chappell have their offices in the same room, and Mr. France has no office on the campus at all, and has to be seen for conferences in the high school building down town. With the addition of another man to the staff for next year the condition becomes even more acute. The Professor of Agricultural Education should if possible be housed in Agriculture Hall, where he can most quickly and adequately form and maintain contacts both with the members of the staff of the School of Agriculture and with the students of that School. The Appointment Office should have not less than two adjoining rooms of its own.

Faculty. During the biennium, the faculty of the School of Vocational Education has been rather thoroughly reorganized. After the death of Dean E. D. Ressler in 1926 Professor H. H. Gibson acted as dean until September, 1927, when Dr. James Ralph Jewell came from the University of Arkansas as dean. The resignation of Mr. Harold White, as critic teacher in Smith-Hughes Agriculture, brought about the appointment of Mr. Martin A. Schreiber. The resignation of Miss Ruth R. Slottee as critic teacher in Commercial Education brought about the appointment of Miss Myra Ethel Frazier. Dean J. A. Bexell asked to be relieved of his duties as professor of Commercial Education and has been replaced by Assistant Professors Lee C. Ball and Bertha A. Whillock. Professor Axel S. Rude severed his connection with the College on the return in September, 1927, of Dr. James F. Bursch, after a year's leave of absence at Stanford University. Miss Bess Chappell, State Supervisor and Teacher-Trainer in Vocational Home Economics, resigns at the end of this biennium and is to be replaced by Miss Frances Wright. The resignation of Mr. J. T. Turner as critic teacher in Industrial Education brought about the appointment of Mr. Frank L. France.

The resignation of Dr. Hyman Meltzer, instructor in Psychology, January 1, 1928, brought about the election of Professor Nolen M. Irby, who is being transferred at the end of this academic year from Psychology to Vocational Education. Dr. Herbert R. Laslett, for the past two years head of the department of Psychology at Whitman College, comes to us as associate professor of Psychology, and Dr. R. J. Clinton, recently holding the Cubberley Fellowship at Stanford, will take over the courses in School Administration following the resignation at the end of the present academic year of Dr. J. F. Bursch, who goes to Sacramento, California, as Assistant Superintendent of Schools.

Students. It is worthy of note that the growth of student enrollment in the School of Vocational Education has been a steady one from year to year, and that there has been no spasmodic gain nor falling off. The average gain of approximately 15 percent from one biennium to another is still being maintained. It should be pointed out, however, that the figures as to the size of the School of Vocational Education, as shown in the tabulations of the Registrar, are not exactly accurate, nor can they readily be made so, owing to the peculiarity of laws as to the certification of teachers. It is possible in Oregon, and in all the surrounding states, for a graduate of any approved college to teach in any standard high school, provided he has also taken the proper 23 credits in Education as a part of his college course. That means that a considerable proportion of the students of certain other schools of the College, taking their degrees from those schools, are each carrying as much as 23 credits in Education and other required work in Psychology, and indeed are definitely preparing themselves for teaching careers. This fact, however, is not shown in the official tabulations of the College. A rather thorough investigation of the matter during the year just ending shows that something like 700 students of the College were during that year preparing themselves for a teaching career, at least to the extent that they would be legally eligible for such service if they desired to follow it later.

Sampling tests given to students throughout the institution indicate that the students of the various other schools of the College who are preparing for teaching are, in their respective schools, rather average students or slightly better than average. Teachers' salaries in the state are so low that the brilliant students of the various schools are often led into commercial pursuits rather than into the profession of teaching. Students majoring in Vocational Education, however, and looking forward toward the profession as such for a life work, rank high. Honors of many kinds have gone to students preparing for lives in the classroom.

During the year just ending the two local honorary Education fraternities have been merged into a chapter of Kappa Delta Pi, national honorary Education fraternity.

Graduates in the teaching profession. There is reason to believe that Oregon State Agricultural College is one of the educational institutions of the country conspicuous for its success in the training of educational experts in the applied arts and sciences in which the College specializes. Its graduates are in demand over a wide territory.

The Appointment Office, a department in the School of Vocational Education, serves all schools on the campus whose students prepare to teach. The schools of the Pacific slope states are looking to the College for experienced and inexperienced technically trained teachers, and an effort is made to fit the teacher to the peculiar school and location. The teaching records of our graduates are carefully followed up by reports and by supervision, and up-to-date information relative to practically all our teachers in the field is kept in permanent files. School men are appreciative of the efforts used to select teachers according to their particular requirements. Their cooperation has been excellent.

Graduates placed directly through the Appointment Office in 1926-27 totalled 346; in 1927-28 the number dropped to 269. In the last few years a large supply of teachers has been available and the turnover is smaller than is usually the case. The active mailing list of this Office includes 957 names, with the following distribution: Oregon 428, California 293, Washington 102. Twenty-eight graduates are teaching in Idaho; 16 in Hawaii; 11 in Arizona; 8 in Montana; 6 in Nevada; 4 in Illinois; 3 each in Alaska, British Columbia, Colorado, Kansas and South Dakota; and 1 each in Georgia, Iowa, Massachusetts, Mexico, Michigan, Ohio, Oklahoma, Tennessee, Texas, Uruguay, Virginia, and West Virginia.

Former teachers or graduates, who prepared to teach and who have worked through the Appointment Office, have been placed as school cafeteria managers, demonstrators of food products or various stoves, dietitians, and as home demonstration agents. Our graduates have been particularly successful in extension work and a good demand for them has been developed in California and Washington.

Service to the state. It is self-apparent, of course, that the welfare of a state is synonymous with the welfare of its agriculture, its commerce, its engineering facilities, its home enterprises and the happiness that goes with their proper functioning. The various divisions of the College as a whole are only subdivisions of the very life of the state. The School of Vocational Education is given over almost entirely to the project of making recent discoveries and opportunities in these various fields of immediate avail to the people of the commonwealth. In the exact proportion in which the boys and girls, the young men and young women of Oregon become efficient farmers, engineers, foresters, business men, bankers, secretaries, pharmacists, homemakers, artisans—citizens in the broad sense of the term, in that same proportion will Oregon attain to that rank among the states of the Union to which its resources entitle it. And it is exactly the function of the School of Vocational Education to train those about to become the teachers of the youth of the state so that the ways and means of a better agriculture, a better homemaking, better skills and precisions of every sort may be made a part of the life of all the children of the state as quickly and efficiently as possible.

Oregon, however, is preeminently a rural state. Only two or three other states of the entire country have such a large proportion of small high schools. This division of the College, then, does two quite different and distinct things. It trains specialists in all the technical fields in which the College specializes, and sends them not only to the centers of

population of the Northwest, but to the ends of the earth. The citizenship of Oregon has a just cause for pride in the knowledge that its young people have every opportunity afforded the youth of any other section of the country for achievement in whatever part of the world they may choose afterward to cast their lot. But because Oregon is a state without many large cities, many of these youths seek other states than this as fields of adventure. It is doubtful whether any other appointment bureau in the West has a record for wide placements equal to the one that is a part of this School. Our graduates are in demand in Texas, in New Mexico, in Arizona, California, Washington, Idaho, and British Columbia.

But the preparing of the brilliant and ambitious youth for a life beyond the borders of the state does not solve the problem peculiar to our own commonwealth. The very small high school, typical of Oregon, can not use a specialist in Agriculture, or Industrial Arts, in Nutrition or Interior Decoration, or indeed in any applied art or science whatever. A specialist in such a school would be as much out of place as a non-specialist in a college. Consequently the School of Vocational Education has carefully undertaken the training of young men and women, recruited from the farms and small towns of the state, in combinations of the vocational subjects with one another, and of this or that vocational subject with the various related academic subjects, so that those communities whose teachers are few in number shall have taken back to them not only opportunities for the study of the conventional subjects, but also the various resources from the applied arts and sciences in which the College is so rich.

The demand for teachers who can bring back to the people of their home communities the advantages of recent developments in the applied sciences, together with certain of the older academic subjects historically a part of the usual high school curriculum, is so marked that this School is justified in making every effort to meet this need of the people of the state. The records of our Appointment Office are a startling commentary on this particular duty of the College. During the winter and spring just past this School was called on by various school authorities to supply them with a total of 125 teachers of the commercial subjects but only 14 of these requests were for teachers of Commerce alone—all the others were for teachers of business subjects together with some other high school branches. There were calls for a total of 186 teachers of Home Economics, usually thought of as a definite specialization; but in 160 of these cases teachers were wanted who could teach more or less of various academic subjects. More than two-thirds of the requests were for teachers of Home Economics and either drama or physical education and often of some purely academic subject in addition. Industrial Arts is always considered a highly specialized subject, and training in either wood or metal working involves expensive equipment and the acquiring of highly technical skills, but of the 78 requests for teachers of these subjects 28 laid down other subject-matter as necessary also. In addition to the demands just noted, there were 276 other requests for teachers of various combinations that did not easily fall into the classifications mentioned above, making a total of 674 requests for teachers that came, most of them spontaneously, from the school authorities of the state.

Every one represented a felt need on the part of the community. It is evident then that this School must bend its energies as much to prepare teachers for combinations of subjects, who have carried academic minors as well as technical majors, in order that the people of the state may have for their children instruction in the modern ways of life to which they are entitled.

Vocational guidance. Some four or five years ago the College undertook, through the initiative of Registrar E. B. Lemon, an Educational Exposition, involving, among other projects, a serious attempt to assist those hundreds of high school seniors who visited the campus for a few days in February, by way of educational guidance, if not of actual vocational guidance. This undertaking has been made an annual event. The matter of educational guidance naturally fell to the lot of the School of Vocational Education and one member of its staff took a two-year leave of absence for graduate work in exactly this field. The entire country from coast to coast was searched annually for the best possible speakers and advisers. The schools and the people of the state came to feel that their high school students were given disinterested advice of so much value that the College has been besought to accept delegations of students from the various high schools of the state much larger than it has the facilities to accommodate.

Following the Educational Exposition of February, 1928, the School of Vocational Education organized, with the active cooperation of the Registrar, a means of carrying educational and vocational advising out to the schools of the state, so as to make it available as rapidly as possible to all the seniors of the various counties of Oregon. During the spring of 1927 this venture had been tried out in a tentative way in Columbia and Union counties, through the cooperation of the County Superintendents of those counties. During March, 1928, the same counties asked for second conferences, and before the spring was over, at the invitation of both the county and city superintendents involved, one-day vocational guidance conferences were held in Union, Columbia, Tillamook, Josephine, Jackson, Deschutes, Klamath, Lake, and Coos counties. Because the experts of the College who conducted these conferences were also performing regular classroom duties on the campus it was not possible to grant more requests than these. Self-analysis questionnaires were prepared and sent out to the seniors of the high schools of the counties to be visited and the seniors of the high schools cooperating studied these for some days prior to the actual conference. In this way they were led to evaluate themselves as best they could, so as to make their respective abilities, capacities and limitations stand out in their own minds. At the time of the conference itself all the high school seniors of a county were gathered together for a day, at which time they were helped to get in touch with materials concerning the particular professions, trades, and occupations for which they seemed to have some bent.

The Committee on Boys' Work of the Portland Rotary Club became interested in what this School was doing over the state in the way of Vocational Guidance, and as a result a Vocational Guidance Office was opened in Portland for the months of April, May, and June, 1928. The Portland Board of Education, acting on the suggestion of Superintendent

Charles A. Rice, furnished two office rooms in the Couch Building, connected with the office of Professor L. E. Brigham, Director of Vocational Education of the Portland Public Schools; the Rotary Club financed the maintenance of the offices, and Miss Frances Wilson and Dr. J. F. Bursch of the staff of this School did the work. Miss Wilson spent her days in the various high schools of Portland, giving intelligence and diagnostic tests to the boys and girls interested, later met with them individually and talked over with each the implications of the tests, which were compared with the ambitions of the individual, and in several hundred cases gave other and later standard tests to carry analysis as far as possible. Dr. Bursch gave his Friday afternoons and Saturdays for ten weeks to individual conferences with complicated cases, Dean H. S. Rogers of the School of Engineering and Mechanic Arts met in individual conferences those boys who seemed to be fitted for some one or another of the engineering pursuits, and Dean J. R. Jewell gave a number of days to conferences with boys and girls who seemed able to profit from individual psychological studies.

In this way, all the high school seniors of nine counties and somewhat more than a thousand young men and women of Portland were given expert advice as to probable successes or failures in the ventures that at the time appealed to them. This represents the most far-reaching effort made by any institution west of the Rockies to give expert aid and guidance to the young people of a state. Its success has been so notable that already there are requests for a large expansion of the guidance program for next year. It is probable that before this biennial report gets into print the Portland Board of Education will have added to the staff of the Portland Public Schools an expert Placement Officer, as recommended to the Board at the close of the guidance work this spring.

A new field of service. The College was one of the pioneer institutions in providing special training for deans of girls. Much of this has been done through consecutive Summer Sessions and not especially by the School of Vocational Education. Oregon stands in the forefront of the states so far as deans of girls for high schools is concerned and the school men of Oregon are outspokenly appreciative of their deans. Educational guidance for the high school seniors of the state, featured as the outstanding offering of the Educational Expositions, has attracted national attention and commendation. Several of the most important colleges and universities of America have officially investigated it, and are considering plans for something similar. A modification of it has been made a permanent part of the Boston Public School program. The American Council on Education is giving the most careful consideration to the great waste in higher education caused by the dropping from the colleges and universities of the country of such an enormously large number of freshmen for failure to carry their college work. One of the most prominent institutions in the Northwest during the past year dropped more than 1,200 freshmen for failure to do their college work. There is no doubt that these failures were due in large part to the fact that the students had enrolled in schools and curricula for which they were not fitted. This is noticeably true of schools of engineering. Thousands of boys who find they have some mechanical ability as evidenced by their skill in caring for their own automobiles take that to be an evidence that they would profit by a college course in engineering. They mistake

"mechanical aptitude" for "engineering aptitude" when it is not the same thing at all. Higher mathematics is likely to eliminate from an engineering college many a boy whose mechanical aptitude is marked.

It is perhaps a most fortunate thing that the educational division of the College received the name School of Vocational Education. The very name proved an encouragement to go into the field of Vocational Guidance, and its efforts in that field have proved to be of so great value that a number of states and a large number of educational institutions are now looking to this institution to occupy the field. The achievements of Dr. J. F. Bursch, who has come to be widely recognized as an authority in vocational advising, led the city of Sacramento, California, to take him away from the College to become an official of the public schools of that city. His work is being taken over in the College by Professor Nolen M. Irby, of Nashville, Tennessee. Both Dr. H. R. Laslett and Dr. R. J. Clinton, who are being added to the staff of the School of Vocational Education, have had experience in this field. School authorities in a number of the cities of the state have consulted with the Dean of this School as to the possibility of training up some member of their respective staffs for a position as Adviser of their students.

Many of the more important colleges and universities of the country maintain a personnel bureau for the educational and vocational advising of their student bodies. The American Council on Education has a permanent committee making a progressive study of the matter. But no other institution has as yet made this service available to the citizenship of the state nor actively gone into the training of men and women with this end in view. There is no reason why this School can not do this, and so be of peculiar service to all the children of the state.

Graduate study and research. Only a generation or so ago higher education was looked upon as only for the exceptional few, and largely only for men who wished training for the so-called learned professions. Nowadays college training is looked on as the rightful portion of almost every normal child of the commonwealth. Not long since graduate training was a thing for college and university specialists only. Now that the masses, very properly, are taking four years of collegiate training in preparation for life itself, and adding three years of graduate training to that for any specialty whatever, conditions demand that the teachers of a state, more than any other class, keep abreast of this movement. Graduate training for departmental teachers in the high schools is now demanded by several of the western states. The alumni of this institution are going to be forced out of a number of the western states unless they meet all the requirements for a standard master's degree. Even this advanced degree does not stand today for preparation as much above that of the average man as did the bachelor's degree only a few years ago.

Approximately a thousand graduates of the College are now actively teaching; most of them, of course, on the Pacific Coast. Very few of them have their master's degrees. Many of those who have such degrees have found it necessary to go elsewhere for graduate work although they have desired to take their advanced degrees from their alma mater. The reputation of this institution as a source of skilled vocation-

al experts is such that many graduates of other institutions apply for graduate work here. There is an opportunity to make this College one of the great centers of graduate and research work in its peculiar field in the West.

It should be pointed out that the realization of this opportunity would require both an augmented faculty and a materially increased offering of advanced courses. The classes in the more elementary courses in Education and Psychology have been so large in the past that every member of the staff has worked to the uttermost to care for the undergraduate students already registered. Every large college and university recognizes that graduate classes must be small and that faculty members must be given time for individual conferences with graduate students. This is not waste by any means, for by so doing the state provides for itself leaders for the future, and such provision is not made in any other way. What is more, those students who have majored in Vocational Education, or in Agriculture or Mechanic Arts, or in any other department of the College, must find ready for them a sufficient number of courses which they have not already taken during their undergraduate days so that they will be kept profitably busy for an entire year of graduate work, else it will be useless for them to resign the positions they already hold and undertake work looking toward an advanced degree. An enlarged faculty is necessary, therefore, both because of necessarily smaller classes and because a larger number of courses than are now offered must be taught. But this must be done quickly if the College is to fulfill its function of supplying leadership for the new life already at our doors.

Recommendations. (1) In common with other divisions of the College, doubtless, the School of Vocational Education is pressed for both classrooms and office space. Teachers must be trained as individuals and not en masse. This makes conference rooms an absolute necessity.

(2) It is imperative that in some way more facilities for supervised teaching be provided. Either a more satisfactory form of cooperation with the Corvallis public schools should be worked out, or the College should maintain a practice high school of its own.

(3) Additions should be made to the teaching staff so that the undergraduate classes shall be kept within a smaller maximum number of students, and so that graduate courses shall be made available to applicants for work toward advanced degrees.

(4) A Personnel Bureau should be established within the College, it seems, primarily for the benefit of the students of the College. In this Bureau graduate students of the School of Vocational Education would get experience in dealing with the educational and vocational aptitudes of others, so that they might be trained to go out into the educational institutions of the state and nation as Advisers.

(5) This School should have as a member of its staff a Professor of Secondary Education, a large share of whose work would be in the high schools of the state. An overwhelming proportion of all high school teachers are required to teach subjects in which they have never had an

opportunity to specialize. A highly skilled supervisor of vocational education, especially trained in educational procedures, would be of enormous advantage to the schools of the state. He should in every case play the part of a "big brother," and offer his help wherever possible with no thought of official action.

(6) Hardly a week passes without calls from parts of the state more or less distant for speakers for education meetings, for granges, for advice in school situations, particularly in suggesting how to maintain a school program providing Agriculture, Home Economics, Manual Training, or Vocational Guidance, in rural or small town schools. A Professor of Rural Education should be added to the staff who would teach elementary courses in Education within the institution, and be ready much of the time to help the school men of the state with their problems. Every one nowadays recognizes the importance of Pig Clubs, of Calf Clubs, of Boys' and Girls' Clubs for whatever purpose. It is just as important to make available to the people of the state modern methods of school administration and supervision, particularly in those technical subjects in which the College specializes.

(7) Two groups of the resident students of the College deserve special consideration. The first is the group made up largely of graduates of state normal schools of this and other states who, while working toward their degrees, find it necessary to teach during alternate years in order to put themselves through college. The second is that rapidly growing group of Summer Session students who of necessity teach during each academic year but who spend their summers in resident study on the campus. It is not possible for the College to offer during any summer term all of the courses required in the various curricula for graduation. During the intervals between attendance on the campus there is a crying need for opportunity to do regular school work by correspondence. This is more true in the case of the School of Vocational Education than with regard to any of the other schools of the College, because its student body is so largely made up of teachers. It should be made possible for students in this School to get courses in Psychology and Education by correspondence as soon as practicable.

Respectfully submitted,

J. R. JEWELL,
Dean of the School of Vocational Education.

REPORT OF THE DEPARTMENT OF CHEMICAL ENGINEERING

To the President of the College,

Sir: I have the honor to submit the following report on the progress of the department of Chemical Engineering for the biennium beginning July 1, 1926, and ending June 30, 1928.

Organization and policy of the department. The organization of the department is the same as given in the last biennial report. The policy with reference to a thorough understanding of the fundamental subjects pertaining to Chemistry continues as formerly. We have broadened our field of research, however, and are giving promising students every opportunity for original investigation. The better men are encouraged to continue for graduate work here or in other institutions. We have visited many industrial plants in Oregon, Washington, and California. Our men have become acquainted with industrial problems and organizations with the result that all of our graduates of the past two years are now employed in chemical fields. These policies will be extended during the next two years.

Curriculum. The curriculum has been unchanged during the past two years. Our enrollment, however, has increased to such an extent that some changes may be necessary within the next biennium. We now have in mind two curricula, one for those who intend continuing for graduate work and one for those who expect to go into the industries.

STUDENTS

	Enrollment	Degrees
1926-27 Average for three terms	92	13
1927-28 Average for three terms	100	15

Graduates. The graduates in Chemical Engineering have divided themselves into two groups; namely, those entering other institutions for graduate work and those taking up industrial work. The men in both groups have done exceptionally well. Chemical Engineering graduates represent the College in the following colleges and universities: Yale 2, Illinois 3, Wisconsin 4, Minnesota 1, Columbia 1, Iowa 1, Iowa State 1, Washington (St. Louis) 1, Washington 1, Rice Institute 1, Stanford 1, Pennsylvania State 1, Ohio State 1, West Virginia 1, California 1, Louisiana 1.

Twenty men are now working for advanced degrees; nineteen men and one woman have received their master's degree, and six have been granted the degree of doctor of philosophy.

Our graduates who have entered the industries are scattered over the entire United States and island possessions. A few are in foreign countries.

Facilities for work. In respect to laboratory equipment and apparatus our facilities for work are excellent; but our laboratories cannot be expanded in the present quarters. Our fourth-floor location, indeed, as

indicated below, is not only unfortunate but dangerous. A new building is seriously needed.

Service to the commonwealth. Research is still in progress relative to Cedar Wood Oil and it is hoped that there will soon be a market developed for this waste product. Work will soon be started on the production of paper pulp from the Douglas Fir. A brief survey of the chemical resources of the state was made during the summer of 1926. Here is a vast field open for original investigation which would be of great value to the people of the state and should be done by this department in cooperation with the Geology department. In the Owyhee Canyon there are large deposits of sodium nitrate which should be investigated as to their origin and extent. The extent and quality of the vast alkali deposits of Oregon are worthy of consideration. A thorough study of these resources would be a very worth while undertaking for the College.

Many lectures and demonstrations have been given before high schools and community gatherings, always with a view toward stimulating a greater desire for a college education on the part of public school and high school students.

Needs. A half-time teaching fellow was granted to the department and we have been fortunate in obtaining the services of Mr. Elzie Reed, a graduate of the State College of Washington. In view of the fact that the services of a full-time instructor, or equivalent, are needed, another half-time fellowship should be established.

The present quarters of the Chemical Engineering department are so restricted as to make impossible the installation of additional laboratory equipment. This past year we installed our new 500-gallon column still in the old heating plant. The department is handicapped greatly by not having adequate space for this type of much needed equipment. Our recent Chemical Engineering inspection trip to San Francisco and vicinity revealed to the students the advantages in having such equipment. The department of Chemical Engineering needs a new building in order to care for the needs of the students. This building should be fire-proof throughout. The two disastrous fires which we have suffered in the past two years emphasize the need for a fire-proof structure. Plans for such a building are now being prepared with the idea that this new building will be similar to the Physics Building and will constitute the west wing of the Mines Building.

Recommendations. A half-time teaching fellow should be provided in addition to the one we already have. I recommend that this fellowship carry a stipend of $1,000 for 10 months work.

I recommend that a new Chemical Engineering laboratory be built as soon as possible, fire-proof throughout. It should be a building the size of the new Physics laboratory.

I further recommend that $2,000 a year be set aside for research work in this department for the investigation of the chemical resources of the state.

Respectfully submitted,

FLOYD E. ROWLAND,
Professor of Chemical Engineering.

REPORT OF THE DEPARTMENT OF MILITARY SCIENCE AND TACTICS

To the President of the College,

Sir: I have the honor to submit the following report of the Department of Military Science and Tactics for the biennium ending June 30, 1928.

Organization and policy. Under the provisions and in support of the National Defense Act, the United States Government established an Infantry Reserve Officers' Training Corps Unit at the College during the month of February, 1917, and has since added the Field Artillery, Cavalry and Engineer Units. Students are trained by commissioned officers and enlisted men of the Regular Army detailed by the War Department.

Enrollment. All physically fit male students under thirty years of age are required to complete two years of training in this department. After completion of this basic course, upon approval of the proper authorities, they may elect to pursue the two-year advanced course offered, thereby being given an opportunity to qualify as commissioned officers in the Officers' Reserve Corps of the U. S. Army. Average enrollment per term during the past two years has been: Basic course, 1080; Advanced course, 170.

Service to the commonwealth. Military service is service based upon patriotism, cheerful loyalty, and respect to properly constituted authority. It impresses the student with the fact that to enjoy the privileges of citizenship one must share in the responsibilities. Through the medium of the Military department the great wall of National Defense is being added to yearly by supplying trained leaders for use in event of national emergency, and the training essential to the development of military leadership is carried into civil life to be applied successfully in practically every field of endeavor. During the biennium ending June 30, 1928, approximately one hundred and forty students have been commissioned in the Officers' Reserve Corps and two thousand three hundred and sixty-eight students have received training which qualifies them to perform the duties of non-commissioned officers of the U. S. Army.

Needs of the department. There is urgent need for a suitable outdoor mounted drill ground for the Field Artillery Unit, especially since, beginning with the coming academic year, this unit is to be expanded. Plans and specifications for such a drill ground, with a suggested location west of the horse barns, have been submitted to your office for consideration and action has been deferred until the next fiscal year. These plans, now on file in this office, were made by the executive officer of the Field Artillery Unit for the past four years, and all recommendations he has made are concurred in as being essential to the proper functioning of this unit in the future and in keeping the instructional work up to the high standard of efficiency demanded by the War Department.

The distance which separates the stable and gun-shed from the Armory, the center of most drill activity, results in a wastage of man-power, due to the constant transfer of animals and equipment. A centralization of housing facilities for all military activities in and about the Armory is most desirable and is strongly recommended.

In the interest of safety to both students and horses, the installation of heel boards in the riding hall to cover steel truss work which projects from the sides of the building is essential.

H. R. RICHMOND,

Colonel, Cavalry, (DOL)

Commandant; Professor of Military Science and Tactics.

REPORT OF THE DEPARTMENT OF PHYSICAL EDUCATION FOR MEN

To the President of the College,

Sir: I have the honor to submit the following report of the department of Physical Education for Men for the biennium beginning July 1, 1926, and ending June 30, 1928.

Organization and policy. During the past two years there has been no radical change in the organization and policy of the department. Intercollegiate athletics have been more or less segregated, and intercollegiate football and track have been definitely removed from the department of Physical Education. The policy of having full-time men as instructors with dual responsibility for physical education and coaching has been generally continued. In football, because of lack of funds, it was necessary to employ assistant coaches on a part-time basis. It has been the policy of the department to give special attention to the health and general well-being of the students and to further the policy of athletics for all. There has been consistent cooperation and coordination with the work of the Health Service. The department has made a special effort to maintain high scholarship ideals among the men representing the institution in intercollegiate sports. A study of the failures among freshman and sophomore students to complete their physical education requirements during the first two years reveals that this probably was caused in part by heavy schedules.

Scope of activities. All activities have been increased and broadened. This is particularly noticeable in orthopedic and intramural work. The orthopedic work, with the addition of the new equipment and space, should increase in usefulness, resulting in very important aid to the students requiring this work. The Intramural work has reached a point which will not permit of further development until added facilities are forthcoming.

A program in the required Physical Education work for freshmen and sophomores has undergone a revision. Realizing that in many instances this type of exercise does not develop or enlist the whole-hearted support of the student, the program has been changed with a view of interest and pleasure as well as physical development. An effort is being made, moreover, to give training in the recreative type of activities which will have a carry-over value in later life. Training for the proper use of leisure time is rapidly becoming a very important element in the field of education. If interest in physical well-being can be inculcated in the student, he will participate in many activities later, after his graduation from college, which will react greatly to his benefit.

In intercollegiate competition the past two years, the department has maintained the high record set in 1925. In football, the Northwest championship was won in 1926, and in 1927 only the first game, to a Northwest opponent, was lost and the last game of the season. This was the first defeat of our team in eighteen games against the competition of Oregon, Washington, Montana, and Idaho. In 1926 the intersectional game with

Marquette University, Milwaukee, was won and in 1927 the intersectional game with Carnegie Tech in Portland resulted in a tie. In 1926-27, our basketball record was very good, although not up to the standard of previous years. This undoubtedly was due to the fact that the men were new and inexperienced. The baseball team, 1926-27, made another very splendid record and the track team of the past two years ranked higher than ever before in the history of the institution. The fine morale of our teams and the type of good sportsmanship that has been shown speaks well for the future of the College in intercollegiate competition.

Intramural sports. Intramural activities have been growing steadily in popularity since they were introduced. The program has been handicapped due to a lack of equipment and playing fields. This has also necessitated running off many of the events on the elimination basis. While many events carried on by the elimination system may show gratifying results statistically, this plan gives the participant a chance to play only once. As soon as facilities permit, the elimination system will be discarded and the Intramural program will be conducted on a league basis. This will result in increased exercise and participation for students.

In the past, Intramurals in all schools have attracted large numbers into an organized program. It remains for the future to improve the program by allowing participants an opportunity to engage in more games, and by providing more thorough supervision and some coaching. Men engaged in Intramurals should be given some coaching to the end that they will play a better game and derive more enjoyment from the accomplishment.

In some of the more strenuous sports, closer supervision must be exercised in regard to the physical condition of men participating. The purpose of the program is defeated if unconditioned men are allowed to participate in cross-country and the distance runs in track. These men will not receive physical benefit and their health may be impaired through overstrain unless they are properly conditioned before they run.

With the increase of facilities which is planned, Intramurals will develop both in numbers reached and in the quality of the program.

The events on the program during the year 1927-28 were: cross-country, basketball, swimming, handball, outdoor track, horseshoes, baseball, and tennis.

Corrective work. This type of work has been established for two years and already has shown gratifying results both in quantity and quality of the work. An effort has been made to interest the students in this work and to give them an appreciation of their trouble together with a regimen of exercise which they can continue after they leave college.

With a view of making this type of work most efficient larger and better quarters have been provided. The latest and best equipment has been added. These new additions together with expert instruction should make corrective work increasingly valuable and at the same time

accommodate more students. Too much emphasis can not be placed on this work.

The cases treated for the year 1927-28 are as follows:

Heart	14
Hyposis (round shoulders)	18
Scoliosis (lateral Anoction given)	16
Lordosis (inward Anoction given)	14
Flat feet	28
Infantile paralysis (effects of disease in early life)	5
Post fractures	8
Miscellaneous (general weakness, recent operations, etc.)	12
Total students treated	115
Students treated previous year	69
Net gain	46

Or a 61 percent increase.

Physical examinations, health, and hygiene. In order to obtain the best results all health agencies should be coordinated under one head. This will result in efficiency, coordination, and a diminuation of effort due to duplication.

A more thorough, complete physical examination should be given to all entering students. A student should be required to pass a rigorous physical examination before registering.

It is the duty of every public institution to underwrite the health of its graduates. A student should be returned to the commonwealth in as good physical condition as when he entered college. Students should leave college with a well-trained mind enclosed in a strong, harmoniously developed body, equipped to meet the demands that the struggles and viscissitudes of life will make upon it. As in the motor car the engine is the important element, so our effort should be directed toward turning out a motor capable of generating power of the first magnitude.

It is good business to examine entering students to ascertain their ability to complete the required program, to discover remediable defects, to prevent the onset of epidemics, and to act as a check on the physical well-being of each student on entering and leaving college. An examination of this kind would be of value in orthopedic work. All large business firms make this a practice for their own protection as well as for the protection of the individual.

An elective course in General Hygiene and Public Health should be added to the curriculum that would acquaint students with the principles and practices of health promotion, individual or physiologic hygiene, disease prevention and control, community hygiene and public health.

Development of facilities. While a comprehensive program for the development of a play space west of the football field has been worked out, little has been done toward developing this project. At very little expense, this area could be plowed, leveled and rolled. This would make a space usable for many activities. There is need for additional tennis courts. Twenty tennis courts should be built along the north side of this field, at least six of which should be cement. Several four-walled handball courts are a necessity. With these added facilities, the Intra-

mural program could continue to develop, whereas with the present facilities the out-of-door program is practically at a standstill.

A jumping pit of sand could be built into the gymnasium floor which would permit the use of the gymnasium for track work in inclement weather. At the present time, the Varsity football men are handicapped by lack of an indoor practice space during rainy weather. If the Armory could be made available for this work between the hours of four and six, material benefit to the football teams would result. Loss of practice is a tremendous handicap in football training.

Theory courses. Theory courses in physical education and athletic coaching are given in limited form to students who are majoring in the various schools of the College. A number of Oregon State men find teaching opportunities where they are required to coach or conduct work in physical education. The coaches of athletic teams take a personal interest in developing coaching ability and a thorough knowledge of their particular branch of sport on the part of their men. This gives the student the opportunity of personal interview and contact with men who know the game as it should be played. The College has thus turned out many men who are occupying prominent and active positions in coaching and physical education.

Staff requirements. In the past, the Physical Education department and the Athletic department have cooperated in the use of instructors. While as a general rule this arrangement should be discouraged, it is felt that in our situation here many benefits have resulted from this coordination. Better instructors have been obtained for both departments and cooperation has been excellent. Each department, however, should tend toward having its staff made up of full-time men. The present staff has functioned satisfactorily and has an educational interest in its work. To keep up with the steady progress of Physical Education, these men should be encouraged to attend summer schools and take advantage of the sabbatical leave, as one is now doing.

An additional instructor is needed to supervise the sophomore physical education program, a man capable of supervising several sports and coaching swimming. This man could also be available for Intramural work.

Respectfully submitted,

CLAIR V. LANGTON,
Director of Physical Education for Men.

REPORT OF THE DEPARTMENT OF PHYSICAL EDUCATION FOR WOMEN

To the President of the College,

Sir: I have the honor to submit the following report of the department of Physical Education for Women for the biennium beginning July 1, 1926, and ending June 30, 1928.

Organization and courses. This department considers that its primary purpose is twofold: (1) to aid the women students in developing and maintaining health and physical efficiency and (2) to aid in the development of such habits and ideals as will tend to continue personal efficiency in after-college years. In the light of this purpose, and guided by the generally accepted principles in physical education of today, the type of work known as gymnastics has been dropped within the past two years from our curriculum. The work now consists of:

(1) A course required throughout the freshman year, in which are emphasized habits of correct posture, of correct walking and efficient use of the body in skills necessary for daily living—such as lifting, jumping, throwing, striking. This differs from gymnastics in that these activities are developed through practice of each particular skill rather than through a series of exercises to develop those skills.

(2) Courses affording opportunity for development of skills and opportunity for participation in recreational and developmental activities which are an accepted part of American life. These have been grouped in four classifications and each student must have 1½ credits in each class, unless she can show that she has acquired sufficient skill in any one group to warrant exemption. These groups are:

(a) Swimming. Each student must be able to swim well enough to feel at home in the water, and to have developed sufficient skill to use swimming as a means of physical activity and recreation in after college years.

(b) Team games. These include such games as basketball, baseball, hockey, volley-ball. These are required for the development of personality and for the opportunity for emotional outlet which they provide.

(c) Individual activities. These include such activities as tennis, golf, archery, quoits. These are required that the student may develop skill in some activity which may be used later as a means of providing exercise and recreation.

(d) Dancing. Required for its value in control of the body, in carriage and in balance, and for the appreciation of body line, of dance pattern, and of music.

(3) Individual conferences with every freshman at least once a term. At this time the student is given a rating, including all factors pertaining to health—skills, physical and organic condition, nutritive rating, mental balance. Efforts are made to develop a desire to improve. It is hoped

that these conferences may be extended to include the women of the three upper classes.

(4) Corrective work for those students who have defects which can be remedied through exercise. These include cases of extreme faulty posture, defective feet, dysmenorrhea, etc. In this department are included those students who are over or under weight. In cooperation with the department of Foods and Nutrition, every effort is made to assist these women to attain a normal weight.

Service to the state and community. The work of the department can be of most service only if the people of the state recognize and are in sympathy with its efforts. Every opportunity has therefore been taken to discuss ideals, to give service in the physical education field. Such activity has included talks and conferences at meetings planned by the Extension Service, radio talks, meetings with high school students, and other effort to promote the development of girls' athletics in the state on a basis which is educationally sound. A county play day for high school girls was held on this campus, and will no doubt become an annual event.

The extension classes—or classes offered for those other than registered students—have been another means of reaching the community. These have included a registration of 470 adults and 452 children. Fees from these classes have totaled $2018 for the year and have paid for the services of one instructor. Women have entered classes from a radius of fifteen miles—including Albany, Jefferson, and rural communities to the south and west.

Building and equipment. After almost two years in the Women's Building, we find it a well planned and adequate structure. Oregon may well pride itself on the provision which it has made for the well-being of its young women, and on the careful planning shown in the arrangement of the building. There will be need for minor changes and additions in equipment which can easily be provided from year to year.

Staff. The present staff is adequate in number. During the past biennium adjustment has been made in matron service from two full time to two matrons each on half time, and each giving such additional service as may be needed. This reduction has been made possible by the compactness of the building. A full time pianist has been added. Better results should hence be obtained in dancing courses. This woman assists in the office when not needed for class work. The position of supervisor of practice teaching in physical education was dropped by the College, leaving the department with such course and no provision for the teacher. (See Needs.) One instructor was added to care for the extension classes described above.

Needs. For progress, the following changes and additions are necessary:

(1) The addition of a woman physician to the college staff to provide for education and personal conference in matters of social hygiene.

(2) A policy which provides for a health education program in which there will be a close cooperation between the health department and

other departments interested in health. In the fall of 1926, the medical examinations were given by medical men. In 1927, the department secured the services of two women physicians. The atmosphere of the examination was one of greater confidence. These women also made a greater effort to give the girl some idea of her condition, though little of this was possible when only two minutes were allowed for each student. For 1928 we have arranged for fifteen to twenty minutes for each entering student, thereby permitting a more detailed medical examination than we have ever had. All examinations will be made by a woman physician who will return for a half-day twice a month to confer with students.

(3) Medical examinations are needed for the students in the three upper classes. Only by a check of some kind may we know what effect college life has upon our young women.

(4) Studies within the past year show that women who live in dormitories are ill less frequently than those living in sorority houses. Taking the extremes, a girl in Margaret Snell Hall is out one day, while a girl in one sorority house is out six days. We need a health checking department which will determine the cause of these differences.

(5) A recreational out-of-door field is needed. At the present time, women have no space on the campus and are using any vacant plot. Each year these vacant plots are being taken up for other purposes. Tennis courts are not numerous enough to supply our needs.

(6) If a course in practice teaching in physical education is offered by the department, some provision should be made for such teaching and for its supervision.

Respectfully submitted,

RUTH B. GLASSOW,
Director of Physical Education for Women.

REPORT OF THE SUMMER SESSION

To the President of the College,

Sir: I have the honor to present the following report for the Summer Session of Oregon State Agricultural College for the summers of 1926 and 1927, included in the biennium ending June 30, 1928, with some additional references to the session of 1928 just concluded.

Organization. The Summer Session is a short course of six weeks duration offering no curricula but aiming to bring together courses of such variety as will meet the needs of widely differing groups of students. The student body differs from that of the regular year in consisting largely of those engaged in teaching* or other occupations during the winter who wish during the summer recess to advance professionally or to earn credit which will count toward one of the various college curricula. Roughly, courses are offered to meet three needs and satisfy four groups. Courses are offered carrying graduate credit looking toward the master's degree; other courses are offered which count toward the bachelor's degree; and a few are offered for students who lack one or two units of entrance credit for admission to college. Two classes of people take work leading to the bachelor's degree: regular-session students seeking to shorten their college term; and mature students who failed to complete their college course or never entered upon it, but graduated, if at all, from a normal school or other institution not offering the bachelor's degree.

Similarly the faculty of the Summer Session consists only in part of members of the regular staff. The summer recess releases instructors from their regular connections and makes possible an exchange of faculties and a bringing together on the summer staff of distinguished scholars and teachers from many institutions and from distant cities. It is not without significance to the people of Oregon that the teachers of the state have been able to get work with nationally known scientists and teachers without the expense of travel to some distant state and the loss of time and money involved both in the travel and in taking time from the winter months for this study. To provide, however, adequately for such a program of resident and visiting faculty necessitates the formulation of plans for the next summer session before the last summer session is over, or even begun. Arrangements were made with one teacher for the summer of 1929 before the opening of the 1928 session. To secure the services of desirable instructors such early arrangements are necessary. Early planning is also necessary in order that the opportunities to be provided may be adequately announced to people scattered over a wide area who will need to determine where they are to take their summer work.

Registration. The registration for the Summer Session has shown during the past biennium a consistent increase. Of mature students, including auditors and special music students, 585 were enrolled in 1926,

*Of the 845,000 teachers in continental United States (figures from the Journal of the National Education Association, November 1927, p. 257) 311,480 registered in 1926 for summer school work in some institution and 377,462 in 1927, so important has summer session become to the teachers of the country.

679 in 1927, and 748 during the Summer Session just passed. This was the largest registration for the Summer Session in the history of the institution. Including the members of the boys' and girls' 4-H clubs who take advantage of the Summer Session arranged for them, the total numbers served by instructional work during the summer for the three years mentioned above are respectively 1068, 1194, and 1398. These figures do not include the many people who make use of the swimming pools in the Men's Gymnasium and the Women's Building but register for no other work. A very significant feature of the enrollment was increase in the number of those registering for graduate credit.

Distinctive service. During the past biennium the Summer Session added notably to the list of outstanding men and women it has been its practice to bring to the campus and make accessible for the students and teachers of Oregon. Prominent among the visiting teachers were Knute Rockne of Notre Dame, whose services were provided for exclusively from fees paid by students taking his work and without charge against other state or institutional funds; Dr. Caroline O. Hedger, of the Elizabeth McCormick Memorial Foundation of Chicago, authority in the field of Child Care; Florence Jackson, M.A., authority in the field of Vocational Guidance; Dr. E. V. McCollum, Ph.D., Sc.D., Johns Hopkins, of world-wide reputation for his contributions to the newer knowledge of nutrition; George M. Wiley, Ph.D., L.L.D., Assistant Commissioner of Education for the New York State Department of Education and in charge of the Secondary Schools of that state; Avery W. Skinner, M.A., Director of the Division of Examinations and Inspections; and Cora M. Winchell, M.A., Head of the Department of Household Arts, Teachers College, Columbia University, authority in the field of Home Economics Education. Among the visiting lecturers during the past summer were C. C. Grover, M.A., Assistant Director of the Bureau of Curricula Development, Research and Guidance, Oakland, California; Mary Swartz Rose, Ph.D., Teachers College, Columbia, authority in the field of Physiological Chemistry and Nutrition; and E. Leona Vincent, Ph.D., head Psychologist and Assistant Director at the Merrill-Palmer Nursery School of Detroit, an authority in the field of Behavior Problems and Child Nursery School work.

Pioneering during the preceding biennium in training of deans or advisers of high school girls, in character education or methods of moral education, and in special coaching work, carried on without expense to the state under the leadership of Knute Rockne, available to the people of Oregon because of a friendly relationship existing between him and Coach Schissler, the Summer Session during the past biennium has continued to develop these lines and has met also a growing demand for instruction in Vocational Guidance. So important has some training in the field of vocational guidance become for teachers that it was found advisable to offer a group of courses in the Summer Session developing different phases of this work: courses in Counseling, a course for boys similar to the course for deans or advisers of high school girls, Measurements in Education, Vocational Guidance, and Current Problems in Vocational Education for Women. Additional emphasis was placed also upon courses in Home Economics Education and courses for teachers of Commercial subjects. During the past summer work in Industrial

Arts on a fairly comprehensive scale was offered again after having been practically discontinued for several seasons. The courses offered were along new lines and involved some opportunity for graduate study. The response was satisfactory.

Program. Specifically, the Summer Session offers courses in Vocational Education, basic or specialized; Home Economics; Commerce; Industrial Arts; Industrial Journalism; Physical Education for men and for women; and the basic arts and sciences including Art, Bacteriology, Chemistry, English Composition and Literature, History, Public Speaking and Dramatics, and Zoology. Courses were also offered by the self-sustaining affiliated department in Music. A few courses were given for students lacking a unit or two for college entrance.

The Summer Session emphasizes those departments featured in the degree curricula of the institution. Teachers who have been working hard through the year, however, and students who are specializing in some technical or vocational field both feel that it is an opportunity to combine with their technical specialty other subjects of more general or cultural character. For this reason provision is made in the Summer Session program for a certain number of courses in Literature and Art, History, and Music. The Summer Session also makes provision for an "out-of-hours" program of readings, concerts, lectures, and social gatherings. These give the students an opportunity to come in contact with stimulating, thought-provoking personalities and to know one another.

Opportunities. Within the biennium every county but one has been represented at the Summer Session. The importance to the state, however, of the many students from outside the state who are now combining travel with summer study is evidenced by the continued growth of out-of-state attendance. While the closing year of the preceding biennium showed a registration of only 135 non-residents, representing 17 states and territories, the closing year of the present biennium enrolled 229 non-residents, representing 20 states and territories.

It is interesting to note the increase on the part of these out-of-state students from year to year. From 1924 to 1928 the figures run 74, 107, 135, 188, and last summer 229. These visitors from more than twenty different states, territories, or other countries, represent a highly valuable form of advertising for the state, as they are influential, relatively well-to-do people, who will go home and tell about their summer travel, the beauties and opportunities in Oregon, and its educational advantages. They will have stayed long enough in the community to have gained some familiarity with the country. Incidentally, they bring money into the state, as do other tourists.

At present the Summer Session brings into use for six weeks College buildings and equipment otherwise idle. Many institutions make of the summer session a full fourth quarter extending over eleven or twelve weeks. The extension to the full quarter would bring equipment into play for the longer period, but inconvenience in arranging for the upkeep of the plant, increased cost in salary for doubling the instruction, and the need on the part of many of the students in the technical schools for

summer field work have hitherto proved obstacles to the extension of the Summer Session of this institution beyond its present term. The possibility of the extension here has not been unconsidered.

Respectfully submitted,

M. ELLWOOD SMITH,
Director of the Summer Session.

REPORT OF THE DEAN OF MEN

To the President of the College,

Sir: I have the honor to present herewith a report of the major activities of the office of the Dean of Men for the biennium ending June 30, 1928.

Functions of the Dean of Men. Wherever possible, the Dean has sought to act in an advisory capacity to every interest of the student body desiring that relation. The most important work has been the many personal conferences with the men students on their various problems. As nearly as the functions can be specifically enumerated, they are as follows:

(1) Confer with men on any problem on which they seek advice.

(2) Supervise men's organizations, such as fraternities and clubs.

(3) Advise with the freshman class for organization and activity purposes for the year.

(4) In a general way, to advise with all classes and officers of the student body.

(5) Serve as chairman of the Student Interests Committee, having general supervision of student body affairs other than student activities involving student body finance.

(6) Advise with faculty members with reference to problems of students in their classes.

(7) Communicate with parents relative to problems of their boys.

Housing men. The total number of men for the year 1926-27, September to June, was 2,537, and for the year 1927-28, 2,595. These include regular students on the campus only, and have no relation to short course or summer session students. Approximately 50 percent of the men are members of fraternities. About 95 percent of the fraternity men live in the fraternity houses. The other men of the student body have lived for the most part in private homes. An average of 125 have been housed in the old dormitory which was the barracks built during the war. The 35 fraternity houses are located near the campus.

Independent men. All men students on the campus are included in either fraternity or independent organizations. The men in the dormitory are divided into groups forming permanent clubs. The city is districted, and the non-fraternity men living in the respective districts are organized into clubs. The presidents of the clubs are organized into the Independent Student Council. These legislate for their members and administer the regulations. The independent men's clubs have made marked progress in organization during the past year, and have been a genuine assistance to their members, aiding them in social and scholastic work. A closely knit organization, with faculty advisers for each club, is the aim.

The new dormitory just being completed will house 348 men. These men will have their meals in a dining-room prepared especially for them in the new Memorial Union, located across the street. These facilities will satisfy a longfelt need of the student body as a whole, particularly of the independent men.

The new dormitory is so constructed that not more than 24 men are housed in any given division of the building. Each of these groups is supplied with adequate facilities in every way. The government of the dormitory will be vested in a Board consisting of representatives of each of the five halls. The Dean of Men will sit with this Board in an advisory capacity. The cost of living in the dormitory will be $30 a term for the room, and $6 a week for board.

Fraternities. Fraternities are operated under general regulations of the College and of the Interfraternity Council. The Interfraternity Council consists of one representative from each of the fraternities. The Dean of Men meets with the Council in ex-officio capacity. The Council meets once a month or oftener to consider problems common to the fraternities. As far as possible, the aim is to make the body self-governing. The regulations cover pledging, initiation, scholarship, and related matters. The Council is both legislative and administrative, punishing its member organizations in case of violation of the regulations. Meetings of the faculty advisers are called at various times to discuss current fraternity problems. Each fraternity must have a faculty adviser to aid the organization and the College in obtaining the desired results.

The location, plans, and cost of all fraternity houses must be approved by the Housing Committee of the College. The primary aim of the College is to assure comfortable and pleasant homes, but to keep the cost within the range of the financial ability of the average student. The maximum cost for board and room in fraternities is $40. The range of costs is $35 to $40 a month.

Social life of the institution. The social life of the student body is maintained by the Associated Students, the four classes, independent social clubs, sororities and fraternities. These different organizations schedule and hold their events under regulations adopted by themselves, the Student Interests Committee, and the College. The immediate scheduling of events is in charge of a subcommittee of the Student Interests Committee, headed by the Assistant Dean of Women. The immediate supervision of the social events is in charge of the office of the Dean of Women. No organization may schedule social events except on week-ends and days preceding holidays. Each month one week-end is kept open for general college events, and for these week-ends no social organization may schedule social events. Likewise the week-end preceding examination week is closed to social events. No organization falling below the grade of 83 for the average of its membership for a term is permitted to hold social events the succeeding term.

Cost of social events. Clubs, sororities, and fraternities have adopted regulations limiting the cost of social events, definitely prescribing a maximum per-member cost for their major entertainments. These organizations provide in their regulations for an Auditing Committee, consist-

ing of one member each from the Independent Student Council, Pan-Hellenic, and Interfraternity Council, appointed by the Student Interests Committee. After each event the organization holding the event must present an itemized statement accompanied by receipts. This account is audited by the Auditing Committee. During the past college year, 65 organizations held a total of 235 events. The average cost per function was $69.54, and the average cost per member for each event during the year was $2.18. The attendance at these functions is from two to three times the membership. Recognizing this fact, one sees that the expense of the functions per person in attendance is very low. The desire of those assisting in this work is to encourage wholesome entertainment on the campus at a cost within the reach of the average student.

Class organizations. The Dean of Men acts in an advisory capacity for all activities of the freshman class. He seeks to be present at all meetings and to help the class to find its place and function on the campus. He acts in a much less close relation to the other class organizations, advising in a general way about their functions and finance. The class funds of the four classes are kept in the Business Office of the College. They can be drawn out by the treasurer of the class only on requisition approved by the president of the class and either the vice-president or the secretary. For the protection of the class funds, the treasurers of the classes are under bond. All bills are approved by the president and secretary or vice-president of the class involved. The books of all the classes are audited by the College auditor.

Student discipline. The discipline of the students is shared by various organizations. As far as possible the College gives the discipline over to the student organizations themselves. Students violating the Honor Code are tried by the Honor Court consisting entirely of students, with a faculty adviser. Many of the other cases affecting men go to the Student Council consisting of representatives of the Student Body and representatives of the various class organizations. Some cases of discipline are handled by the Dean of Men. All actions of these various bodies involving discipline must be approved by the President of the College.

Student Interests Committee. The Student Interests Committee consists of 6 students and 5 faculty members, all of whom become members of the Committee ex officiis. The student members consist of the President of the Associated Students, Editor of the Barometer, President of the Independent Student Council, President of the Interfraternity Council, President of Pan-Hellenic, and President of the Associated Women Students. The faculty members are the Chairman of the Housing Committee, Chairman of the Scholarship Committee, Director of Physical Education for Men, the Dean of Women, and the Dean of Men. It will be seen that practically every interest of the student body is represented, from the point of view of both faculty and students. This Committee legislates chiefly for social affairs of the student body, though it gives consideration to all of the student interests; hence the presence of the Chairman of the Scholarship Committee, the Chairman of the Housing Committee, and the Director of Physical Education, as well as the Dean of Women and the Dean of Men.

Correspondence with students and parents. The first approach to incoming freshman men is made by means of a form letter which is personal in character. The letter not only welcomes the student but tells a bit about the service of the office. In the same letter is enclosed a folder entitled "Tips to Freshmen," giving freshmen advice about some of the first problems that will confront them. Among these are choice of rooms, choice of friends, attitude to fraternities, faculty, and organizations on the campus. After registration is completed a letter is sent to the parents of each freshman man, offering the services of the office for any help that may be given to freshmen. Throughout the year a great number of letters are received from parents about the boys and their work. This correspondence forms an important part of the work of the office, helping to maintain the contact between the institution and the home.

Other functions. The Dean of Men is head of the Political Science department in the School of Commerce, and has taught one class each term. He is scheduled for one class each term this year. He is a member of the Scholarship Committee, member of the Y. M. C. A. Advisory Board, and Chairman of the Committee on Student Interests. He gives a considerable number of addresses to high schools, commencements, and civic and religious organizations.

The entire work of the office is handled by the Dean of Men and his secretary, Miss Edith Wilkinson.

Respectfully submitted,

U. G. DUBACH,
Dean of Men.

REPORT OF THE DEAN OF WOMEN

To the President of the College,

Sir: I have the honor of submitting to you the report of the Dean of Women for the biennium ending June 30, 1928.

The past biennium has been marked by no innovation or radical departure from the previous policies of this office but has been characterized rather by continuance of the policies last reported, by an effort to effect closer cooperation and bring about more personal contacts with the students and a consummation in careful detail of these plans.

Personnel. At the close of the academic year 1926-27, Miss Edith Livingston, Associate Dean of Women, and Miss Jewel Godfrey, Secretary, resigned. The former was succeeded by Mrs. Lorna C. Jessup, a graduate of this institution, as Assistant Dean of Women; the latter, by Miss Helen Moor of Smith College. On the whole, the division of duties remains unchanged, the Assistant Dean of Women taking the entire responsibility for the conduct of social affairs and representing the office on the Housing Committee. The Secretary continued in charge of the Self-Help department.

Living. The policy of requiring all students who do not reside in Corvallis to live in one of the three halls of residence or a sorority house has been carefully observed. As far as possible, all freshman girls are required to spend the first year in one of the halls of residence. Exceptions are made only in cases of extreme emergency and then only at the beginning of the first term.

The sixteen sororities established on this campus are now all members of national associations. Ten of these groups own their own houses, six of which have been recently built or are in process of being built. It is hoped that the present policy of recognizing no new women's organizations will be continued until such time as the present organizations find themselves on a firm financial footing. This policy should work no hardship to younger students, for many organizations exist, the advantages of which, if utilized, will give ample opportunity for self-expression and closer companionship.

On the whole, the financial condition of the sixteen women's social organizations is more substantial than at any time during the past five years. This is due largely to the careful supervision given by Miss A. Grace Johnson, Professor of Household Administration, in her committee work with house managers. Due to this cooperation, savings have been effected and the quality of food has been improved. It is hoped that the time given by Miss Johnson to this phase of the work will be recognized as part of her regular duties and that in the near future a more careful supervision can be made on the kind and quality of food being served.

Personal contacts. In order to become acquainted with students as early as possible, a form-letter is sent to each new student early in September. Within the first month of the fall term a personal conference

is held with every new woman student. Information regarding the student is recorded on a card, on which are later entered also all matters connected with the student during all her years in college.

To bring about closer cooperation between sororities and the College, personal interviews are held each term, first with the presidents alone, then with the presidents, housemothers and faculty advisers. Semimonthly meetings are held with all presidents, once at a luncheon hour. These meetings are followed by separate meetings with the housemothers as a group. This policy requires a great deal of time, but the result is a closer cooperation between the college and sororities and a better understanding of sororities and housemothers as well as a feeling of fellowship among the members of the various houses themselves. Supplementing these activities are numerous small meetings at luncheon and dinner. Similar relationships are maintained with the young women in the halls of residence, and with the preceptresses in charge of the halls, and also with the young women resident in the homes of the city. Every young woman in college belongs to some recognized club organization linking her with the student body and the institution.

Organizations. One of the most important duties of a college dean of women of today is the development of organizations and the training of young women in their responsibility to them. During the past biennium all women's organizations have been united under the title of Associated Women Students. This association is responsible for helping girls to become acquainted with each other, bringing speakers of note to the campus, raising the general standard of womanhood, and developing in the women themselves a sense of their importance in the social economy and spiritual life of the day. Monthly meetings are provided for by various departments, such as the Home Economics Club, Physical Education Club, Young Women's Christian Association, Wytomachee (Downtown Girls') Club, and Theta Sigma Phi (honorary Journalism sorority). The Associated Women Students organization itself is responsible for two large general meetings, one at the beginning and one at the end of the college year. The latter has been called Women's Day and occurs early in May. On this day, mothers of young women and women prominent in the state are invited to the campus. The entire day is devoted to women and women's interests. New officers of Associated Women Students are installed. New pledges to women's honor societies are announced; May dances by the Physical Education department are given; the Co-Ed Barometer is issued under the direction of an editor chosen by the girls themselves. A special speaker gives an address in the morning, and various guests and students speak at the banquet which closes the day.

Cap and Gown. During the past two years there has been organized a new Senior Women's honorary society under the title of Cap and Gown. Young women comprising this group are carefully selected on the basis of character, scholarship, and wholesome influence. The membership is kept relatively small—from seven to nine only. So far this organization has been of very great help to the Dean of Women in establishing attitudes and standards of conduct. In a day of changing moral standards such as we are passing through now, an organization of this kind is of inestimable value to a dean of women.

Service to the commonwealth. While the work of a dean of women of today deals chiefly with the campus, she must work with the entire community in order to accomplish her aims and ideals among the women students themselves. For this reason, invitations to speak before high schools and women's clubs are welcomed. During the past biennium, thirty-five such addresses have been given. Membership is also maintained in the Oregon State Federation of Women's Clubs, Congress of Parents and Teachers, American Association of University Women, League of Women Voters, and the State Teachers' Association. These organizations serve as a medium for the expression of ideals which should influence women and prepare them to enter upon the opportunities afforded by present-day conditions.

Conclusion. Although the personnel of the office has been changed, the work, I believe, has been conducted with the same earnestness and disinterestedness that characterized the previous incumbents. I wish to take this opportunity to express my deep appreciation to Mrs. Jessup and Miss Moor for their devotion, and to you, Mr. President, for the cooperation and sympathetic understanding which you have extended to me at all times.

Respectfully submitted,

(MRS.) K. W. JAMESON,
Dean of Women.

REPORT OF THE LIBRARIAN

To the President of the College,

Sir: I have the honor to submit the following report on the progress of the Oregon State Agricultural College Library for the biennium July 1, 1926 to June 30, 1928.

Organization and policy. The reorganization outlined in the previous biennial report was followed by the installation of an additional circulation desk, and the transferring of the Card catalogue from the reading room to the hall. The results in improved accuracy in records, increased speed in public service, and more time for personal attention to each patron's wants, have been most gratifying, as indicated in the section on Service.

The maintenance of discipline in the Reading Room, formerly under the control of the Student Body Honor System, was resumed by the library staff during the winter 1926-27. Considerable improvement was effected by the close of the college year, due to the vigilance of all departments of the staff. We have long hoped that some legitimate center for social life of the students might be provided on the campus, leaving the Library to perform its function in an appropriate atmosphere for concentrated study and the promotion of scholarship. We trust that some fulfillment of this hope will be afforded in the use of the new Memorial Union Building. We also welcome this building as a place which will provide for such student activities as elections and ticket sales, removing from our lobby those elements of confusion and disturbance so inimical to the quiet and studious atmosphere desirable in a college library.

Another forward step in our organization was the centralization of the catalogue work by removing to the Cataloguing department certain work formerly done in the Technical department. All publications, whether continuations, documents, or books, are now catalogued in the Cataloguing department under the supervision of the one head. Until a full time cataloguer is provided, it is necessary for the head of the Technical department to devote some time to the work in the Cataloguing department.

The routine work of the Order department was changed to conform to the routine of purchase through the Oregon State Board of Control.

Library practice. In the fall of 1927 the required course in Library Practice for freshmen was dropped from the curriculum, and three lectures to students in freshman English were substituted. An elective course of two credits in Bibliography for upper classmen was announced in the 1927-28 College Catalogue, but was not given in the spring of 1928.

Staff. There were nine resignations from the staff of fifteen during the biennium, including one head of a department. Two of these resigned to do advanced study, two to be married, and five to accept other positions.

Two leaves of absence were granted for the year 1927-28. The Librarian was on sabbatical leave for travel abroad, and one reference assistant obtained an advanced degree in library science from Columbia University.

Service. The work of the Library has increased more rapidly than the student body. Development in any department on the campus is immediately reflected in increased demands for books and periodicals, and in greater variety of library service.

Besides keeping up indexes already started, and doing increasingly thorough and substantial reference work, the Reference department has begun an index to poems not otherwise indexed. Work with debate and the Picture Collection showed a steady growth.

Books of interest to children were segregated from the general collection and placed in a separate section in the reading room where they would be more useful for classes in Education, Child Care, and the Boys' and Girls' 4-H Club session.

Constant shifting was necessary to keep the books in order in the stacks and make room for new accessions. Superfluous duplicates of state and government publications were weeded out to gain space.

As nearly as possible the file of state courses of study was completed and the usual effort made to keep up such reports as those of tax commissions, highway comissions, state colleges and universities, geological surveys, and others.

A project of cooperative indexing of Oregon publications was started in company with other state institutions. This should be continued if sufficient cooperation is received on publications which we need indexed.

A bibliography on the Source of Agricultural Statistics of Oregon was compiled by Miss Haley and mimeographed by the United States Department of Agriculture.

Increasing demands on the staff are made for work outside the campus. In 1926-27 several members contributed to the college radio programs. Several questionnaires have been filled out, including exhaustive reports for the American Library Association and the Land Grant College survey.

The Library was represented at the annual meetings of the Pacific Northwest Library Association. The Assistant Librarian was appointed chairman in charge of the College Section of that organization, and contributed a paper to the 1927 meeting of the Agricultural Libraries Section of the American Library Association.

The head of the Circulation department prepared a survey of the reading of college students for presentation at the next meeting of the Pacific Northwest Library Association.

In cooperation with the State Library, Corvallis Public Library, and other institutions in the state, increasing numbers of inter-library loans have been made. Many of the questions from small libraries involve extensive reference investigation.

The resources of the Library are advertised by a semi-monthly list of accessions, sent to the faculty on request. Displays in the Reading Rooms of new books, or works on various topics of current interest, are held in connection with conventions on the campus, such as the Parents' School; Oregon Retail Merchants' Association, Daughters of the American Revolution, Educational Exposition. These included books on vocations, popular scientific works and high school recreational reading. Exhibits of postage stamps and of bookplates were shown. Several exhibits have become annual features, such as those for Children's Book Week and a display of travel literature. Valuable publicity has been furnished through the department of Industrial Journalism and various student publications.

The Librarian particularly acknowledges the efficient and loyal service of the library staff in carrying on every branch of the work during her absence on sabbatical leave. It has been most gratifying to return to a system that has run smoothly, with every consideration for the best interests of the institution, and the patrons we serve. Special acknowledgment is made to the Assistant Librarian, Head of the Order department, and Head Cataloguer, who had to assume extra duties in the adjustment of the Librarian's work; and to the Assistant Librarian for her cooperation in the preparation of this report, and other more difficult administrative duties.

Books and collections. The total number of volumes in the Library July 1, 1926 was 70,534. To these a net total of 4,687 were added during the first year of the biennium and 6,156 during the second year. The net total number of volumes at the close of the biennium is 81,377. The net total of catalogued pamphlets has increased during the biennium from 3,379 to 4,092. Uncatalogued publications have increased during the biennium from 298,851 to 329,085.

As far as funds permitted, the book collection has been built up for the use of research workers by the purchase of standard sets of periodicals, avoiding unnecessary duplication of files in other state institutions. While in Europe the Librarian purchased several important sets which are almost entirely off the market, and arranged to secure others as soon as funds permit. A list of wants and preferences is kept checked up in order that immediate advantage may be taken of any desirable material offered for sale.

Binding of periodicals has by no means been brought up to date, but progress has been made in collecting and binding valuable files.

The open shelf collection for general reading has been freshened by the withdrawal of worn copies and replacements and additions.

Facilities. The main reading room was redecorated during the last Christmas vacation, and presents an improved appearance. The periodical room was more conveniently arranged with new shelves. Additional tables and chairs increased the seating capacity of all reading rooms. Noise in the main reading room was reduced by shifting the entrance doors into the hall as requested in previous report.

Acknowledgments. It is impossible to list here the numerous books, periodicals, and bulletins received as donations to the Library. Especial-

ly noteworthy is the gift by Mrs. E. D. Ressler of the professional library of the late Dean Edward DeVore Ressler. Mr. Fred Lockley presented a collection of works on home economics which are designated as the "Hope Lockley Collection." Valuable engineering periodicals from the library of Mr. Louis C. Kelsey were the gift of Mr. Chester C. Kelsey. Fourteen works of art and historical subjects were received from the Hispanic Society of America.

Needs. There is a pressing need of more office and reading room space. The present faculty study room is inadequate. Rooms with more privacy and larger desk space are demanded by those carrying on serious study and investigation. There is at present no place for oral consultation without intruding in the various library offices. There are practically no accommodations for graduate students, since they cannot be given space in the faculty study room, and have no place in the general reading room to leave material on which they are doing extended work. The valuable and growing art collection is crowded into a small closet which is also used for wraps. There should be a separate room for storage and supervised use of expensive or rare books.

The service is seriously handicapped by the crowded condition of the stacks. Heavy and oversized books must be incorrectly shelved, to the serious damage of bindings. The basement is overflowing. Valuable, rare, and expensive periodicals are seriously crowded, and inconvenient of direct access. Valuable files of newspapers are piled on the floor exposed to dust. Money must be spent in mere shifting of books which could be well spent for more direct service. The capacity of the Technical room can not be expanded, and yet there is no shelf space on which to place single volumes returned from the bindery.

There is space in the stack room for the addition of two tiers of stacks, which if installed would relieve the congestion of books and periodicals. We requested this last year, but funds were not available. The need is imperative. Installation would cost approximately $14,000.

The Staff Room, which was only sufficient for the small staff of five when it was built, is absolutely inadequate for a staff of fifteen. There is no cloak room for the use of staff members, and most of them do not have office rooms where wraps may be placed. One of the basement rooms, now occupied by other departments, should be made available for this purpose. The small alcove staff room which we now use should be thrown into the main hall on second floor, to provide proper light and ventilation for the Card Catalogue. We are handicapped for lack of working space for our staff, and rooms now occupied by other departments should be placed at our disposal. Even the reading rooms, which ten years ago seemed ample, are inadequate for our large student body. The time will soon come when the building of a new wing must be considered.

One more trained assistant is greatly needed. Reasons for this have been fully set forth in the annual report to the President and in the last biennial report, and need not be repeated here.

The recommendations of the previous biennium, especially in regard to additional trained and student assistants and increased book appropriation still hold, but with greater urgency.

There is a demand from the research staff for a high type of service in connection with documents, periodicals, and less familiar reference sources, which can not be filled when experienced workers must be occupied with clerical and mechanical duties which, though necessary, could be done by clerical assistants, if available. We do not have enough trained assistants to cover reference or technical desks during all the hours the Library is open, and student assistants are not equipped to render satisfactory assistance in such work.

We are besieged with persistent and legitimate demands from faculty members for books which they need and for which money is not available. Various schools and departments which are developing rapidly are seriously handicapped by the failure to increase their library allotments. They are also handicapped by the lack of sufficient copies of important periodicals, which should be duplicated more extensively.

We are facing the problem of more detailed cataloguing, and of the possible necessity of reclassification of the Library according to the Library of Congress system, as the present system is inadequate for the rapid development of science and industry.

Recommendations: 1. A substantial annual increase in funds for purchase of books and periodicals.

2. Provision for an assistant for the Order department, releasing the present half-time assistant for full time work in Cataloguing.

3. Additional provision for student assistance.

4. Release for library work rooms, as originally designed, of certain rooms now occupied by departments of instruction and administration.

5. Installation of two tiers of steel stacks, to relieve crowded conditions as outlined above.

Respectfully submitted,

LUCY M. LEWIS,
Librarian.

REPORT OF THE REGISTRAR

To the President of the College,

Sir: Following is the report of the Registrar for the biennial period ending June 30, 1928.

Organization. In addition to the administration of the usual functions of the Registrar's Office, during the past two years an organization has been perfected to help the individual student find the field of work for which he is best fitted and to provide adequate supervision of his progress while at the College. This work is carried on through the annual Educational Exposition, Freshman Week, faculty committees, and individual members of the faculty who are specialists in the field of vocational guidance. Admission requirements and scholarship standards have been given adequate attention in harmony with the general policy of the College to maintain its position in the front rank of the state institutions of the country.

Educational guidance. Helping the student find the field of work for which he is best fitted is a problem which has been given major consideration by leaders in education in recent years. The College has not overlooked this important service, and during the past two years particularly this work has been a special function of the Registrar's Office. While many students determine their careers early in life, the number who are undecided even at the time of high school graduation is considerable. In a technical institution it is advisable that the student begin to carry some of his professional work, along with the basic and tool subjects, as early in his curriculum as possible. It is essential, therefore, in order to avoid waste effort, for students to make a vocational selection in the first or second year of their college career. An error in such selection sometimes leads to discouragement and failure, with the result that the student may give up entirely his plans for higher education. The College is actively interested in helping the young people of Oregon avoid such difficulty. A definite choice, based on a careful analysis of the student's abilities and the needs of society, is of great advantage to every student, especially on entering college. In pursuance of this policy to aid students to avoid mistakes and to make an early and intelligent vocational choice, the Educational Exposition was organized. This is an event held annually in February, when a representative group of high school students and faculty members are invited to come to the College for a three-day period to participate in an educational guidance program. This program is arranged to stimulate student thinking and to give a student looking forward to college a practical idea of the field of endeavor to which a particular college curriculum should lead. Supplementing the Exposition program, educational guidance conferences are held in various sections of the state, upon invitation and in cooperation with the high schools. For such programs the College furnishes one or more faculty members, specialists in vocational guidance work. Last year conferences were held in nine Oregon counties by request of the local school officers. At each of the programs conducted, all of the high school seniors in the county were in attendance. In addition to these

definitely scheduled programs, faculty specialists in the course of a college year have hundreds of individual conferences with young high school people desiring assistance and advice.

Freshman Week. Freshman Week has become an established institution in the yearly program of the College. The first program of this character was held in 1924. At that time only one other state institution, the University of Maine, was conducting a freshman week program. Since then other institutions have realized the value of the enterprise to the extent that now most all of the leading institutions conduct some form of orientation program. The central idea upon which Freshman Week is based is a period of intensive training preliminary to the beginning of the regular work. The freshmen spend the week at the College in advance of the return of students who have previously been in attendance. They are made acquainted with methods of procedure and are helped to bridge the gap between high school and college. It is believed that this program has been of tremendous value to the incoming students, and has, in many cases, avoided serious difficulty and discouragement. This institution, being one of the pioneers of the freshman week plan, has been called upon to furnish suggestions to many other colleges and universities.

Admission. In 1921 the higher educational institutions of Oregon agreed upon uniform minimum entrance requirements for Oregon students. Since that time the College has operated in harmony with this agreement. Due to the large number of non-resident students seeking admission to the College, chiefly because of the type of instruction available here, stringent regulations for entrance of non-resident applicants have become necessary. Such students must not only meet the regular entrance requirements of resident students, but are admitted only on a basis of personal selection, with merit and accomplishment in preparatory work the essential element of consideration. This method insures a high type of non-resident student, worthy of the institution and the state of Oregon.

Tuition. Until September, 1921, admission to the College was free to all qualified students. Beginning at that time, however, a non-resident tuition fee of $20 a term, or $60 a year, was established, applying to all out-of-state students. The following year this fee was increased to $35 a term, or $105 a year. The succeeding year this fee was again increased, this time to $50 a term, or $150 a year and this rate is still in effect. Beginning with the academic year 1927-28 a tuition fee of $12 a term, or $36 a year, was established, applying to all resident students. At the present time, therefore, all students attending the College pay a tuition fee. These fee schedules are rigidly enforced and have naturally affected enrollment to some extent.

Scholarship. The scholarship standards of the institution have been consistently maintained on a high plane, and certain advances have been made during the period under review. Effective admission requirements and a high grade of work demanded have tended to put increased emphasis upon scholarship. Students are dealt with considerately and sympathetically, but those who cannot meet the requirements of the institution

are promptly eliminated. A Scholarship Committee, composed of eight members of the faculty, with sub-committees in each of the several schools of the College, devotes a great deal of time to studying the personal needs of students who are not making satisfactory progress. Through these channels every feasible assistance is extended to those who have deficiencies, and eliminations are not made until such action is deemed to be for the best interests of both the student and the institution. During the biennium 227 students were eliminated. While this appears to be a rather large number, it is a comparatively small percentage of the total number of students admitted during the same period. Students are not permitted to graduate by merely earning passing grades. A qualitative as well as a quantitative requirement is in operation. This means that a student whose rating is uniformly low is not recognized as eligible for graduation. As a means of promoting high scholarship as well as eliminating from graduation those who are not qualified to do a high grade of work, a careful check is made of the records of all students at the close of the second year in college. At that time those who are not meeting the standards demanded are either eliminated or transferred to non-degree status. In the latter case, the student is permitted to continue in the institution in some special field of instruction in which he may be particularly interested, but is no longer a candidate for graduation.

Enrollment. During the biennium a total of 3,039 students were admitted to the institution for the first time, an increase of 8½ percent as compared with the number accepted during the preceding biennium. The total number of full time students in attendance during the last college year was 3,818. Adding to this figure the summer session enrollment, and others coming to the College for special instruction for short periods of time, the grand enrollment total for the year is 5,311. The geographical distribution of students, as in past periods, is in every way representative of the state of Oregon. All of the thirty-six counties have sent students to the institution. The number transferring from other institutions of higher learning located in Oregon, in other states, and in foreign countries, is most gratifying, and is complimentary to the reputation the institution enjoys. The number admitted during the two years and receiving advanced standing for the work done elsewhere is 568. These represent all of the institutions of higher learning in Oregon, similar institutions located in thirty-four other states and territories and two foreign countries.

Graduation. During the two years of the biennium 1011 applicants for graduation have been awarded degrees. This is an increase as compared with the degrees conferred in the preceding period. The distribution of these degrees and the fields of work represented are shown in statistics presented elsewhere in this report. The high standard demanded for graduation, which is an important factor in determining the size of respective classes, is referred to above.

STATISTICS

Following is presented a series of tables dealing with enrollment in the various schools and sessions, distribution of transfer students, figures

relating to scholarship ratings, percentage of students self-supporting, average age of students, and figures showing the degrees conferred.

ENROLLMENT BY SESSIONS

	1926-27	1927-28
Full year courses	3772	3818
Summer Session	1068	1194
Short Courses	248	299
	5088	5311

CLASSIFICATION OF STUDENTS ENROLLED

Graduate	60	86
Regular undergraduate	3626	3669
Special	86	63
	3772	3818

ENROLLMENT IN FULL YEAR COURSES

	1926-27			1927-28		
	Men	Women	Total	Men	Women	Total
Agriculture	307	11	318	293	7	300
Chemical Engineering	107	3	110	104	4	108
Commerce	821	363	1184	823	323	1146
Engineering	687	2	689	697	1	698
Forestry	162	.....	162	171	1	172
Home Economics	.....	486	486	.....	476	476
Military Science	6	.....	6	4	.....	4
Mines	44	1	45	51	1	52
Optional	22	44	66	22	26	48
Pharmacy	196	41	237	175	36	211
Vocational Education	141	268	409	197	320	517
Graduate	44	16	60	58	28	86
Total	2537	1235	3772	2595	1223	3818

ENROLLMENT AS TO CLASSES

	1926-27	1927-28
Freshman	1395	1422
Sophomore	1550	1542
Junior	197	196
Senior	484	509
Graduate	60	86
Special	86	63
Total	3772	3818

SUMMER SESSION ENROLLMENT

	1926-27		1927-28	
Collegiate				
Men	199		227	
Women	344	543	396	623
Boys' and Girls' 4-H Clubs				
Boys	172		185	
Girls	311	483	330	515
Non-collegiate courses		42		56
Totals		1068		1194

REGISTRATION FROM COUNTIES OF OREGON

Counties	1926-27 Regular curricula	1926-27 Summer Session and Short Courses	1926-27 Total	1927-28 Regular curricula	1927-28 Summer Session and Short Courses	1927-28 Total
Baker	44	.....	44	42	5	47
Benton	967	409	1376	883	488	1371
Clackamas	100	40	140	123	48	171
Clatsop	83	13	96	81	15	96
Columbia	52	6	58	57	18	75
Coos	82	17	99	63	6	69
Crook	4	1	5	15	2	17
Curry	3	1	4	4	4	8
Deschutes	37	8	45	34	4	38
Douglas	90	33	123	70	13	83
Gilliam	13	.....	13	10	.....	10
Grant	10	2	12	13	5	18
Harney	14	1	15	18	3	21
Hood River	40	9	49	23	17	40
Jackson	76	32	108	79	22	101
Jefferson	10	1	11	8	2	10
Josephine	27	18	45	26	33	59
Klamath	49	58	107	42	42	84
Lake	29	17	46	26	9	35
Lane	103	41	144	74	34	108
Lincoln	27	11	38	24	9	33
Linn	134	43	177	126	59	185
Malheur	25	7	32	25	8	33
Marion	175	49	224	183	84	267
Morrow	20	1	21	22	3	25
Multnomah	842	151	993	833	155	988
Polk	50	42	92	45	29	74
Sherman	21	13	34	32	18	50
Tillamook	21	18	39	16	11	27
Umatilla	82	18	100	87	19	106
Union	56	7	63	46	9	55
Wallowa	26	4	30	23	4	27
Wasco	53	14	67	47	14	61
Washington	65	47	112	60	76	136
Wheeler	11	1	12	9	.....	9
Yamhill	75	18	93	72	19	91
	3516	1151	4667	3341	1287	4628

REGISTRATION FROM OTHER STATES

State	1926-27 Regular curricula	1926-27 Summer Session and Short Courses	1926-27 Total	1927-28 Regular curricula	1927-28 Summer Session and Short Courses	1927-28 Total
California	149	47	196	323	58	381
Idaho	19	18	37	26	24	50
Montana	4	4	8	5	7	12
Washington	57	65	122	72	75	147
All other states	13	22	35	24	35	59
	242	156	398	450	199	649

REGISTRATION FROM FOREIGN COUNTRIES AND TERRITORIES

Africa	1	----	1	----	----	----
Alaska	1	1	2	5	----	5
Canada	6	5	11	7	4	11
China	3	----	3	3	----	3
District of Columbia	----	----	----	1	----	1
Hawaii	1	2	3	4	----	4
India	----	----	----	----	1	1
Korea	1	----	1	1	1	2
Philippines	----	----	----	5	----	5
Russia	1	1	2	1	1	2
	14	9	23	27	7	34

SUMMARY

Oregon	3516	1151	4667	3341	1287	4628
Other states	242	156	398	450	199	649
Foreign countries	14	9	23	27	7	34
Grand totals	3772	1316	5088	3818	1493	5311

STATES, AND NUMBER OF COLLEGES AND UNIVERSITIES REPRESENTED BY STUDENTS TRANSFERRING TO OREGON STATE AGRICULTURAL COLLEGE

State	1926-27		1927-28	
	Number of institutions	Number of students	Number of institutions	Number of students
Arizona	—	—	1	2
Arkansas	—	—	1	2
California	20	65	25	66
Colorado	2	3	4	4
Florida	—	—	1	1
Idaho	7	22	6	17
Illinois	3	3	2	2
Indiana	—	—	5	5
Iowa	2	2	2	2
Kansas	1	2	4	4
Maine	1	1	1	1
Massachusetts	3	3	—	—
Michigan	3	3	2	2
Minnesota	1	1	—	—
Missouri	1	1	1	1
Montana	2	2	1	2
Nebraska	3	4	2	5
Nevada	1	1	—	—
New Mexico	1	1	1	1
New York	1	1	2	3
North Dakota	1	1	—	—
Ohio	2	2	4	5
Oklahoma	1	1	1	1
Oregon	15	122	12	102
Pennsylvania	2	2	—	—
South Dakota	1	3	1	3
Tennessee	—	—	1	1
Texas	—	—	1	1
Utah	3	5	1	1
Washington	7	26	9	44
Wisconsin	1	2	1	1
Wyoming	1	1	1	1
Alaska	1	1	—	—
Canada	1	1	2	2
China	1	1	1	1
Hawaii	—	—	1	1
Philippines	1	1	—	—
	90	284	97	284

SCHOLARSHIP RATINGS

	1926-27	1927-28
First term		
Student body	82.40	82.96
All men	81.75	82.29
All women	83.72	84.29
Men in fraternities	84.35	84.78
Men not in fraternities	81.29	81.35
Fraternity pledges	79.48	80.34
Women in sororities	85.96	85.67
Women not in sororities	82.99	83.79
Sorority pledges	83.24	84.32
Second term		
Student body	83.59	83.14
All men	83.16	82.17
All women	84.48	84.35
Men in fraternities	84.89	83.24
Men not in fraternities	82.50	83.11
Fraternity pledges	81.05	80.64
Women in sororities	86.36	85.74
Women not in sororities	83.95	84.35
Sorority pledges	82.83	80.95
Third term		
Student body	84.38	83.43
All men	83.94	83.06
All women	85.24	84.19
Men in fraternities	85.52	84.56
Men not in fraternities	82.61	82.95
Fraternity pledges	80.42	79.12
Women in sororities	86.11	85.43
Women not in sororities	84.79	83.47
Sorority pledges	84.73	82.59

PERCENTAGE OF SELF-SUPPORTING STUDENTS

	1926-27	1927-28
	%	%
Men		
Entirely self-supporting	51	51
One-half or over, but not entirely	32	29
Partly, but less than one-half	10	11
Dependent	7	9
Women		
Entirely self-supporting	20	19
One-half or over, but not entirely	16	16
Partly, but less than one-half	16	14
Dependent	48	51
Student body		
Entirely self-supporting	41	40
One-half or over, but not entirely	27	25
Partly, but less than one-half	12	12
Dependent	20	23

AVERAGE AGE OF STUDENTS

	1926-27	1927-28
Freshman	19.53	19.41
Sophomore	21.34	21.18
Junior	21.58	21.76
Senior	23.08	22.97
Special	27.79	26.97
Graduate	30.54	27.74
Student body	21.19	21.03

DEGREES CONFERRED

	1926-27			1927-28		
Masters of Science			7			17
Bachelors of Science						
Agriculture		52			48	
Commerce		123			121	
Engineering						
Civil	25			19		
Electrical	38			51		
Industrial Arts	11			7		
Mechanical	17	91		17	94	
Forestry		13			10	
Logging Engineering		5			5	
Lumber Manufacture		...			2	
Home Economics		77			87	
Mines		8			8	
Chemical Engineering		13			15	
Pharmacy		8			16	
Vocational Education		68			70	
Military Science		1	459		1	477
Pharmaceutical Chemists			24			27
			490			521

DISTRIBUTION OF MEN AND WOMEN IN GRADUATING CLASS

Degrees	1926-27 Men	Women	Total	1927-28 Men	Women	Total
Masters of Science	6	1	7	12	5	17
Bachelors of Science						
Agriculture	51	1	52	48	.....	48
Commerce	88	35	123	84	37	121
Engineering						
Civil	25	.....	25	19	.....	19
Electrical	38	.....	38	51	.....	51
Industrial Arts	11	.....	11	7	.....	7
Mechanical	17	.....	17	17	.....	17
Logging Engineering	5	.....	5	5	.....	5
Lumber Manufacture	.....	.....	.....	2	.....	2
Technical Forestry	13	.....	13	10	.....	10
Home Economics	.....	77	77	.....	87	87
Mines	8	.....	8	8	.....	8
Chemical Engineering	13	.....	13	12	3	15
Pharmacy	6	2	8	12	4	16
Vocational Education	19	49	68	16	54	70
Military Science	1	.....	1	1	.....	1
Pharmaceutical Chemists	23	1	24	23	4	27
Totals	324	166	490	327	194	521

NUMBER IN GRADUATING CLASS TRANSFERRING FROM OTHER COLLEGES AND UNIVERSITIES

	1926-27	1927-28
Number entering by transfer	102	102
Number of institutions represented	64	54
States represented	22	15
United States territories represented	1	1
District of Columbia	1	.....
Foreign countries represented	3	2

GEOGRAPHICAL DISTRIBUTION OF GRADUATING CLASS

	1926-27	1927-28
Oregon	448	487
Other states	40	31
Foreign countries	2	3
	490	521

DEGREES CONFERRED JUNE 6, 1927

DOCTOR OF LAWS

BENJAMIN FRANKLIN IRVINE
B.S., M.S., LL.D., Willamette University.

MASTERS OF SCIENCE

HAROLD LESLIE COLBY
Madison, Wisconsin.
B.S., Agriculture, 1924, University of Wisconsin.
Thesis: Histological Studies in Shoots and Spurs of Pyrus.

HARRY HARRISON GARDNER
LaFayette, Indiana.
B.S., Agriculture, 1915, South Dakota State College of Agriculture and Mechanic Arts.
Thesis: The Effect of Potassium on the Germinability of Corn.

ROBERT MURKLAND HALEY
Corvallis, Benton.
A.B., 1913, Harvard University.
Thesis: Analysis of Causes of Successes and Failures of Agricultural Cooperation in Oregon.

JOHN FRANCIS JARVIS
Corvallis, Benton.
B.S., Agriculture, 1918, Iowa State College of Agriculture and Mechanic Arts.
Thesis: A Study of the Effect of Feeding Turnips on the Flavor of Butter.

RAYMOND LUTHER STOVER
Corvallis, Benton.
B.S., Agriculture, 1924, Kansas State Agricultural College.
Thesis: A Study of the Operation of Dairy Herds by Colleges and Universities.

HERBERT TOWNSEND VANCE
Corvallis, Benton.
B.S., Vocational Education, 1924, Oregon State Agricultural College.
Thesis: The Byproducts of a High School Commercial Course.

BERTHA ALICE WHILLOCK
Medford, Jackson.
B.S., Commerce, 1918, Oregon State Agricultural College.
Thesis: The Status of Commercial Education in the Secondary Schools of Oregon.

BACHELORS OF SCIENCE

SCHOOL OF AGRICULTURE

Animal Husbandry

ELDON FRANCIS AZEVEDO
Corvallis, Benton
CARL WILLIAM BLACK
Corvallis, Benton
FRANK HARKNESS BRYAN
Corvallis, Benton
LELAND OWEN DREW
Junction City, Lane
JOHN ALEXANDER PAYTON
Baker, Baker
DAVID ARCHIBALD ROGERS
Phoenix, Arizona
CHARLEY DEVERS THOMPSON
Nyssa, Malheur

Botany and Plant Pathology

EARL ADRIAN HELGESON
Corvallis, Benton
DEFOREST HAROLD PALMITER
Hood River, Hood River

*In case of starred names, degree was granted at close of 1926 Summer Session.

Dairy Husbandry

ESTON HERYFORD AHLSTROM
Lakeview, Lake
WILLIAM SAMUEL BENNETT
Independence, Polk
LEWIS CLARK BRANDT
Silverton, Marion
WILFRED BARNES COOPER
Klamath Falls, Klamath
AAGE GRIBSKOV
Junction City, Lane
FRANK ALTON LOUGHARY
Monmouth, Polk
DALE READER WINN
Junction City, Lane

Entomology

ORIN ANCIL HILLS
Corvallis, Benton

Farm Crops

HARVEY STEPHENS HALE
Corvallis, Benton
*JOHN MACMAHON MCPHEETERS
Corvallis, Benton
JAMES FOSTER MARTIN
Corvallis, Benton
CHARLES DILLARD REQUA
Corvallis, Benton
BENJAMIN WALLACE TOTTEN
Corvallis, Benton
ARTHUR HERBERT WALKER
Medford, Jackson

General Agriculture

CARL JESSE AVRIT
Corvallis, Benton
SHERMAN FREEMAN
Corvallis, Benton
DONNELL TREGEA HENDERSON
Bingen, Washington State
ROBERT MCILVENNA
Jefferson, Marion
JOHN EMMETT SPURLOCK
Corvallis, Benton
MARSHALL WEDELL STONE
Tacoma, Washington State

Horticulture: Landscape Gardening

EDWIN CLAIR HEILMAN
Corvallis, Benton
JEAN MCDANIEL
Portland, Multnomah
ALLAN HIMES REID
Portland, Multnomah

Horticulture: Pomology

JAMES BYRON BASSETT
Corvallis, Benton
BERNAL WYLIE GIFFEN
Fresno, California
FRANK LOUIS HUFFMAN
Manteca, California
LESTER ROBERT SCHOFIELD
Buena Park, California

Marketing of Agricultural Products

LEO HENRY BECKLEY
Roseburg, Douglas
HAROLD FRANKLIN ELLIS
Corvallis, Benton
HARRY WAYNE LARSON
Corvallis, Benton
EARLE LYSONS
Snohomish, Washington State
ELMER JOHN MATHEWS
Astoria, Clatsop
LORENCE WILLIAM NOLTE
Lakeview, Lake
WALTER HERMAN SCHWEDLER
Gresham, Multnomah
DONOVAN STEWART
Corvallis, Benton
HENRY ROBERT WILEY
Corvallis, Benton
LAURENCE RIDLEY WOODWARD
Arago, Coos

Poultry Husbandry

GAY MACKENZIE HEATH
Troutdale, Multnomah
ALFRED OSCAR REIMANN
Corvallis, Benton
HOMER WEBB SETTLEMIER
Woodburn, Marion

Soils

WALTER VERNON BLACK
Corvallis, Benton
ROBERT PEROW
Corvallis, Benton
ROY WENDEL SOUTHWICK
Whittier, California

SCHOOL OF COMMERCE

LORENTZ LOUIS ALLEN
Corvallis, Benton
JAMES WILBUR ALTMAN
Gresham, Multnomah
GUNNAR ANDERSON
North Bend, Coos
CARL HENRY BADURA
Portland, Multnomah
HARRY SUGG BAKER
Corvallis, Benton
WALDO JOHN BAKER
Grants Pass, Josephine
JESSIE MARY BELL
Pendleton, Umatilla
MABEL CADY-BERGHOLZ
Corvallis, Benton
AGUIDO ZANDUETA BERNAL
Sto. Tomas, Philippines
STEPHEN CHARLES BILHEIMER
Corvallis, Benton
ARLIN BLAIN
Corvallis, Benton
THELMA DORIS BLAKER
Fairbanks, Alaska
*WARREN CECIL BONER
Joseph, Wallowa
FREDERICK GEORGE BRACHER
Portland, Multnomah
WALLACE MILTON BURKHART
Albany, Linn
MARK WILLIAM BUSACCA
Corvallis, Benton
MELVA MAY BUTLER
The Dalles, Wasco
LOIS ELIZABETH CAMPBELL
Corvallis, Benton
MILDRED CANFIELD
Portland, Multnomah
HAROLD PERRY CARLILE
Baker, Baker
KENNETH SOUTHAM CHAMBERLIN
Corvallis, Benton
*THELMA LUCILE CHASE
Corvallis, Benton
MARIE CORA CHRISTIANSEN
Portland, Multnomah
DELOS ERAL CLARK
Halsey, Linn
G. L. COMPTON
McMinnville, Yamhill
SARAH ANNE CONNER
Corvallis, Benton
GEORGE GUY CRAIG
Enterprise, Wallowa
JESSIE CUNNINGHAM
Oregon City, Clackamas
DANIEL BARTON DELOACH
Portland, Multnomah
KENNETH GEORGE DENMAN
Corvallis, Benton
FRANK EDWARD DESPAIN
Portland, Multnomah
SERLE ALVAN DOUGHERTY
Halsey, Linn
PRESTON FRANKLIN DOUGHTON
Lebanon, Linn
LOUIS SPENCER EADE
Corvallis, Benton
ANABEL EBERTING
Corvallis, Benton
MARK EARNHEART EVANS
Pendleton, Umatilla
CHARLES FERDINAND FEIKE
Portland, Multnomah
CLIFFORD CHARLES FIELDS
Roseburg, Douglas
BLAINE MELVIN FINCH
Portland, Multnomah
JOHN OVERFIELD FOYLE
Corvallis, Benton
WILLARD AUSTIN FRAZIER
Salem, Marion
EVA MARIE FREEMAN
Corvallis, Benton
AMORY TINGLE GILL
Corvallis, Benton
CARLIE MAY GILSTRAP
Portland, Multnomah
ROBERT GUY HAINES
Portland, Multnomah
THOMAS STEWART HARDIE
Condon, Gilliam
EUGENE JULIAN HARTLEY
Corvallis, Benton
*RALPH HOMER HAUCK
Bend, Deschutes
BERNICE LOUISE HENZE
Portland, Multnomah
GLADYS LUELLA HESGARD
Portland, Multnomah
FRANCIS KEITH HILL
Corvallis, Benton
RICHARD EDWARD HOCKING
Portland, Multnomah
BERNICE HUNTER
Corvallis, Benton
BURTON SEYMOUR HUTTON
Roseburg, Douglas
JAMES WILLIAM JENKS
Tangent, Linn
EVELYN ISABEL JENSEN
Corvallis, Benton
DOROTHY ETHEL JOHNSON
Portland, Multnomah
HAROLD ROUNDS JOHNSTON
Corvallis, Benton
THOMAS CHARLES JONES
Portland, Multnomah
ANONA FRIEDA JOOS
Hillsboro, Washington
PETER KAPUTA
Lamona, Washington State
GERTRUDE FLOREINE KNEBEL
The Dalles, Wasco
MATHEW REYNOLD KOONTZ
Marshfield, Coos
LLOYD WELCOME KUNI
Crabtree, Linn
RUBY DAVIS LARSEN
Tacoma, Washington State
WILLIAM EDWARD LIGHTOWLER
Oregon City, Clackamas
ARTHUR RUDOLPH LINDBLAD
Portland, Multnomah
CLAUDE MACDONALD LOCKWOOD
Eugene, Lane

FRANCES MEINIG LOUNDREE
Sandy, Clackamas
THEODORE ROOSEVELT LUEBKE
Corvallis, Benton
ROBERT LOUIS LURSEN
Portland, Multnomah
*ROBERT LEE MCCOURT, JR.
Hollywood, California
*ROBERT WRIGHT MCKEE
Corvallis, Benton
BETH MCKEOWN
Corvallis, Benton
AGNES MALLERY
Corvallis, Benton
FRANK BLAIR MALLOY
Klamath Falls, Klamath
ALFRED RICHARD MEINIG
Sandy, Clackamas
*HOWARD GLENN MERCER
Troutdale, Multnomah
JOHN DONALD MERRITT
Central Point, Jackson
CHARLES WARREN MESSING
Corvallis, Benton
LYLE DELOS MILLS
Klamath Falls, Klamath
FRANCIS MARION MITCHELL
Portland, Multnomah
ERNEST HERMAN MOSER
Myrtle Point, Coos
LYLE CALEB NEWCOMER, JR.
Portland, Multnomah
MILDRED NEWTON
Corvallis, Benton
WARD MATTHEWS NICHOLS
San Jose, California
LESTER FRED NIELSEN
Junction City, Lane
JAMES VERNON OWENS
Medford, Jackson
STUART MOUNTFORT PAGETT
Portland, Multnomah
JUDD KERMIT PAYNE
Tacoma, Washington State
BERTHA MARIE PELTZ
Klamath Falls, Klamath
GEORGE PLUMB
Linnton, Multnomah
RUSSEL EDWARD PRATT
Salem, Marion
MARTHA ISABEL PROCTOR
Corvallis, Benton
*DALMER DARREL REEDER
Corvallis, Benton
KATHERINE AGNES SANDON
Corvallis, Benton
FREDERICK FOSTER SCHEPMAN
Corvallis, Benton
HELEN ELIZABETH SCHEPMAN
Corvallis, Benton
LUCILLE SCHRAEDER
Corvallis, Benton
EDWARD WESLEY SCHULMERICH
Hillsboro, Washington
ALFRED WILLIAM SERPA
Fresno, California
VIRGIL LAWRENCE SEXTON
Portland, Multnomah
VELMA TRUE SHATTUCK
Corvallis, Benton
*ORVAL EVERETT SHRYDER
Portland, Multnomah
LINDROFF GEORGE SKAAR
Oregon City, Clackamas
GEORGE KENNEDY SMARTT
Corvallis, Benton
CLARENCE MORRIS SMITH
Mayville, Gilliam
WILLIAM LEO SMITH
Portland, Multnomah
ALVIN REDMOND SNEDEGER
Cloverdale, Tillamook
IRVING WALLACE STEWARD
Corvallis, Benton
GEORGE RICHARD SURRY
Lebanon, Linn
ELIZABETH TAYLOR
Corvallis, Benton
GUSTAV AUGUST TIMM
Corvallis, Benton
PEARL TIMMONS
Medford, Jackson
ANTHONY VAN COUVERING
Corvallis, Benton
KENNETH ALEXANDER VOIGT
Portland, Multnomah
KENT ELLSWORTH WALKER
Corvallis, Benton
LAURANCE KENNETH WARNER
Pendleton, Umatilla
LEWIS NIXON WEST
Salem, Marion
MILDRED WHITTAKER
Lakeview, Lake
*CHRIS THEADORE WILDE
Junction City, Lane
IDYLE ALCESTE WILDE
Corvallis, Benton

SCHOOL OF ENGINEERING

Civil Engineering

ERVIN EARL BARKLOW
Norway, Coos
*WILLIS HENRY BARTLETT
Ashland, Jackson
GEORGE LEWIS BERRY
Corvallis, Benton
ARTHUR FRANK BESTER
Tillamook, Tillamook
RUSSELL STANLEY BOND
Portland, Multnomah
CONRAD DAHL BUE
Enterprise, Wallowa
KENNETH RUPERT DIBBLEE
Rainier, Columbia
PRESTON GERALD DREW
Junction City, Lane
VICTOR LEE GOODNIGHT
Portland, Multnomah
THOMAS HARTLEY IVES
Corvallis, Benton
JACOB DONALD KROEKER
Dallas, Polk
PERCY HAROLD MCGAUHEY
Corvallis, Benton
HARRY EARL MITCHELL
Sandy, Clackamas
HAROLD EDWARD MOORE
Corvallis, Benton
WAYNE GORDON ROBERTSON
Halsey, Linn
FRANK ARTHUR ROSS
Wheeler, Tillamook

JOHN HARVEY SUMMERS
Tigard, Washington
BYRON KIZER TAYLOR
Corvallis, Benton
FRANCIS JOHN THOMAS
Hubbard, Marion
JESSE THEODORE WALKER
Salem, Marion
HARRY ELSWORTH WILBERT
Harrisburg, Linn
BUELL ELSWORTH WILCOX
Milton, Umatilla
JULIUS PARKER WILLIAMS
Corvallis, Benton
FRANS ALBERT WUOPIO
Astoria, Clatsop
DON PAUL YEAGER
Corvallis, Benton

Electrical Engineering

CARL GEORGE ARCHIBALD
Corvallis, Benton
THEODORE DEEMS BUTTS
Albany, Linn
FREDERICK DENTON CROWTHER
Portland, Multnomah
HARRY WALLACE DALBY
Portland, Multnomah
KENNETH IDRIS DAVIS
Portland, Multnomah
ORMOND CLIFTON DOTY
Corvallis, Benton
RICHARD LAHUE EARNHEART
Pendleton, Umatilla
JOHN LYMAN FENTON
Corvallis, Benton
FREEMAN CHARLES CHRISTIAN FIKE
Portland, Multnomah
EUGENE CHARLES FULTON
Bend, Deschutes
ALBERT LAVERNE HAWN
Roseburg, Douglas
MANUEL HOLTZMAN
Portland, Multnomah
WAYNE EDWARD HOUSTON
Portland, Multnomah
ERNEST ASHLEY HOWARD
Corvallis, Benton
CLARENCE HURD
Corvallis, Benton
FRANCIS ERNEST KIRK
Portland, Multnomah
HENRY EDWARD KIRKLAND
Portland, Multnomah
EUGENE MICHAEL KLEINER
Portland, Multnomah
WALTER RUDY KNAPP
Portland, Multnomah
MARTIN JOHNSON LANTZ
Portland, Multnomah
JOHN MILTON LUTTRELL
Corvallis, Benton
JOY CLAUDE MCKEOWN
Corvallis, Benton
NELSON MEREDITH MEKEEL
Corvallis, Benton
JOHN MOTEJL
Sandy, Clackamas
OSCAR FREDRICK RANZENBACH
Portland, Multnomah
ERNEST FRANCIS REDDY
Albany, Linn
VENE ELMER RINEHART
Lakeview, Lake
JOHN FRANCIS RUSSELL
Corvallis, Benton
WALTER HARVEY RUSSELL
Portland, Multnomah
DILLANE GORDON SCHLOTH
Portland, Multnomah
ROBERT CHARLES SCHUKNECHT
Hood River, Hood River
LEVI MARION SMITH
Chitwood, Lincoln
PHILIP CHARLES SOWERSBY
Riddle, Douglas
THEODORE CHARLES SPINNING
Dufur, Wasco
MELWOOD WERTZ VANSCOYOC
Corvallis, Benton
KNEUT CARL WERNMARK
The Dalles, Wasco
WENDELL CORNELIUS WING
Hood River, Hood River
VIRGIL ELDON WOODCOCK
Roseburg, Douglas

Industrial Arts

JULIUS LUDWIG BEDYNEK
Corvallis, Benton
*COLA LEWIS EGGLESTON
Brownsville, Linn
HARRY HERMAN EHLEN
Aurora, Marion
JOHN MATHEWS ELIASSEN
Astoria, Clatsop
ALVIN HERBERT HOLLENBERG
Corvallis, Benton
FRED MELVIN JABUSCH
Corvallis, Benton
*CASEY STACEY JONES
Reedsport, Douglas
CLARENCE HARVEY LANDES
Mossy Rock, Washington State
JOHN PARKER MILLER
San Francisco, California
FELIX AUGUST SUBJECT
San Bernardino, California
HAROLD ARTHUR TEALE
Battle Ground, Washington State

Mechanical Engineering

KENNETH WILLIAM BUCKLEY
Corvallis, Benton
WALTER CARLETON DOANE
Salem, Marion
RILEY LLEWELLYN GILBERT
Victoria, British Columbia
ERNEST ALFRED GORDON
Corvallis, Benton

WILLIAM HARRY HART
Corvallis, Benton
HOWARD GRANT HUGHEY
Portland, Multnomah
GRATTON DAVID KEERINS
Izee, Grant
FRANCIS HENRY KNIFTON
Corvallis, Benton
BYRON HAROLD MONISH
Portland, Multnomah
ABRAHAM AROU OSIPOVICH
Portland, Multnomah
CHARLES WESLEY RALLS
Corvallis, Benton
ORVILLE WILSON RICE
Portland, Multnomah
JOHN VIRGIL SPAINHOWER
Corvallis, Benton
FRED VOSS
Astoria, Clatsop
ORVILLE LEE WALTER
Ontario, Malheur
BYRON SHELBY WARNER
Pendleton, Umatilla
ERNEST CLARENCE WEBB
Salem, Marion

DEPARTMENT OF CHEMICAL ENGINEERING

BURTON RENO ADAMS
Salem, Marion
ADRIANO AFROILAN
Corvallis, Benton
PERCY BAILEY BELL
Pasco, Washington State
LOYAL WALTER CLARKE
Corvallis, Benton
*EDWARD JOHN DIENER
Corvallis, Benton
MAURICE EVERETT KINSEY
Hood River, Hood River
BYRON ELMER LAUER
Portland, Multnomah
GUILFORD LEROY MACK
Corvallis, Benton
LESLIE JAMES ROLL
Portland, Multnomah
HARRY SINES
Portland, Multnomah
PERRY SWANSON
Cherry Grove, Washington
MARION CHURCH TADLOCK
Corvallis, Benton
JOE ELMER VOYTILLA
Dillard, Douglas

DEPARTMENT OF MILITARY SCIENCE AND TACTICS

GEORGE WILLIAMS MOSES, JR.
Corvallis, Benton

SCHOOL OF FORESTRY

Logging Engineering

JOHN HEMAN BAGLEY, JR.
Portland, Multnomah
*ALEXANDER ROBERT CRAVEN
Corvallis, Benton
ALVIN CLARENCE OLSEN
Corvallis, Benton
FRED JACOB SCHREINER
Corvallis, Benton
*PAUL THOMPSON
Corvallis, Benton

Technical Forestry

WILLIAM JENNINGS BAKER
Toledo, Lincoln
JASON KERMIT BRANDEBERRY
Albany, Linn
MILTON MOWREY CRAVEN
Parkdale, Hood River
RICHARD BERTRAM FEHREN
Portland, Multnomah
CHARLES WHITE FOX
Portland, Multnomah
ERIC HEATON GARMAN
Vancouver, British Columbia
JAY HANN, JR.
Corvallis, Benton
EDWARD LOUIS JOY
Portland, Multnomah
JOSIAH ALFRED LIBBY
Corvallis, Benton
OTTO LINDH
Corvallis, Benton
WALTER HANS LUND
Warren, Columbia
ALVIN LOUIS PARKER
Vernonia, Columbia
JOHN CHRISTOPHER WILKINSON
Corvallis, Benton

SCHOOL OF HOME ECONOMICS

MARIAN LOUISE ANDERSON
Portland, Multnomah
LOUISE MARION ARNOLD
Portland, Multnomah
HELEN BAILEY
Tangent, Linn
FERN ELIZABETH BANDY
Corvallis, Benton
IRENE MAY BARBUR
Portland, Multnomah
WILDA ELIZABETH BARTON
Corvallis, Benton

FRANKIE LEOLA BENEFIEL
Corvallis, Benton
BETTY BENN
Portland, Multnomah
VERA BISHOP
Corvallis, Benton
ROZINA BLAKE
Corvallis, Benton
GLADYS BOEGLI
Culver, Jefferson
HELEN FRANCES BOYER
Portland, Multnomah
VERA HASKELL-BRANDON
Corvallis, Benton
LANTA ELIZABETH BREWER
Corvallis, Benton
BESSIE JANE BROWN
Lakeview, Lake
ELLEN BERTHA BROWNELL
Portland, Multnomah
ELIZABETH MAE CARLETON
Alsea, Benton
HELEN MARGARET CHASE
Roseburg, Douglas
LOIS MARGUERITE CHEADLE
Lebanon, Linn
*ANABEL CLARK
Portland, Multnomah
VERNA RUTH CUTTING
Campbell, California
*MERLE BONNEY DAVIS
Corvallis, Benton
ELIZABETH LUCILE DE LA FONTAINE
Portland, Multnomah
ELIZABETH DONALD
Portland, Multnomah
*AVIS FLO DOUGHERTY
Corvallis, Benton
CHRISTINE HELEN FISHER
Corvallis, Benton
DORIS EDITH FITZGERALD
Corvallis, Benton
ALLEEN FRANCES FLETCHER
Sacramento, California
MARGERY HAVENS FOSTER
Corvallis, Benton
PAULINE ANN GIENGER
Tillamook, Tillamook
MARGARET HALL
Woodburn, Marion
MARY ESTHER HALL
Monroe, Benton
GERTRUDE HELEN HARRY
Portland, Multnomah
MILDRED RUTH HARTSOCK
Albany, Linn
CONSTANCE VIRGINIA HENDRICKSON
Roseburg, Douglas
MARGARET ANNA HESSLER
Dayton, Yamhill
HAZEL MONA HOPKINS
Salem, Marion
JANE CATHERINE IRVING
Wilbur, Douglas
MARY MARGARET JACOBBERGER
Portland, Multnomah
ALMYRA VIOLA JACOBSON
Minot, North Dakota
LURA POLLARD JARMON
Echo, Morrow
BERTHA FAYE JOHNSON
Wenatchee, Washington State
*ADAH FAE KETCHAM
Corvallis, Benton
HANNAH KIM
Corvallis, Benton
MARY LEWIS
Corvallis, Benton
ELVA DOROTHY LOWES
Portland, Multnomah
ETTA MARGARET MCCREIGHT
Portland, Multnomah
RUTH MCFARLAND
Corvallis, Benton
ELLEN AMANDA MATSON
Astoria, Clatsop
ELEANOR MARTIN MENEILLY
Portland, Multnomah
HARRIET LEE METCALF
Corvallis, Benton
EDNA DOROTHY MOORE
Portland, Multnomah
MAE MARTHA MOORE
Corvallis, Benton
MAUD ROMAINE MUELLER
Portland, Multnomah
WEALTHY MAY MURPHEY
Berkeley, California
MARIAN SHEETS NEEDHAM
Milton, Umatilla
LOUISE JANE NOBLE
Gladstone, Clackamas
RUTH ALICE NORGAARD
Junction City, Lane
CORA BARKLEY OLIVER
Corvallis, Benton
LILIAH EDNA OLSON
Portland, Multnomah
BESS MARIE PAYNE
Tacoma, Washington State
*DORIS PHILIPS
Marshfield, Coos
CORA NATALIE PRICE
Corvallis, Benton
ORPHA MARIE PUCKETT
Caldwell, Idaho
RITA PEARL REID
Salem, Marion
EVA LOUELLA RICKERT
Corvallis, Benton
ISOBEL MARY ROBERTSON
Corvallis, Benton
JOSEPHINE NELLY ROBINSON
Wilderville, Josephine
SOPHIA MARGARET SHELK
Linnton, Multnomah
HAZEL MARTHA SMITH
Corvallis, Benton
MARION TYLER SMITH
Berkeley, California
ROSALIA KATHRYN SODJA
Portland, Multnomah
CORA ELIZABETH TAYLOR
Astoria, Clatsop
EUGENIA VILM
Medford, Jackson
DELMA DAISY WAHL
Halsey, Linn
WILLETTA MAY WELCH
Salem, Marion
CHARLOTTE WELLS
Portland, Multnomah
*LUCY WILSON
Corvallis, Benton

SCHOOL OF MINES

CLIFFORD RAYMOND ALDERMAN
McMinnville, Yamhill
HAROLD DURWARD BAILEY
Huron, South Dakota
RICHARD SEARS DIXON
Corvallis, Benton
GEORGE ROSS FULTON
Corvallis, Benton
ERB ADOLPH PARKER GURNEY
Portland, Multnomah
ELMER GLENN REXFORD
Corvallis, Benton
GEORGE CHARLES SELFRIDGE
Portland, Multnomah
ARTHUR EUGENE WIGHT
Lebanon, Linn

SCHOOL OF PHARMACY

BENJAMIN JACOB ADLEMAN
Portland, Multnomah
CHARLES RUSSELL CHICK
Hood River, Hood River
*SYLVIA GENEVA GOOCH
Philomath, Benton
WILLIAM BANCROFT HANDFORD
Corvallis, Benton
ALFERD HENRY ILLGE
Portland, Multnomah
KENNETH LEO MCGRATH
North Powder, Union
MELANIE ANNE PARKE
Portland, Multnomah
LAWRENCE TEMPLETON
Brownsville, Linn

Pharmaceutical Chemists

DELL ROY ALEXANDER
Independence, Polk
MILORAD JOHN ANGELICH
Corvallis, Benton
HUGH CONLEY BATES
Ashland, Jackson
CARL DARIUS BENSON
Corvallis, Benton
ROBERT WALLACE BOYD
Portland, Multnomah
HARLAN BUCKINGHAM
Corvallis, Benton
*SOLON KENNEDY BUGBEE
Portland, Multnomah
PAUL EDWARD CLANTON
Portland, Multnomah
GILBERT LESTER CONNER
Mikkalo, Gilliam
VANCE TANSEY COYNER
Bend, Deschutes
*EDWARD NORTH DUNN
Corvallis, Benton
ROBERT LORENZO HARRIS
Beaverton, Washington
ALFRED CHUMASERO HILL
Corvallis, Benton
VINCENT ALEXANDER HURLEY
Portland, Multnomah
ROBERT ANSON JONES
Eugene, Lane
CECILIA ALICIA MCFADDEN
Corvallis, Benton
RICHARD JASPER MCGREW
Portland, Multnomah
EARL CRANSTON PEARSON
Baker, Baker
DONALD SLOOP
Tangent, Linn
GEORGE THOMAS SPEROS
Baker, Baker
KENNETH GERALD STONE
The Dalles, Wasco
JOHN WILLIAM TAYLOR
Corvallis, Benton
WALTER OLIVER TAYLOR
Corvallis, Benton
ADELBERT ARTHUR YOUNG
Roseburg, Douglas

SCHOOL OF VOCATIONAL EDUCATION

MARGARET ALICE ANDERSON
Newberg, Yamhill
*BERNADINE RUSSELL ARANT
Seattle, Washington State
FRANCES LOUISE BATTEY
Corvallis, Benton
*HELEN HAWKES BATTEY
Hood River, Hood River
RUTH BEATTY
Brownsville, Linn
MARY WHIPPO BECK
Corvallis, Benton
STELLA LOUISE BERG
Canby, Clackamas
RUTH MILDRED BLAKE
Corvallis, Benton
VERA HASKELL-BRANDON
Corvallis, Benton
MABEL FRIEDA BROWN
Marshfield, Coos
KATHERINE BROWN
McKinley, Coos
REX PATRICK BRUMBACH
Parma, Idaho
HELEN KATHLEEN CARPENTER
Portland, Multnomah
CATHERINE LOUISE CARTER
Portland, Multnomah
CAROL MILA CHAPMAN
Corvallis, Benton
EMILY HELEN HARRIET CRAIG
Corvallis, Benton
ANNE ELIZABETH CURRIE
Camas, Washington State
NEVA OPAL DALLAS
Corvallis, Linn
KENNETH HERBERT DUNKELBERGER
Portland, Multnomah
ELEANOR EAKINS
South Pasadena, California
LULU RUTH EARNHEART
Pendleton, Umatilla
WILDES LONGSWORTH EDWARDS
Fossil, Wheeler

*MYRTICE EDITH FOWLER
Portland, Multnomah
RUTH ZARA HANN
Portland, Multnomah
ARTHUR CARL HILLSTROM
Marshfield, Coos
CECIL CURRY HORTON
Corvallis, Benton
IRENE HOGUE
Corvallis, Benton
LORING GARDNER HUDSON
Willamina, Yamhill
BLANCHE ESTHER HURD
Corvallis, Benton
*DELIGHT SUZANNE INGOLD
Portland, Multnomah
LIDA THOMSON JARMON
Echo, Morrow
ROY HORACE JENKINS
Arcata, California
THELMA JEAN JOHNSON
Salem, Marion
SYRA CHARLOTTE KALLANDER
Portland, Multnomah
MYRTLE DOROTHY KLAMP
Woodburn, Marion
PAULINE LAMAR
Corvallis, Benton
WILMA ELIZABETH LEACH
Lexington, Morrow
*CLIFFORD ALLEN LUCAS
Portland, Multnomah
MARGARET GRACE MCCLARAN
Wallowa, Wallowa
RAY WILBUR MCDUFFEE
Heppner, Morrow
*THOMAS THEODORE MACKENZIE
Lostine, Wallowa
FAYE CATHERINE MUIRHEAD
Henningford, Nebraska
CHARLES LEROY NELSON
Scappoose, Columbia
*HARRY GEORGE NELSON
Corvallis, Benton
LESLIE MAHIN OLIVER
Corvallis, Benton
GLENN NOBLE OLMSTED
Whiteson, Yamhill
THELMA JEANETTE OLSON
Corvallis, Benton
BETH PARTRIDGE
Monmouth, Polk
CLAIR PEPPERD
Coldwater, Kansas
MERRILL ALFRED PIMENTEL
Hayward, California
MILDRED CECILA RAMSEY
Willamina, Yamhill
ROY RICHERT
Pacific Beach, California
GEORGE PAUL RONICKE
Corvallis, Benton
MARGUERITE ELLEN RUSSELL
Corvallis, Benton
*ARIZONA SAWYERS
Elkton, Douglas
IDAMAE SCHLOTH
Portland, Multnomah
*BEULAH SLADE
Philomath, Benton
MARJORIE TEDROW
Marshfield, Coos
CHARLOTTE FANSHAW THAYER
Corvallis, Benton
ORVAL ANDREW THOMPSON
Moro, Sherman
MONA ETHEL TIMBERLAKE
Portland, Multnomah
VIVIAN ROMONA TOHL
Nehalem, Tillamook
BEATRICE MARCELLA TUBBS
Molalla, Clackamas
DALLAS CARL WARD
Lexington, Morrow
NELLIE CATHERINE WATSON
Hillsboro, Washington
MARGARET WILHELMINA WATT
Portland, Multnomah
RUTH MARIE WILEY
Portland, Multnomah
MABEL WILLS
Carlton, Yamhill

DEGREES CONFERRED JUNE 4, 1928

MASTERS OF SCIENCE

WILLIAM JENNINGS BAKER
Toledo, Lincoln.
B.S., Forestry, 1927, Oregon State Agricultural College.
Thesis: The Utilization of Tanbark Oak.

FREDA CARBAUGH BONAR
Hillsboro, Washington.
B.S., Commerce, 1922, Kansas State Normal.
Thesis: Extra-curricular Business Activities in Oregon High Schools.

MADELINE BRUMBAUGH
Corvallis, Benton.
B.S., Home Economics, 1924, Oregon State Agricultural College.
Thesis: The Designing and Costuming for an Historical Play.

CHARLES RUMPEL DONHAM
Corvallis, Benton.
D.V.M., 1921, Iowa State College.
Thesis: Salmon Poisoning in Dogs.

CHARLES WHITE FOX
Corvallis, Benton.
B.S., Forestry, 1927, Oregon State Agricultural College.
Thesis: The Kiln Drying of Oregon Softwoods.

RALPH IRVIN HALE
Marysville, California.
B.S., Agriculture, 1925, Oregon State Agricultural College.
Thesis: Scarification of Red Clover and Alfalfa Seed.

EDNA TIBBITS HAWLEY
Corvallis, Benton.
B.A., 1913, University of Washington.
Thesis: What the Rural Social Worker Needs to Know About Mental Deficiency.

ROBERT COMBS JACKSON
Corvallis, Benton.
B.S., Agriculture, 1906, Oregon State Agricultural College.
Thesis: A Study as to the Feasibility of a Cooperative Butter Marketing Agency for Oregon Creameries.

HANNAH KIM
Ewha College, Seoul, Korea.
B.S., Home Economics, 1927, Oregon State Agricultural College.
Thesis: A Course of Study in Home Economics for the Korean Middle Schools.

HAROLD WILLIAM EMANUEL LARSON
Stanton, Iowa.
B.S., 1926, Iowa State College.
Thesis: The Relation of Calcium Ion Requirement of Alfalfa to the Calcium Content of the Soil.

GUY ROBERT MCGINNIS
Corvallis, Benton.
B.S., Agriculture, 1926, Oregon State Agricultural College.
Thesis: Life-history, Habits, and Control of the Indian Meal Moth *Plodia Interpunctella* HBN., Order Lepidoptera, Family Pyralidae.

CLIVE EARNEST RUSSELL
Manton, Michigan.
B.S., Agriculture, 1926, Michigan State College.
Thesis: Relation of Growth to Fruitfulness in the Italian Prune.

ALBERT LLOYD RYALL
Corvallis, Benton.
B.S., Agriculture, 1926, The North Dakota Agricultural College.
Thesis: The Effects of Certain Glucosides on the Germination of Pollen in Artificial Media.

DAVID CLYDE SMITH
Logan, Utah.
B.S., Agriculture, 1926, Agricultural College of Utah.
Thesis: The Effect of Seed Treatment Upon Germination and Subsequent Growth of Winter Wheat.

NETTIE SPENCER
Halsey, Linn.
B.S., 1899, University of Chicago.
Thesis: A Study of Crime in an Oregon Rural Community, with Special Reference to the Temperance Laws.

HAROLD ROTH VINYARD
Canby, Clackamas.
B.S., Electrical Engineering, 1924, Oregon State Agricultural College.
Thesis: A Translucent Writing Screen.

JOSEPH WILCOX
Corvallis, Benton.
B.S., Agriculture, 1925, Oregon State Agricultural College.
Thesis: The Species of Root-weevils Attacking Strawberry with Special Reference to Their Life-history, Habits, and Control in Oregon.

BACHELORS OF SCIENCE

SCHOOL OF AGRICULTURE

Agricultural Chemistry

HARLAN MEIKLE SHEPARDSON
Corvallis, Benton

Agricultural Economics

RONALD WESLEY BROWN
Albany, Linn
JAMES KEEFE GOSS
Portland, Multnomah
JOHN DOUGLAS HARDIE
Fossil, Wheeler
*GEORGE BOLTON LOWNES
Corvallis, Benton
*WILLIAM CLARK MOORE
Corvallis, Benton
LYALL DEFOREST SEARING
Portland, Multnomah
EDMUND STEPHENS
Moro, Sherman
CAROL OSCAR YOUNGSTROM
Culver, Jefferson

Agricultural Education

JOSEPH EVERETT WALKER
Corvallis, Benton

Animal Husbandry

IRA HUBER FORREY
Corvallis, Benton
WILLIAM DELANEY KETCHUM
The Dalles, Wasco
WILLIAM THOMAS OGLESBY
Corvallis, Benton

Dairy Husbandry

VICTOR FREDERICK BIRDSEYE
Gold Hill, Jackson
SAMUEL EUGENE BOSWORTH
Sumner, Washington State
IRVING ERICKSON
Warren, Columbia
ALVIN WILFRED HARE
Corvallis, Benton
ERNEST MILLARD HAUSER
Meacham, Umatilla
FRANK WADE SHERWOOD
Nyssa, Malheur

Entomology

THOMAS CORT ALLEN
Pasadena, California
FREDERIC PERCIVAL DEAN
Corvallis, Benton
DOUGLAS GRAYSON GILLESPIE
Corvallis, Benton

Farm Crops

HOLLIS MAX BULL
Moro, Sherman
VICTOR WALDEMAR JOHNSON
Corvallis, Benton
THEODORE ROBERT MERRYWEATHER
Corvallis, Benton
FLOYD CHARLES MULLEN
Albany, Linn
HENRY HERBERT TAUBE
Corvallis, Benton
JAMES WARREN THAYER, JR.
Eugene, Lane
RALPH EARL WARD
Baker, Baker

Farm Management

*KENNETH KINSMAN ATKINSON
Corvallis, Benton
RONALD EDWIN BURNETT
Eagle Creek, Clackamas
ALEXANDER STURGES
Corvallis, Benton

*In case of starred names, degree was granted at close of 1927 Summer Session.

General Agriculture

*JAMES PERCIVAL LANGLEY
Eburne, British Columbia

Horticulture: Horticultural Products

*PACK NGAI LEE
Portland, Multnomah
BING WAH LOUIS
Portland, Multnomah
RUBEN MARRIAGE SEIN
Eugene, Lane

Horticulture: Landscape Architecture

EMIL LEONARD ANDERSON
Boring, Clackamas
MAX EDWARD WALLISER
Tualatin, Washington

Horticulture: Pomology

NIELS WILLARD FUTTRUP
Corvallis, Benton
*CHARLES DONALD SCHOOLCRAFT
Dilley, Washington

Soils

OSCAR FITZALLEN BARTHOLOMEW
Echo, Umatilla
IVAN CUMMING DEARMOND
Corvallis, Benton
DONALD EVERETTE FEHLMAN
Corvallis, Benton
DENZIL CASSIUS GLINES
Santa Maria, California
ARTHUR SOLOMON KING
Corvallis, Benton
RAY ARTHUR PENDLETON
Corvallis, Benton
JOHN BOOTH PETERSON
Newberg, Yamhill

Zoology

NAVARRE JAMES DUNN
Corvallis, Benton

DEPARTMENT OF CHEMICAL ENGINEERING

ALICE VICTORIA ANDERSON
Portland, Multnomah
FREDERICK ROSCOE CONKLIN
Grants Pass, Josephine
RALPH EMMETT DRANE
Ontario, Malheur
JACK HALE ELLIOTT
Corvallis, Benton
JACK EDWARD FAHEY
Corvallis, Benton
LETA DAVIES FEIKERT
Corvallis, Benton
JAMES KENNETH FLESHMAN
La Grande, Union
FREDERICK GARDINER
Oregon City, Clackamas
GEORGE WALTER GLEESON
Portland, Multnomah
HERBERT PARK HARRIS
Central Point, Jackson
EDWARD GIBSON LOCKE
Portland, Multnomah
PERRY ELLSWORTH MAYER
Corvallis, Benton
*MARY ELIZABETH SMITH
Albany, Linn
GEORGE THAYER
Vale, Malheur
ELVIN LEONIDAS VERNON
Corvallis, Benton

SCHOOL OF COMMERCE

JOHN ALBERT
Corvallis, Benton
THEODORE BERNARD ANDERSON
Hammond, Clatsop
JOHN HOWE ARMSTRONG
Corvallis, Benton
*HAROLD PETER BALLF
Corvallis, Benton
*HARRY AMBROSE BALLF
Corvallis, Benton
ORAN TILBERT BARNETT
Wasco, Sherman
*CARL ALLAN BAUER
Portland, Multnomah
ADRAIN CLEMENS BECHDOLT
Hardman, Morrow

ELVIDA JOSEPHINE BOWMAN
Portland, Multnomah
JOHN FRANK BREAKEY
Corvallis, Benton
RODNEY FRANCIS BROWN
Portland, Multnomah
IVY LEONA BROWNE
Portland, Multnomah
ARTHUR WALLACE BURNS
Corvallis, Benton
LILLIAN BURNS
Corvallis, Benton
RAYMOND JEWETT BURR
Corvallis, Benton
CONWAY DELBERT CARTER
Hillsboro, Washington
CECIL BEACH CASTOR
Union, Union
MYRTLE LOUISE CASWELL
Portland, Multnomah
*ROYAL ALVRO CHAPMAN
Pasadena, California
EDWARD SOFUS CHRISTOFFERSEN
Bend, Deschutes
DOROTHY DOVE CONNER
Corvallis, Benton
IRMA VIRGINIA COULTER
Portland, Multnomah
ORVILLE GLEN CULBERTSON
Clatskanie, Columbia
ROLLAND CULBERTSON
Clatskanie, Columbia
WARD RANDALL DAVIS
Salem, Marion
WALDO DEWILDE
Pendleton, Umatilla
HARVEY FRANKLIN DICK
Portland, Multnomah
AILI OLIVIA ENEGREN
Marshfield, Coos
KOLA FELLMAN
Portland, Multnomah
HARLAND EUGENE FLEETWOOD
Baker, Baker
CARMEN FLEMING
West Side, Lake
RIDGWAY KNIGHT FOLEY
Portland, Multnomah
PAUL HOLMES GARDNER
Portland, Multnomah
CYRUS KINGSLEY GATES
South Bellingham, Washington State
JOSEPH WELLINGTON GAULT
Corvallis, Benton
HERBERT ERNEST GORDON
Portland, Multnomah
RAYMOND FREDERICK GRAAP
Portland, Multnomah
VALLEDA GRUA
Corvallis, Benton
EDMUND GURNEY, JR.
Portland, Multnomah
HUGH HARLOW HANKINS
Portland, Multnomah
LESLIE ROBERT HARBISON
Corvallis, Benton
THELMA MAE HERREN
Rye Valley, Baker
GORDON STANLEY HERTZ
Portland, Multnomah
LILLIAN ROSE HESLIN
Fairview, Multnomah
MORRIS HOVEN
Goble, Columbia
*ROLAND CURRIE HUNTTING
Portland, Multnomah
WALLACE BYRON INGLE
Lakeview, Lake
THOMAS HENRY IRELAND
Corvallis, Benton
ARNOLD CARL JOHNSON
Bend, Deschutes
GEORGIANNA CHRISTINA JOHNSON
Coquille, Coos
*RALPH ELVIN JONES
Freewater, Umatilla
WILLIAM ORIN JOOS
Hillsboro, Washington
VERA FAYE KEARNS
Pendleton, Umatilla
FRED KELLEWAY
Corvallis, Benton
ROBERT IRVING LADOW
Corvallis, Benton
IVAN LAWRENCE LAHUE
Helix, Umatilla
MADELINE LARSON
North Bend, Coos
JOHN ROBERT LAVINDER
Portland, Multnomah
GERALD WARREN LELAND
Salem, Marion
LESLIE DENISON LEWIS
Freewater, Umatilla
ESTHER ELSA LIENING
Portland, Multnomah
KENNETH TOWNSEND LOWELL
Corvallis, Benton
BENTON HENRY LUTTRELL
Myrtle Point, Coos
*ETHEL MCCORMACK
Roseburg, Douglas
DAVID BROWN MCFARLAND
Corvallis, Benton
MARY ALICE MCGINNIS
Corvallis, Benton
*ALVA LOWELL MCMILLAN
Corvallis, Benton
KERNAN THEODORE MARKUSON
Corvallis, Benton
ODILE EDYTHE MATTHEWS
Salem, Marion
JOSEPH NICHOLAS MISOVETZ
Portland, Multnomah
VELMA JEANNE MORGAN
Corvallis, Benton
URSEL COLIN NARVER
Portland, Multnomah
THEODORE GARFIELD NETTLETON
South Bend, Washington State
MARY ELIZABETH NOBLE
Canby, Clackamas
JOSEPH HARRY NORTH
Baker, Baker
CHARLES ARTHUR OLSEN
Corvallis, Benton

PHILIP PARTRIDGE
Monmouth, Polk
GRACE STCLAIR PATERSON
Astoria, Clatsop
ISABEL EMILY PEUTHERT
Portland, Multnomah
HOWARD REGINOLD PHILBRICK
Corvallis, Benton
VIOLET JOY PIERCE
Albany, Linn
DAN WILLIAMS POLING
Albany, Linn
ERNEST DEWOLF POORE
Corvallis, Benton
FLORENCE LILLIAN PORTER
Corvallis, Benton
OPAL POWELL
Moro, Sherman
JUANITA LEONA POWERS
Wallowa, Wallowa
*FRANCES EMILY PRATT
Ashland, Jackson
RUSSELL LEE REEVES
Albany, Linn
IRENE AGNES RIECHEL
Woodburn, Marion
HARRY KAY ROBERTS
Portland, Multnomah
EDWARD ROEHLK
Pendleton, Umatilla
WARREN ARNOLD ROLPH
Corvallis, Benton
*EDWARD LAWRENCE RYAN
Portland, Multnomah
ROBERT OTIS RUSSELL
Corvallis, Benton
PAULINE SCHWARTZ
Portland, Multnomah
OWEN LESTER SEARCY
Moro, Sherman
MARIAN VIOLA SEWARD
Portland, Multnomah
STUART JOHN SHELK
Linnton, Multnomah
MONROE THOMPSON SMARTT
Corvallis, Benton
DALE SMITH
Roseburg, Douglas
DELBERT RUSSELL SNIDER
Warren, Columbia
CLARENCE FREDERICK STEVENS
Freewater, Umatilla
RUDOLPH SCHIFFMANN STEWARD
Pasadena, California
PARIS WALLACE STEWART
Corvallis, Benton
MABEL STONE
Portland, Multnomah
RUTH STOVER
Weiser, Idaho
HAROLD THARP
Tangent, Linn
CARL THELEN
Corvallis, Benton
PHILIP THURMOND
Portland, Multnomah
STANLEY IMMANUEL TORVIK
Corvallis, Benton
ALFRED WILLIAM TRIMBLE
Hereford, Baker
DAVID SAMUEL TUCKER
Elgin, Union
MARIAN ALICE VANSCOYOC
Corvallis, Benton
*CLARA BELLE WAGNER
Corvallis, Benton
GERTRUDE CATHERINE WALLENBURG
Terrebonne, Deschutes
THURLOW WEED
Beaverton, Washington
REX DERRELL WHEELER
Cottage Grove, Lane
DOROTHY DORRELL WHITEHEAD
Portland, Multnomah
ANNA-VESTA WILLIAMS
Portland, Multnomah
MABEL WHITTENBERG WINSTON
Corvallis, Benton
WERNER ALLEN WRENN
Corvallis, Benton

SCHOOL OF ENGINEERING

Civil Engineering

DONALD PORTER BARNES
Grants Pass, Josephine
CHARLES BEGGS
Corvallis, Benton
NEIL MALCOLM BURDICK
DeLake, Lincoln
KENNETH TWICHELL CASE
Klamath Falls, Klamath
GEORGE BALDERREE CRITESER
Corvallis, Benton
ARTHUR LINCOLN EWELL
Portland, Multnomah
JAMES ARTHUR HARDIE
Condon, Gilliam
DONALD ELLERSTON HARTUNG
Eugene, Lane
DONALD EDWARD LARSON
Portland, Multnomah
ARTHUR PUTNAM LORING
Corvallis, Benton
RALPH SEYMOURE MANCHESTER
Corvallis, Benton
IVAN DARREL MERCHANT
McMinnville, Yamhill
JOHN GRAY MOFFATT
West Linn, Clackamas
NOLAN PAGE
Ione, Morrow
JOHN GRAY RANSOM
Shelburn, Linn
WILLIAM DUNN SEDGWICK
Creswell, Lane
*DONALD BOYD SLAWSON
Corvallis, Benton
GEORGE MOORE THAYER
Eugene, Lane
THOMAS WITHYCOMBE
Yamhill, Yamhill

Electrical Engineering

ELOF GILBERT ANDERSON
Oregon City, Clackamas
TOWNLEY WHEELER BALE
Portland, Multnomah
RAYMOND IRVING BETTS
Corvallis, Benton
RUSSELL EMILE BLEVINS
Corvallis, Benton
FRANKLIN ELLIS BLOUNT
Portland, Multnomah
JACK CONRAD BOWMAN
Portland, Multnomah
WILLIAM ELMER BRIGGS
Ashland, Jackson
WILLIAM EDWARD BURKE
Portland, Multnomah
GEORGE WILLIAM CAIN, JR.
Portland, Multnomah
HOWARD OSBORN COLBURN
Portland, Multnomah
VIRGIL CORBIN
Halsey, Linn
CHARLES CHRISTENSEN CRAM
Portland, Multnomah
FRED HOWARD DAVIS
Burns, Harney
DAVID DON
Fossil, Wheeler
PAUL ALBERT DUE
Portland, Multnomah
MALVERN JOSEPH GROSS
Portland, Multnomah
JOHN JAMES HANLON
Tacoma, Washington State
THOMAS HENRY HARRIS
Brooks, Marion
JOHN DICKINSON HERTZ
Portland, Multnomah
ARNOLD LAURIDS JENSEN
Corvallis, Benton
ERNEST JEPPESEN
Bacona, Washington
*LAWRENCE OTTO JOHNSON
Everett, Washington State
*FRANK LESLIE KELLOGG
Oregon City, Clackamas
ADOLF ERNEST KLEGER
Clatskanie, Columbia
NORMAN EDWARD KLEIN
Medford, Jackson
PAUL KLEV, JR.
Portland, Multnomah
ALEXIS ALLMEN LUNDSTROM
Portland, Multnomah
WILLIAM ARTHUR MCMORRIS
Albany, Linn
HIDEKICHI MAKITA
Ihara-mura-Opane, Japan
ENSIGN KENNETH MARTIN
Portland, Multnomah
AARON LAYMAN MERCER
Rainier, Columbia
JAMES MADISON MORRIS, JR.
Eugene, Lane
ROBERT PROSPER MOSER
Portland, Multnomah
*JOHN MARTIN NOVAK
Molalla, Clackamas
GEORGE OSBORNE
Corvallis, Benton
RODERICK PAULSON
Portland, Multnomah
ROSS ARTHUR PETERSON
Portland, Multnomah
MILES DORWIN PILLARS
The Dalles, Wasco
CHARLES EDWIN REAGAN
Corvallis, Benton
DARREL ARCHER RIECHEL
Woodburn, Marion
CHARLES FRANCIS SAVAGE, JR.
Portland, Multnomah
HERMANN SCHERNER
Aurora, Clackamas
RICHARD CARL SETTERSTROM
Portland, Multnomah
PETER THOMAS SINCLAIR
Portland, Multnomah
SAMUEL EDWIN SPITTLE
Astoria, Clatsop
MERLE ELLSWORTH SUTTON
Portland, Multnomah
LEONARD WESLEY SYFERD
Portland, Multnomah
EDWIN TORVIK
Corvallis, Benton
EARL NELSON TURNER
Portland, Multnomah
CLARENCE LEROY WELCH
Dairy, Klamath
JAMES EUGENE WINTON
Portland, Multnomah

Industrial Arts

CLAUD LORRAINE BOOTH
Corvallis, Benton
EUGENE DORSEY DONNELLY
Council, Idaho
DESMOND THOMAS FULP
Cove, Union
FRED MARTIN GOODWIN
Corvallis, Benton
REUBEN LEANDER JENSEN
Silverton, Marion
JACK SAVORY
Corvallis, Benton
LLOYD WILLS SHRINER
Ashland, Jackson

Mechanical Engineering

HORACE JOHNSON COCHRUN
Oswego, Clackamas
FRANK LEROY DELPHEY
Chino, California
HERMAN GASTIN DICKSON
Vernonia, Columbia
SHIRLEY VICTOR DUNAGAN
Scotts Mills, Marion
GERALD JOSEPH FINNEY
Sheridan, Yamhill
ANGUS HONORE GRIFFIN
Corvallis, Benton
JOHNNIE DWIGHT HAYNES
Kent, Sherman
RALPH JAMES HOOKER
Corvallis, Benton
JOHN WILLIAM JAMES
Portland, Multnomah
EVERETT BEACH KUHN
Union, Union
CHARLES RUESEL LEEVER
Medford, Jackson
EDWARD CHRISTIAN LUNDA
Portland, Multnomah
CARLO PILUSO
Portland, Multnomah
CARL NICHOLS SANFORD
Portland, Multnomah
HARRY LAY SNYDER
Palo Alto, California
PHILLIP EVERETT SULLIVAN
San Francisco, California
JOSEPH DEFORREST TURLAY
Portland, Multnomah

SCHOOL OF FORESTRY

Logging Engineering

SHELBY BAILEY
Lakeview, Lake
LAURENCE JENNINGS CUMMINGS
Corvallis, Benton
CLARENCE MCCLELLAN DANIEL
Elkton, Douglas
JOHN HENDERSON
La Grande, Union
HARRY NUGENT ROUNSEFELL
Corvallis, Benton

Lumber Manufacture

WALTER REX DENNEY
Beaverton, Washington
LYNN ABBOTT HORTON
Hildebrand, Klamath

Technical Forestry

MAX HULL ENGLAND
Corvallis, Benton
WILLIAM WALLACE HALSEY
Springfield, Lane
MONTEREY LEMAN HOLST
Sam's Valley, Jackson
ROBERT DAIL HUTCHINSON
Corvallis, Benton
DOUGLAS REED MILLER
Halsey, Linn
PHILIP LESTER PAINE
Oregon City, Clackamas
CURTIS EDMISTON PRICE
Springfield, Lane
CARL DANIEL RAWIE
Corvallis, Benton
HECTOR ALLAN RICHMOND
Corvallis, Benton
HAROLD WEAVER
Corvallis, Benton

SCHOOL OF HOME ECONOMICS

FLORENCE WATERBURY ANDERSON
Corvallis, Benton
*WILMA HAZEL ANDERSON
Portland, Multnomah
RUTH CHARLOTTE BARNES
Oswego Lake, Clackamas
KATE WEIR BELDEN
Corvallis, Benton
*ORPAH BENSON
Cottage Grove, Lane
VIOLET MARIE BEST
Grants Pass, Josephine
ELIZABETH BOURHILL
Portland, Multnomah
LOIS ELIZABETH BURTON
Portland, Multnomah
*AGNES MARY BUSJAEGER
San Jose, California
MARGARET ALICE CALEF
Eugene, Lane
MARGARET CARTWRIGHT
Seaside, Clatsop
JOSEPHINE ANNE CATLIN
Kelso, Washington State
RUTH CHINDGREN
Molalla, Clackamas
HELEN CHURCHILL
Roseburg, Douglas

VIOLET MAE CLIFF
Tacoma, Washington State
ITHA MABEL CLINTON
Corvallis, Benton
*HELEN DUNDAS DAIGH
Corvallis, Benton
MARY LORETTA DAVIS
Albany, Linn
FRANCES DAY
Enterprise, Wallowa
PAULA LARE DENSON
Carlton, Yamhill
MARION ELOISE DUNSMORE
Portland, Multnomah
GAYLE EDGERTON
Claremont, California
BLANCHE EICKWORTH
Empire, Coos
GLADYS MYRNA FAWVER
Harrisburg, Linn
BIRDEAN FEESE
Wallowa, Wallowa
DOROTHY ELIZABETH GODDARD
Portland, Multnomah
LORETTA LENO GOODFELLOW
Corvallis, Benton
MINERVA VERMILYEA GRACE
Corvallis, Benton
JENNIE DORA GRAYSON
Portland, Multnomah
MILDRED MARY HABERLY
Silverton, Marion
IONA RUTH HARRIMAN
Portland, Multnomah
ELIZABETH HARWOOD
San Dimas, California
WILNA WINIFRED HATHAWAY
Eugene, Lane
MARGARET HERMANN
Astoria, Clatsop
VERNEITA RUTH HERRON
Junction City, Benton
BERTHA EMMA HERSE
Corvallis, Benton
DELILA HILL
Eugene, Lane
ALICE GERTRUDE HORN
Fort Jones, California
OPAL FANNY JARMON
Echo, Morrow
FORENA JENKS
Albany, Linn
MARION EDITH JONES
Portland, Multnomah
*MARY ELIZABETH JONES
Corvallis, Benton
FLORENCE JAYNE KRUSE
Portland, Multnomah
DOROTHY GRACE LEWIS
Roseburg, Douglas
HELEN CHARLOTTE LEWIS
Rickreall, Polk
ELIZABETH JENNIE LUTTRELL
Corvallis, Benton
*MARGARET ELIZABETH MCCOY
Ashland, Jackson
MABEL CLAIR MACK
Portland, Multnomah
DORIS BEVERLY MARDIS
McMinnville, Yamhill
ERMA ELLEN MEEKS
Salem, Marion
AZA RAE MILLER
San Jose, California
*LUCILE MOORE
Salem, Marion
*IRENE NEIGHBORS
Corvallis, Benton
HELENA NINA NIXON
Brownlee, Baker
MILDRED ANNE NYE
Talent, Jackson
RYNTHA JUANITA OLDHAM
Lebanon, Linn
PEARL PEHRSON
Halsey, Linn
PATRICIA HELEN PRICE
Portland, Multnomah
KATHLEEN RUTH PUMFREY
Portland, Multnomah
MARGARET ELIZABETH PURVES
Portland, Multnomah
ALICE QUARNBERG
Vancouver, Washington State
DORIS ADEAN REDDICK
Oregon City, Clackamas
LILLIAN REIMER
Talent, Jackson
ERMA RUTH RICHARDS
Portland, Multnomah
ELSA HERTHA RINGEL
Athena, Umatilla
RUTH CHARLOTTE ROGERS
Portland, Multnomah
SALLIE RUTH ROGERS
Corvallis, Benton
DAGNY BERNICE RUDBACK
Astoria, Clatsop
ALMA LOUISE SCHULMERICH
Hillsboro, Washington
*ELEANOR PHYLLIS SCOTT
Portland, Multnomah
MARJORIE FRANCES SCOTT
Portland, Multnomah
GERTRUDE LONETTE SKOW
Portland, Multnomah
ELVA SLOTTEE
Astoria, Clatsop
ESTHER ALICE SPANGENBERG
Lakeview, Lake
*MARIE LEONA STEELE
Corvallis, Benton
*ELIZABETH ALEXANDER STEWART
Portland, Multnomah
LYDIA TARRANT
Corvallis, Benton
MILDRED ALLEGRA THOMAS
Portland, Multnomah
ELIZABETH DOROTHY UNDERDOWN
Portland, Multnomah
MAE WEISNER
Corvallis, Benton
FRANCES LUCILLE WELCH
Salem, Marion
CRYSTAL MARIE WILCOX
Newberg, Yamhill

*RHEA WILKES
Hillsboro, Washington
DOROTHY EDNA WILLIAMS
Eugene, Lane
*ETHEL GRACE YATES
Billings, Montana

CATHRINE DAVIS YOUNG
Corvallis, Benton
DORIS RUTH ZIMMERMAN
Portland, Multnomah

DEPARTMENT OF MILITARY SCIENCE AND TACTICS

HAROLD LLOYD CRONK
Corvallis, Benton

SCHOOL OF MINES

MARION CHARLES HIRTZEL
Portland, Multnomah
EDWARD STUART JEWELL
Portland, Multnomah
ALLEN DEAN LOOK
Portland, Multnomah
GEORGE GORDON MCCALLUM
Corvallis, Benton

CHARLES MERO MCCONNELL
Burns, Harney
DONALD HOWARD PATCH
Weiser, Idaho
LYNTON WESLEY SHANER
Corvallis, Benton
ANDREW DEXTER SOULE
Klamath Falls, Klamath

SCHOOL OF PHARMACY

ERNEST LESLIE BEALS
Corvallis, Benton
HARVEY DIMOND BEAUCHAMP
Albany, Linn
EDWARD MARK BOONE
Corvallis, Benton
CRAIG CHARLES DEDMAN
Canby, Clackamas
FRANK HERBERT GOFF
Forest Grove, Washington
HAROLD SCHOOLEY INGLE
Lakeview, Lake
MABEL FLORENCE KLINK
Canyon City, Grant
MORRIS LORRIE LETON
Portland, Multnomah

CECILIA ALICIA MCFADDEN
Corvallis, Benton
MABLE MALLERY
Corvallis, Benton
FRANCIS ANDREWS NIELSEN
Mosier, Wasco
EMIL RICHARD RUSSELL
Corvallis, Benton
GEORGE THOMAS SPEROS
Baker, Baker
WALTER HAROLD STANBROUGH
Monmouth, Polk
ERNA GERTRUDE STARR
Portland, Multnomah
LEWIS MATTISON WELLS
Portland, Multnomah

Pharmaceutical Chemists

ROY RALSTON BROWN
Corvallis, Benton
FRANCIS THEODORE CLODFELTER
Corvallis, Benton
GEORGE WALLACE CUTHILL
Sherwood, Washington
ARTHUR STAFFORD DOWSETT
Gresham, Multnomah
GEORGE LOWEL GARDINIER
Baker, Baker
KENNETH SYLVESTER GROVES
Lebanon, Linn
ALICE HAZEL HAYDEN
Dallas, Polk
*MARION MYRON HEADLEY
La Grande, Union
HAROLD MELVIN JOHNSON
Corvallis, Benton
JOSEPH KRAUSE
Corvallis, Benton
LOWELL SPAFFORD MCGRAW
Portland, Multnomah

EUGENE THOMAS MOON
La Grande, Union
ALPHA DORAL NEWBY
Yoncalla, Douglas
WALTER CLAIR NOLAN
Lexington, Morrow
ANN PAINTER
Salem, Marion
EDWARD WALTER PAYNE
Marshfield, Coos
TRUMAN ROBNETT
Halsey, Linn
FRANKLIN ROBERT SCHWOOB
Corvallis, Benton
LAYKE LORRAINE SEATON
Yamhill, Yamhill
GEORGE WALTER SIGURDSON
Warrenton, Clatsop
HAZLE SLOAN
Echo, Umatilla
HORACE ARTHUR SMITH
Corvallis, Benton

JESSE WARREN SMITH
Portland, Multnomah
*GLENN STAGGS
Weston, Umatilla
HAROLD WESLEY STRONG
Warrenton, Clatsop
LILLIAN GRACE TROVER
Corvallis, Benton
HENRY ALLEN YOUNG
Coquille, Coos

SCHOOL OF VOCATIONAL EDUCATION

ALICE ANDRESEN
Oregon City, Clackamas
ORLO MARION BAGLEY
Corvallis, Benton
ROWENA ARABELLE BEACH
Dayton, Yamhill
RUTH AMANDA BENNETT
Corvallis, Benton
EDITH BICKNER
Oswego, Clackamas
EDNA MARGUERITTE BLOMSTROM
Roseburg, Douglas
EUNICE CATHERINE BOYLES
Portland, Multnomah
CLYDE HOWARD BURMASTER
Corvallis, Benton
EDITH ROMA CORLETT
Nampa, Idaho
FERN COUSINEAU DUNCAN
Corvallis, Benton
EVERETT DUNNETTE
Monmouth, Polk
GEORGE ASHTON FOERST
Applegate, Jackson
CAMILLA FREEL
Portland, Multnomah
MAXINE ADA GENTRY
Lexington, Morrow
*CHARLES ARTHUR GOODWIN
Corvallis, Benton
HESTER MAREN GRAM
Salem, Marion
EVADNA CLEMENTINE HAGER
Portland, Multnomah
JANET HAMILTON
Corvallis, Benton
AGATHA LORRAINE HARDING
Corbett, Multnomah
*DONNA BELLE HENRY
Corvallis, Benton
GILBERT HOWARD
Milton, Umatilla
*MEDORA HOWARD
Grants Pass, Josephine
*MARSHALL BIRD JAQUES
Valley, Washington State
GLADYS CARROON JARDINE
Corvallis, Benton
VENA GLADYS JENSEN
Waldport, Lincoln
*MATILDA SIEGMUND JONES
Stayton, Marion
REBECCA ARLENE JONES
Meridian, Idaho
EUNICE LOUISE KETEL
St. Helens, Columbia
ELDORA MARGARET KINGSLEY
Hermiston, Umatilla
EVA ERNESTINE KRAUS
Aurora, Clackamas
NANCY GARLAND KREMERS
Portland, Multnomah
BESS KUSTER
Corvallis, Benton
JAMES FLOYD LIGHT
Tillamook, Tillamook
HELEN MAY LOCKWOOD
Portland, Multnomah
NINA ELIZABETH MCCORD
Portland, Multnomah
FLORA MARIE MCCOY
Corvallis, Benton
GLENNA GENEVRA MCDANIEL
Albany, Linn
JEWEL MACKENZIE
Portland, Multnomah
BETTY MACMILLAN
Lebanon, Linn
*RODERIC ALEXANDER MACMILLAN
Lebanon, Linn
*WILLIAM DAVID MACMILLAN
Portland, Multnomah
HUBERT ERICK MATHEWS
Tillamook, Tillamook
CLARABELLE MINTONYE
Marshfield, Coos
EUDORA DWIGHT MITCHELL
Corvallis, Benton
PHILIP TYLER MITCHELL
Corvallis, Benton
ALICE ALETHA MOSER
Corvallis, Benton
CARL OSCAR MUHR
Warren, Columbia
KATHERINE ELIZABETH MURPHY
North Bend, Coos
LILA LYDIA OJALLA
Siletz, Lincoln
HELEN GERTRUDE PARKER
Seaside, Clatsop
MILDRED MAY PAYTON
Baker, Baker
ALLYN ORA RICHARDSON
Portland, Multnomah
WILMA ROHRBOUGH
Albany, Linn
GARLAND MARIE SCHMIDT
Corvallis, Benton
LUCILE CALL SHARP
Corvallis, Benton
LETITIA SHEWEY
Dallas, Polk
JOHN LEWIS SHEYTHE
Corvallis, Benton
*KATHLEEN LOUISE SKINNER
Independence, Polk
FRANCES ELIZABETH SMITH
Ontario, Malheur

MARJORIE OLIVE SOUTHAM
Corvallis, Benton
GLADYS PAULA THORSON
Portland, Multnomah
FRANCES ALMIRA TOMLINSON
Albany, Benton
LAURA ZYLPHA TURNIDGE
Stayton, Marion
EFFIE LOUISE WAGNER
Wilsonville, Clackamas
HELEN RUTH WASHBURN
Portland, Multnomah
*ROSA GENEVA WEBBER
Salem, Marion
THELMA WILLIAMS
Independence, Polk
FRANCES EVA WILSON
Portland, Multnomah
CASSIUS FREDERICK YERGEN, JR.
Corvallis, Benton
ALEXANDER MARTIN ZEVELY
The Dalles, Wasco

Respectfully submitted,

E. B. LEMON,
Registrar.

REPORT OF THE AGRICULTURAL EXPERIMENT STATION

To the President of the College:

Sir: I have the honor to submit herewith a brief report of the Agricultural Experiment Station for the biennium 1926-1928. A report at much greater length is submitted for publication as a more complete record of individual investigations and progress for use by other stations and research agencies. The aim of this statement, therefore, is to present in as brief form as possible the general scope and development of the Station work during the biennium, including something of accomplishments and service to agriculture of the state, and to direct attention to the more urgent needs of the Station.

SCOPE OF STATION RESEARCH AND EXPERIMENTATION

The Report of the Agricultural Experiment Station for the biennium 1924-1926 reviewed briefly the Federal and State acts bearing upon the scope of work and responsibilities of the Station. Special attention was called to the Federal Purnell Act, which definitely expanded the field of research to include all phases of agricultural economics, home economics, rural sociology, and agricultural engineering, and at the same time placed added responsibility on the stations for research on new problems related both to the older fields of production and protection and to these newer fields.

During the biennium, marked development of the Station program within this broad field has been made possible in part by slight increases in State appropriations, but in greater degree through increase in the Federal Purnell Fund and through additional cooperation secured from Federal Bureaus and offices whereby Federal funds and research workers have been assigned to work with the Oregon Station staff on problems important to Oregon, but having a regional or national bearing as well.

State support. The State Legislature at its session in January, 1927, reenacted existing state appropriations, and in addition provided an increase from $10,000 to $15,000 per annum for dairy investigations, including dairy diseases; an increase from $5,000 to $7,500 per annum for poultry disease investigations; an increase from $7,500 to $10,000 per annum for investigations in soils, irrigation, and drainage; a special item of $8,000 for establishing irrigation by deep well pumping on eighty acres of land at Burns; and a continuing annual appropriation for crop rotation and nursery experiments in Eastern Oregon, especially Umatilla county.

Federal support. The Federal Purnell Act, passed by Congress and approved by the President February 24, 1925, has increased by $10,000 each fiscal year. This increase, along with the state increases, has been

effective even in excess of the amount of the increase. The additional funds have made possible more thorough attack on important problems and have made possible organization of cooperation to secure effective assistance of Federal agencies working along lines of special importance in Oregon. The new cooperation of such Federal agencies listed below is evidence of this fact. The cooperation of Dry Land Agriculture in crop rotation investigations at Pendleton would not have been obtained had not the State appropriation of $2,000 annually for this work been made available. Likewise, the excellent Federal support for investigations on diseases of potatoes, diseases of bulbs, and "curly-top" of truck crops would not have been obtained had the slight increase in state appropriations and the increase in Purnell funds not been available.

COOPERATION WITH THE UNITED STATES DEPARTMENT OF AGRICULTURE

With additional funds available, special effort was made to organize State and Federal resources in most effective joint research on problems of the state. Most of the cooperation established previously was continued. and in some cases expanded. A considerable amount of effective new cooperation was obtained.

Cooperation continued. Forage crop investigations were continued in cooperation with the Office of Forage Crop Investigations, Bureau of Plant Industry. Of this same Bureau, the Office of Cotton, Truck and Forage Crop Disease Investigations increased cooperation and assigned a man to Corvallis for potato disease investigations; the Office of Pine Blister Rust Control continued the campaign to control White Pine Blister Rust; the Seed Laboratory continued its office at Corvallis; the Moro Branch Station was continued in cooperation with the Office of Cereal Investigations; and the Branch Station at Hermiston in cooperation with the Office of Western Irrigation Agriculture Investigations.

The soil survey in cooperation with the Bureau of Soils was continued and representatives of this Bureau assisted in economic surveys of irrigation projects.

The Bureau of Agricultural Economics gave valuable assistance in a study of the raw milk situation around Portland.

The Division of Agricultural Engineering, Bureau of Public Roads, continued cooperation in studies on methods of irrigation and assisted in making economic surveys of irrigation projects.

New cooperation. The Division of Agricultural Engineering, Bureau of Public Roads, materially increased its cooperation. Without the assistance of this division it would have been difficult for the Oregon Station to meet the request of the State Securities Commission for economic and feasibility surveys of such reclamation districts as the Ochoco, Warm Springs, Grants Pass, and Tumalo. The state profited greatly by this assistance from the Federal Department. The cooperation with this Bureau in studies on methods of irrigation and water utilization was expanded before the close of the biennium. An outstanding agricultural

engineer was employed cooperatively to spend full time on such investigations.

The Office of Cotton, Truck and Forage Crop Disease Investigations increased cooperation by assigning additional assistance to Corvallis to work on bulb disease, beginning with the fiscal year 1927-28. Before the close of the biennium this office had agreed upon still further cooperation in connection with "curly-top" disease of truck crops.

Beginning January 1, 1928, cooperation was started with the Bureau of Plant Industry on investigation of perennial apple canker and related diseases. This cooperation was most timely as the perennial canker was rapidly becoming a limiting factor in production. Existing informal cooperation with Plant Industry on strawberry investigations was expanded materially late in the biennium.

In June, 1928, cooperation with the Dairy Bureau was started in an investigation on standardization of butter.

Funds were secured for the Office of Dry Land Agriculture to cooperate with the Oregon Station in establishing and maintaining a branch experiment station near Pendleton, Oregon, beginning July 1, 1928.

Cooperation was arranged with the United States Geological Survey for a joint investigation of ground water in the Willamette Valley, beginning July 1, 1928.

Arrangement was made with the Bureau of Entomology for cooperation in the study of "curly-top" disease, centering especially at Hermiston, Oregon.

In addition to the foregoing formal cooperation, representatives of the United States Department rendered valuable assistance at different times throughout the biennium in the diagnosis of agricultural problems. The cooperative joint attack in all of the technical phases was on a larger scale than in any previous period.

COOPERATION WITH THE OREGON STATE COMMITTEE ON RELATION OF ELECTRICITY TO AGRICULTURE

The Oregon State Committee on Relation of Electricity to Agriculture was organized in May, 1924. The organization and purpose of the committee were reported briefly in the report of the last biennium.

The Director of the Agricultural Experiment Station continued as Chairman of this committee during the biennium just closed, and the Experiment Station was responsible for the program of investigations sponsored by the Committee. The Committee financed this program to the extent of $6,000 in money each year; and in addition, equipment companies were liberal in cooperating by the loan of field and laboratory equipment.

The cooperation of utilities and equipment companies and farmers in these investigations has been most encouraging.

COOPERATION WITH STATE AGENCIES

The policy of the Agricultural Experiment Station is to render cooperation to other state agencies whenever feasible and within the province of the Station as the state agency responsible for research having to do with agriculture in all its phases. The following represent major illustrations of such cooperation during the biennium.

Just before the close of the preceding biennium the Experiment Station undertook cooperation with the State Irrigation Securities Commission, in an economic and feasibility survey on the Ochoco district. The Station staff was responsible for seeking and securing cooperation of the Division of Agricultural Engineering, Bureau of Public Roads, in this survey. This cooperation was continued throughout the biennium just closed. Thorough studies were made of the Ochoco, Warm Springs, Grants Pass, and Tumalo projects. These reports furnish the information for reorganization and refinancing of the irrigation districts reported upon. The rather complete, thorough statement of facts has been made possible by assistance of the Federal Bureau of Public Roads, and cooperation of the State Engineer's Office.

The biennium will long be remembered by Experiment Station workers and fruit-growers. Before the end of July, 1926, trouble arose in reducing the spray residue on fruit to a point within Federal requirements for interstate shipment. The Experiment Station had already begun investigations to develop new methods for cleaning the fruit, and throughout the biennium has concentrated the skill and effort of several departments of the Station on this problem. As a result, the hydrochloric acid wash has been developed until it is working with fair satisfaction. The Station, of course, had no regulatory authority for shipping-point inspection of such fruit. The State Dairy and Food Commissioner had this responsibility and authority for the State of Oregon. Beginning in 1926, there has been most hearty cooperation between the Dairy and Food Commission and members of the Experiment Station staff. The Station has furnished technical assistance and advice, and at times the staff members have acted as deputies of the Dairy and Food Commissioner. The cooperation is an example of effective joint service to the people of the state in time of emergency.

The Station department of Bacteriology has cooperated with the Dairy and Food Commissioner also in a study of the market milk supply of towns in Oregon, including a complete test of the milk and a survey of the conditions under which the milk is produced.

As in past years, also, Station staff members have cooperated with the State Horticulture and Plant Quarantine Board, and with the State Livestock Sanitary Board, furnishing technical advice and assistance, especially in connection with insect and plant and animal disease problems. The cooperation has been harmonious and effective considering the great number of problems and the small organization of the Station to handle them.

Late in the biennium cooperation was started with the Oregon State Fish and Game Commission. At the request of the Comission the Agri-

cultural Experiment Station will assist in a cooperative study of the economic status of the China Pheasant in Oregon. The study will be largely financed by the Fish and Game Commission. The Station will examine several hundred specimens of birds submitted by the Commission.

BENEFITS FROM AGRICULTURAL EXPERIMENT STATION RESULTS

The Station report for the biennium ended December 31, 1926, presented facts indicating benefits to the agricultural industry of the state from accumulated Experiment Station results amounting to $5,000,000 to $10,000,000 annually as follows:

1. From the use of better farm crops introduced or developed, tested, and recommended by the Agricultural Experiment Station, and of improved methods of growing and marketing them	$3,400,000
2. From the use of fertilizers as developed and recommended by the Agricultural Experiment Station	1,180,000
3. From the use of methods developed by the Agricultural Experiment Station for controlling crop diseases and pests	2,025,000
4. From the use of improved methods and improved varieties in fruit production, not including control of diseases and insects	400,000
5. From the use of higher producing poultry stock	1,000,000

There is justification for increasing rather than decreasing these estimates at the present time. In judging their soundness one must bear in mind the magnitude of the industry—more than $100,000,000—the many highly specialized crops, the fact that much of the production is surplus which must be marketed in distant markets in competition with products grown nearer consuming centers. Practically all crop varieties and cultural methods of Eastern Oregon are developments of the Agricultural Experiment Station; the legumes and methods of growing them in Western Oregon are largely the product of the Experiment Station; methods for effectively controlling a host of insect and plant disease pests have been worked out by the Experiment Station, without which —or some such control—there could be no commercial industry; much of improvement through use of fertilizers, including the use of sulfur on alfalfa, fertilizers and cover crops for orchards, lime for the Coast region, is the result of Station work; results in late years relative to harvesting, storage, and processing for market have been of timely economic importance; likewise, results the past few years in the control of diseases of dairy cattle, sheep, and poultry are of vital consequence to these industries.

SOME OUTSTANDING DEVELOPMENTS OF THE BIENNIUM

As stated in previous reports, accomplishments of outstanding economic importance usually are the product of research over years. With a continuous program, however, new problems reach solution and in a

way indicate the possibilities, need, and justification of research. The following are outstanding accomplishments of the biennium.

Promising solution for spray residue problem worked out. The most outstanding accomplishment of the biennium has been the development of what appears to be a fairly satisfactory practical solution for meeting the requirements of the trade as to the removal of spray residue from fruit. The problem in this connection came as an emergency during the winter of 1925-26, when fruit was denied release for sale in eastern markets and shippers were compelled to unpack and further clean the fruit at great expense in terminal markets. About the same time Great Britain indicated that American fruits, especially apples, must not carry in excess of .01 grain of arsenious oxide per pound of fruit.

Early in 1926 the Oregon Agricultural Experiment Station staff began a study of the situation with a view to finding a solution for the spray residue problem. It was soon decided that there could be no hope of an effective change in spraying practice soon enough to meet the situation in a practical way. Attention was promptly given to possible means of removing the residue from the fruit without impairing the quality of the fruit. This led to preliminary laboratory tests of some 50 or more chemicals in a hurried search for an effective solvent of spray residues non-corrosive on fruit tissues through short periods of contact. When the real emergency came during the harvest of 1926 the preliminary laboratory tests had already indicated that perhaps water solutions of hydrochloric acid would be the safest and most generally serviceable.

In the short time, however, only laboratory tests had been possible. Storage tests comparable to commercial conditions following the use of such acid solutions were lacking. The Station staff, therefore, could go no further than to suggest the acid solution. Acting upon this suggestion, a considerable amount of Oregon fruit was treated in a water solution of hydrochloric acid to remove the residue. The results were fairly satisfactory.

The Station, the growers, and the equipment manufacturers continued their efforts following the close of the season, and by the harvest season of 1927 there were a number of practical commercial machines on the market. The Agricultural Experiment Station continued with harvesting, storage, and cleaning *tests running into thousands* and including all known phases of the problem and prospective ways of meeting them.

The outcome is that the Oregon fruit industry is facing the harvesting and marketing of a large fruit crop in 1928 with real confidence that the pack will be one of the best, if not the best, ever harvested as regards quality, freeness from residue, and general appearance. There is confidence that international and national requirements will be met, and by methods which are economically feasible.

This may be looked upon as a test of the Agricultural Experiment Station such as may come only once in a half century or longer. It was a real emergency and has been met. The greatest of credit is due the Station staff for unselfish effort, long hours, and intelligent follow-up of the experimental work to its ultimate satisfactory application in practice. Likewise, the highest commendation is due the fruit growers of the state

and the equipment manufacturers of the Pacific Coast. The cooperation of these three agencies is jointly to be credited with meeting a situation which gave every promise of "wrecking" one of our most important industries.

The value of Station findings in this connection has been estimated in millions of dollars. A better measure of the value is the actual fact that the greater part of the fruit crop was practically embargoed until a solution of the problem was found.

Control of Strawberry Root-Weevil. For many years the Strawberry Root-Weevil has been a menace to the strawberry industry in Oregon, and in late years has been the most important limiting factor. Shipments from one community dropped from 100 cars to 30 cars in about three years. During the biennium the poisoned bait method of combating strawberry weevils has been adapted to Oregon conditions with such effectiveness that growers no longer look upon this pest as a limiting factor or a serious hazard.

The poisoned bait method of control was not first worked out in Oregon, but as applied elsewhere would not have solved the Oregon problem. Application in Oregon must be made during harvest rather than after harvest; it has been found necessary to apply bait early in the spring for overwintering weevils; it has been found that there is not one but several species of weevil to be controlled, each requiring special study and treatment. The Federal Purnell fund has made it possible to continue the investigation vigorously in the laboratory and in the most important growing sections, and a practical solution has been adapted to field conditions. The fact that an important industry has been saved is the best measure of the economic importance of the Station results.

"Curly-Top" of vegetables diagnosed. The findings or the discoveries by research in the department of Botany and Plant Pathology in connection with the problem of "Curly-Top" of vegetables are somewhat different in character, but of no less ultimate economic importance than even the findings in connection with spray residue. For example, tomatoes have been seriously affected for 30 years, and no appreciable progress had ever been made toward a solution or a diagnosis of the problem. In 1926 our Station discovered this was due to the "curly-top" virus. Squashes, horseradish, peppers, beans, and other crops were found also to be seriously affected.

The "curly-top" virus was recognized as the causal disease in many of our important truck crops. This explained a condition that had been most puzzling in the Western States. The way is now open for progress in control of the malady.

Tulip mosaic. The breaking of tulips is a condition that has been known for fully 300 years and generally considered to be a sport or variation. During recent years the view that it is a disease has been gaining ground. Work at our Station during the biennium proved conclusively that it is an infectious mosaic disease readily transmitted by aphids and by inoculations. Means are readily available now for controlling it by roguing, isolation, etc. Interest is attached to this progress

because this is now considered to be the oldest plant virus disease on which we have any authentic information in literature.

Control measures for infectious abortion in dairy cattle. Reliable facts indicate that this disease has for years been costing dairymen of the state from $1,000,000 to $2,000,000. This cost is occasioned through loss of calves, attendant sterility, decrease in milk flow, and secondary diseases. Many dairymen have thus been forced out of business.

Investigation of the disease from many angles has been the major research work of the Veterinary Medicine department and the Dairy department cooperating over the past eight years. As early as three years ago what was believed from experimental results to be a practical possibility of eliminating the diseased animals and building up healthy herds under field conditions had been worked out. During the past biennium special attention has been given to practical tests of this method in cooperation with leading dairymen. Such experiments are under way in fifteen counties with good results in nearly every herd. A number of leading dairymen now have clean herds as a result of this procedure.

The results have been so satisfactory that in recent months recommendations for practical application of the Experiment Station recommendations in dairy management throughout the state have been made to the State Livestock Sanitary Board. These recommendations have been accepted by the State Livestock Sanitary Board. Based upon them the Board has evolved a plan for accrediting dairy herds and areas where dairying is carried on. In two localities movements are already started to eradicate the disease in cooperation with the Livestock Sanitary Board and the Extension Service.

Since this disease is more destructive to dairy herds in Oregon than tuberculosis, there is justification for considering this accomplishment of the Experiment Station as a really outstanding development. Further, it is of timely importance since in recent months cases of serious illness in human beings have been diagnosed as Undulent Fever, which many authorities think is caused by drinking the milk from cows infected with the abortion disease.

Immunization against coccidiosis in poultry. Experiments have proved: (1) that small doses of coccidia do not necessarily produce symptoms in susceptible birds; (2) that repeated small doses produce a very high resistance, and (3) that such resistance can be regularly produced through the regular administration of sublethal doses of coccidia.

It has been shown that there is a strain of coccidia which attacks the caeca only and another strain which attacks the small intestine only. Immunity against one strain does not necessarily protect against the other.

These findings are of outstanding importance because of their promise in control of coccidiosis in poultry, which has been one of the most troublesome of poultry diseases. The findings establish or lay the foundation for control through proper sanitation. Field tests on a practical scale already are supporting the experimental conclusions.

An improved method of vaccinating young fowls against chicken-pox has been worked out. Vaccination is in the skin, and not subcutaneous.

Unattenuated virus is used. Immunity is produced in four weeks or less. This immunity has lasted at least two years in some fowls. About 60,000 birds have been vaccinated by this method.

This method is of outstanding importance because of great reduction in cost of vaccination, vaccination at a time more advantageous to production, the establishment of immunity for a longer period, and much less liability of loss following vaccination.

Facts bearing upon taxation. During the biennium a study in the ratios of assessed values to sale values of real property in Oregon was completed and the data published in Station Bulletin 233. These facts have been favorably received by tax experts as of real value.

The Oregon Voter of July 21, 1928, classes the bulletin presenting the facts of this study as:

> "The most important contribution in recent years toward accurate knowledge of what is behind the tax complaint, which seems to be so much louder in Oregon than in most states."

A promising new legume. Austrian winter field peas introduced and selected in connection with forage crop investigations have promise of real value in Western Oregon. They are well suited to many of the medium heavy soils in the Willamette Valley. There is much demand for the seed in the Southeastern States, where winter hardiness is necessary.

There are a few limitations to the crop, including susceptibility to aphid injury and attack by pea weevil. As a whole, however, this pea seems to be the outstanding new legume in recent years.

PUBLICATIONS

Twelve Station bulletins, nine Station circulars, and eleven circulars of information were prepared and issued during the two years. As in former years, the editions were small, ordinarily from three thousand to five thousand copies. This is a smaller number of publications than the preceding biennium, due in part to the development of the new Station series, "Circulars of Information," and in part to the publication of technical results in outside journals.

The circular of information is a mimeographed circular intended to present results of progress together with recommendations perhaps for a single season, and in advance of developments which warrant publication in circular or bulletin form. This series meets an important need, and makes it possible to defer printing publications longer than otherwise.

More than one hundred articles, technical in character, were printed in national and regional scientific journals and farm journals. This policy makes results of research available to research workers and reserves the limited Station funds for Station publications of interest primarily to the general public.

As in past years, no individual mailing list for publications of the Station has been maintained. Individual copies are furnished upon request. Requests for copies in numbers are filled only on approval by the Director. With cooperation of interested individuals, this policy will

result in each copy of Station publications reaching some one who is particularly interested in the subjects reported. Editions can, in this way, be kept to a minimum, thereby allowing printing of a larger number of different bulletins in each series than would otherwise be practicable with limited funds.

There are occasional complaints because individual mailing lists are not maintained, and because new publications are exhausted within a few months. Effort is made, however, to have copies on file in libraries which have any considerable patronage interested in subjects such as are reported in Station publications.

The following publications were issued during the biennium:

Bulletins

Number	Title	Edition	Pages
224	Wintering Stock Steers	5,000	15
225	The Cranberry in Oregon	5,000	31
226	A Progress Report on the Removal of Spray Residue from Apples and Pears	10,000	46
227	Walnut Drying and Packing in Oregon	5,000	28
228	Investigations on the Harvesting and Handling of Bosc Pears from the Rogue River Valley	5,000	30
229	Cattle Marketing Investigations at Portland, Oregon	5,000	15
230	Immunity or Resistance of the Chicken to Coccidial Infection	5,000	32
231	Electric Lights for Increasing Egg Production	5,000	40
232	The Eradication of Infectious Abortion from the Dairy Herd of Oregon State Agricultural College	8,000	12
233	A Study in the Ratios of Assessed Values to Sale Values of Real Property in Oregon	5,000	45
234	The Removal of Spray Residue from Apples and Pears	5,000	38
235	Economic Limit of Pumping for Irrigation (in press)	4,000	48
236	Field Crops for Pump Irrigation at the Harney Branch Experiment Station (in press)	3,000	32

Circulars

Number	Title	Edition	Pages
77	The Hessian Fly in Oregon	2,500	7
78	Commercial Fertilizers, 1927 Edition	2,500	22
79	The Strawberry Root-weevils and their Control in Oregon	4,000	24
80	Japanese Barnyard Millet, a New Forage for the Coast Section	3,000	4
81	Electric Water Heaters for Poultry	5,000	15
82	A Method for Testing Moisture in Dried Prunes	3,000	8
83	Drainage and Improvement of White Land and Similar Wet Land	5,000	16
84	The Chemical Composition of Insecticides and Fungicides	1,500	16
85	Green Feed and Pasture for Poultry (in press)	8,000	16

Circulars of Information

1927-1928 Number	Name	Pages
11	A Preliminary Report on the Hydrochloric Acid Dipping Process and Its Effect on the Keeping Quality of Fruits, by R. H. Robinson and Henry Hartman	4
12	Timely Warning on Western Army Cutworm—A Wheat Pest, by Don C. Mote	2
13	The Determination of Maturity in Sweet Cherries, by Henry Hartman	7
14	Apply First Codling Moth Cover Spray Now, by Don C. Mote	1
15	The Oregon Fruit Washer, by Henry Hartman, George W. Kable, and R. H. Robinson	5
16	Ladino Clover for Coast and Willamette Valley Sections, by H. A. Schoth	3
17	The Raspberry Fruit Worm, by Don C. Mote (Oct. 1927)	2
18	The Raspberry Fruit Worm, by Don C. Mote (Mar. 1928)	1
19	The Gooseberry and Currant Fruit Fly, by Don C. Mote	2
20	The Effect of Land Plaster Applied as a Dust to Seed Corn, by E. N. Bressman	2
21	The Gooseberry and Currant Fruit Fly, by Don C. Mote	1

SERVICE TO THE STATE

The primary function of the Agricultural Experiment Station is the accumulation of facts through research and experimentation for solution of problems confronting agriculture and rural life. The facts are brought together in bulletins, circulars, circulars of information, and in journals and reports available to the Extension Service. The fact-finding responsibility, strictly speaking, might be considered closed when the above task is well done.

In addition, however, the Experiment Station staff, as a group, constitutes a clinic and an information bureau. The service called for and rendered through personal interviews, letters in reply to requests for information, identification of insects, counseling concerning plant and animal diseases, soils, fertilizers, analysis of milk and water specimens, and addresses and radio talks undoubtedly is of great value to the state. This service, in the main, is rendered in cooperation with the Extension Service and Resident Instruction and is jointly financed.

At times the calls upon Station specialists seriously tax the Station organization and endanger progress in the real task, fact finding. Following is a careful estimate of such activities for one year.

Estimated service for one year, July 1, 1927 to June 30, 1928.

1. Letters in reply to requests for information	26,300
2. Consultations with individuals seeking information	11,800
3. Identification of plant specimens	460
4. Identification of insect specimens	2,100
5. Tests for Bacillary Diarrhea in poultry	193,000
6. Tests for Infectious Abortion in dairy cattle	15,000
7. Germination and purity tests of seeds	1,630

8. Purity tests of milk 1,200
9. Purity tests of water 1,000
10. Soil analysis and identification 300
11. Distribution of vaccine .....10,000 doses
12. Legume culture for .....7,000 acres
13. Addresses at public meetings 500
14. Radio talks .....over 100
15. Exhibits at state, Pacific International, and county fairs.
16. Popular articles and press notices.....several hundred

Not infrequently letters require consultation of several specialists. Others call for library study. Many require critical examinations and laboratory work on specimens.

As agriculture becomes more of a business and more complex, the calls for such service increase.

PROGRESS OF STATION INVESTIGATIONS

The Station program of investigations was more comprehensive than in any previous biennium. As a whole, progress was satisfactory. In addition to the accomplishmments listed as outstanding, many other investigations reached development to produce results of definitely practical value.

Agricultural Chemistry. In addition to the valuable chemical work on the spray residue problem, the agricultural chemists supervised the washing of fruit in the Rogue River, Hood River, and Milton-Freewater districts, and assisted with such washing as was done in the Willamette Valley. This has taken a great deal of time, but has yielded some experimental data and is acknowledged as a desirable service by the fruit industry.

Dr. J. R. Haag, in cooperation with the Dairy department, has made good progress in animal nutrition studies. As a result of this cooperative investigation recommendations have been made to dairymen which are materially assisting in the management of dairy herds.

The Chemistry department has cooperated effectively with Horticultural Products on investigations to work out more satisfactory grades for dried prunes. This is recognized as one of the big problems of the prune industry. Final solution has not been reached, but good progress has been made.

During the biennium the chemical work of soils in the Willamette Valley, in cooperation with the Soils department, was completed. This work is proving fundamental to a better understanding of agricultural possibilities and aids materially in advising farmers.

Much work has been done in testing fifty or more chemicals in search of one suitable for disinfecting fruit to prevent decay in storage. Formaldehyde shows some promise and is being tested on a practical scale this season.

The staff of the Chemistry department has received the highest commendation for its unselfish, energetic, and effective efforts, especially in behalf of the fruit industry.

Agricultural Economics. The personnel and lines of work are listed under Organization. Already the work of Dr. Dreesen on taxation has attracted attention. Publications from Dr. Mittelman and Mr. Belden are expected within the next few months.

Agricultural Engineering. Experiment Station work in Agricultural Engineering was confined to investigations made possible by the Oregon Committee on Relation of Electricity to Agriculture. The Committee continued its support to the extent of $6,000 per year. This was supplemented by loans of equipment and by excellent cooperation from other departments of the Experiment Station, especially Animal Husbandry and Poultry. The work of Agricultural Engineering made possible the development of programs in these other departments in which the departments were much interested because of the opportunities for the industries they represent.

Excellent progress was made on the following projects: electric lights for increasing egg production, electric water heaters for poultry, electric power for prune dehydration, development of a cheese starter incubator, electric brooding of chicks, feed grinding by electricity, hay hoisting by electricity. Much attention was given to refrigerators for general farm storage. Some attention was given to arc lamps for lighting poultry houses, and to dairy water heaters and sterilizers, feed cutters, electric pumping for irrigation, electric milking machines, cream separators, grain elevators, gooseberry cleaners, hay choppers, and fruit graders.

The work of the Station in this field has attracted such attention that the agricultural engineer in charge of the project has received an offer at nearly double the salary and equal opportunity for research. He has resigned, effective November 1.

Animal Husbandry. Investigations in Animal Husbandry were slightly expanded during the biennium.

A complete study of the goat industry has been undertaken, including an economic study and comparison of various types of goat meat with similar types of lamb and mutton.

Animal Husbandry has cooperated with Agricultural Engineering in adapting electrical equipment to stock farm operations. A practical electric hay hoist has been worked out; a practical feed grinder with an automatic feed operated by 5 horse-power has been worked out.

At the Union Station a ten-year study of methods of wintering growing steers has been completed. This is perhaps the most complete study of its kind on record.

Seven tests on chopping and grinding alfalfa for fattening lambs were completed at the Hermiston and Union stations.

Many additional data were obtained relative to pastures for pigs, the value of grinding grain for pigs, methods of growing pigs, and protein and vitamin deficiencies of barley and tankage for pigs. These data all are important as a basis for most economic pork production.

Results of studies in the raising of spring lambs are in manuscript form; much information has been collected on yields and economy of different pastures for sheep, including, with the cooperation of the Soils department, irrigated pastures for the Willamette Valley.

A study was completed and results published on the marketing of cattle in the Portland markets. A similar study for sheep was started.

Bacteriology. The program of investigations in Bacteriology is limited mainly to one research project having to do with correction of acidity in soils. Good progress has been made.

At the first opportunity Bacteriology should be financed for investigations in food preservation and in bacteriological phases of certain diseases, such as hemorrhagic septicemia in cattle and sheep.

As indicated elsewhere, this department cooperated with the Dairy and Food Commissioner in a milk survey and made a total of 1,750 tests of water and 2,000 bacterial analyses of milk. It furnished the farmers of the state legume cultures for about 15,000 acres of land, and hemorrhagic septicemia vaccine to the extent of 20,000 doses.

Botany and Plant Pathology. Investigations in the Botany department were materially strengthened through additional cooperation from the Bureaus of Plant Industry and Entomology. Excellent progress was made on a number of important diseases of bulbs and potatoes. An outstanding contribution was made by M. B. McKay, of this department, through positive identification of Western yellow tomato blight and other troubles as identical with the "curly-top" disease of sugar beets.

As indicated under Requests for Additional Investigations and under Service, this department is called upon for much more investigational and service work than can be rendered with the staff and funds available. Federal funds have been used to the maximum possible extent to meet the state needs. Still the Station is unable to cope with the need for work in this line. As indicated in the statement to the Budget Commission, it should be understood that even the present requests for assistance can not be met, even in major part, with the funds available.

Dairy Husbandry. The program of investigations in the Dairy Husbandry department was somewhat expanded. The major efforts, however, were continued in cooperation with Veterinary Medicine to find a practical solution for the infectious abortion disease. The development during the year was outstanding, as already indicated.

Late in the biennium a cooperative study was started with the Federal Dairy Bureau to secure basic information to assist in marketing Oregon's butter product.

Investigations were continued to determine the most satisfactory succulent feeds for dairy cows; to determine the comparative value of alfalfa hay grown in Eastern Oregon and similar hay grown in the Willamette Valley; in cooperation with Chemistry, to determine the mineral requirement of growing heifers; in cooperation with Veterinary Medicine, to determine causes of difficult breeding of heifers; to accumulate further data on normal growth of dairy animals; to secure data on

the economic vealing of calves; in cooperation with the Federal Dairy Bureau, to secure further data relative to proved sires.

The spirit of cooperation between the staff in Dairy Husbandry, the chemists, and the veterinarians deserves the highest commendation.

Entomology. The department of Entomology, as in past years, was confronted with many times more requests for investigations and service than could be met. This is indicated in the list of requests for additional important investigations. Attempt has been made to increase the amount of work possible by the employment of advanced and graduate students. The state needs in this line, however, can not be met without considerably more funds and organization. The department is now investigating strawberry root-weevils, codling-moth, onion maggot, gooseberry borer, bulb insects, Syneta leaf beetles, prune thrips, apple aphids, substitutes for lead arsenate spray, oil sprays, dust spraying compared with liquid spraying, life-history and possible methods of control of symphilids, and further observations on peach and prune root borer control and on parasites of the European earwig. Obviously, the small staff can not do thorough work on so many projects, yet contact and collection of data are imperative to even intelligent discussion of these subjects.

Excellent results were secured in control of strawberry weevils, and promising results on others of the insects named.

Farm Crops. Investigations in Farm Crops were somewhat reorganized so that more effective investigations were possible with the major cereals in Western Oregon. The Station work combined with Extension work is gradually improving the varieties and production in Western Oregon.

Farm Crops work at the Moro Station continued to be of acknowledged outstanding benefit to wheat growers of the Columbia Basin. Crops work at the Union Station was strengthened somewhat to supplement more adequately the crop breeding work at Moro and Corvallis. Likewise, Crops work at the Burns Station was coordinated with the other stations best to meet the needs of Eastern and Southeastern Oregon. The Astoria Station continued to improve varieties for the Coast section. Practically all crop varieties grown in the Coast section now are improvements over older varieties as the result of work at the Astoria and Corvallis stations.

Farm crops still constitute a large part of the agricultural products of Oregon. The needs in Eastern Oregon are fairly well taken care of by the branch stations. The Corvallis Station is seriously handicapped by lack of land and lack of sufficient funds to meet the many complex Crops problems for Western and Southern Oregon. This department should have additional funds as soon as can be arranged. The first need is for land.

Farm Management. A program of investigation was first started with Purnell funds in 1925. During the biennium all the field work in three major and two minor projects was brought to a conclusion, including:

(1) A four-year study of the cost of prune production and prune farm organization.

(2) A three-year study of the cost of pear production and pear farm organization.

(3) A three-year study of the cost of forage production throughout the state.

(4) As minor projects, a two-year study of the cost of strawberry production, and a price history study of commercial apples in Oregon.

The vast amount of data secured are now under compilation. The next year should see much valuable information from these studies made available in publications. That these data will be of service is evident from calls already received.

Home Economics. Home Economics continued with one research project having to do with rural home management. Research in Home Economics must be developed as to problems and technique. This requires patient, hard work.

The work of Miss Wilson in Home Economics is recognized by the Federal Bureau of Home Economics and by other national home economists as perhaps outstanding for the problems undertaken. The Director is in full sympathy with the School of Home Economics in concentrating effort for the present upon studies of the rural home.

Horticulture. The problems of major concern and interest for Horticulture during the biennium have been in connection with spray residue. Through cooperation of the Corvallis staff, the staff in Hood River, at Medford, and the chemists, the Experiment Station has done a most effective work. These problems were recognized as an extreme emergency. They have been met by a solution which promises satisfactory, economical handling of the fruit crop.

Horticulture has cooperated with Farm Management in cost of pear production, commercial apple enterprise study, and cost of prune production. During the biennium Station results from investigations in the harvesting and handling of Bosc pears resulted in recommendations acknowledged to be of high economic value to pear growers. Similar work was requested and undertaken to secure data relative to harvesting and handling of fresh prunes, cherries, and other commercial varieties of pears.

Data were brought together for a bulletin on the cranberry in Oregon. A bulletin was published giving information on walnut drying and packing. A circular was issued presenting a method for testing moisture in dried prunes. Many technical papers were printed presenting results of meritorious research work.

Before the close of the biennium cooperation was started with the Bureau of Plant Industry relative to the culture and testing of perfume roses. Formal cooperation was started with the same Bureau centering the Federal strawberry breeding investigations for the Northwest at the Oregon Station.

A field study was completed relative to the economics and methods of producing strawberries. Further data were secured on walnut seedlings, cherry seedlings, tomatoes, and beets. Valuable data were collected relative to the possibilities of irrigation in the Willamette Valley for vegetables and small fruits. Work was undertaken to meet problems relative to sprays for gooseberries and prunes which are to be canned; the relation of ripeness of fruit upon perforations of cans; relative to preserving Royal Ann cherries in brine; relative to the feasibility of canning the better meat from wild horses; concerning methods of candying fruits; investigations concerning canning of fresh and dried prunes.

This department is called upon to a great extent for information and advice through correspondence, personal interviews, and addresses.

Poultry Husbandry. Investigations by the Poultry Husbandry department were continued, as a major project, on breeding to extend the profitable age of the domestic fowl. The hope of this investigation is that a strain of White Leghorns and a strain of Barred Plymouth Rocks can be produced of which 50 percent or more of the individuals can be relied upon to lay profitably for four years or more, thus making it unnecessary for poultrymen to reproduce their flocks every one or two years, as is now the case. Naturally, this objective means a long period of work, and it is difficult at any time to be sure that advancement in a given direction really means permanent progress. Thus far it appears that the factor of disease will constitute a difficult obstacle.

The data collected on the main project are of value in connection with problems such as early laying maturity in relation to good laying, relative influence of sire and dam on offspring, and breed improvement.

The Experiment Station, through the Poultry Husbandry department, has cooperated during the past year with the Oregon Accredited Hatchery and Breeders Cooperative by supervising the inspection work of that organization. The object of the organization is to improve the quality of eggs, chicks, and breeding stock sold in Oregon. At the request of the Association, the Station will supervise the inspection for the coming year.

The Poultry department has cooperated with Farm Management for two years in a cost and efficiency survey of commercial poultry production. Another year of field data will be required before final compilation of the data.

As in past years, the department was called upon to a certain extent, by residents of the state, for hatching eggs and pedigreed males. The policy of supplying these is at times questioned, but undoubtedly it has aided materially in improving the production of flocks throughout the state.

Soils. The program of investigations in Soils, Irrigation and Drainage was somewhat expanded as a result of a slight increase in state appropriations and increased Federal cooperation.

An important feature of the work was economic surveys of irrigation districts at the request of the State Reclamation Commission. Thorough surveys followed by reports were made of the Ochoco, Warm Springs,

Grants Pass, Tumalo, and Eagle Point districts. Surveys are planned for small districts in Central Oregon.

For this work the Experiment Station secured cooperation of the Agricultural Engineering Division of the Federal Bureau of Public Roads. The help of this Federal agency has been indispensable to the magnitude and character of work done. The results should form a foundation for negotiation in reorganization and refinancing of the districts concerned.

The Soil Survey in cooperation with the Federal Bureau of Soils was continued, and more than half a million acres in Marion county, one-fourth million acres in Grand Ronde Valley, and before the close of this season more than 400,000 acres in Columbia county will have been covered, making a total of approximately one million acres at a cost to the State of about $4,000.

Cooperation with the Division of Agricultural Engineering, Bureau of Public Roads, in studies of irrigation and drainage was strengthened during the biennium and now a highly qualified engineer is assigned to the cooperative project and financed jointly. He is engaged this season on surveys in Baker and Grand Ronde Valleys. There are requests for assistance along this line in the Coquille Valley and the John Day Valley. Urgent requests have been made to continue the Baker survey another year.

On July 1, 1928, cooperation was started with the U. S. Geological Survey on a study of ground water in the Willamette Valley, the investigation to be jointly financed. The aim of this study is to get reliable data on the extent and availability of ground water for irrigation. This investigation is of real importance to the gradual development of irrigation by pumping in the Willamette Valley.

Reclamation of alkali lands was continued at Vale. The Station fields there are the oldest experimental fields in the Northwest. All ideas regarding possible means of improvement of alkali land are being tried out. The results on the alkali land are more promising than had been expected.

Research and field experiments were continued on the use of fertilizers, especially sulfur as a fertilizer on alfalfa and as a corrective treatment on alkali land, some twenty-four cooperative field fertilizer experiments with different soil types to coordinate fertilizer tests with the Soil Survey classifications, further investigations with lime as to its need and economic value in Western Oregon, and studies with phosphorus and other fertilizers on different crops in Western Oregon.

Crop rotation and soil building experiments were continued and have been under way now for fourteen years. At the beginning the land yielded 12 bushels an acre. Continuous cropping had reduced the yield below six bushels, while rotation, manure, and irrigation have increased the yield to about 30 bushels an acre.

The Soil Survey shows 1¼ million acres needing drainage in the Willamette Valley. Drainage surveys have been conducted and assistance has been rendered in designing and installing drainage systems.

On the Linn county experiment station farm and on the Main Station farm the feasibility of pumping for irrigation and the amount of water most economical for use on different crops have been given further study and a bulletin issued on this subject. Studies have been started to determine the feasibility of drainage by means of pumping from wells. A number of more technical studies have been under way and are reported in the Director's Report submitted for separate publication.

With the expansion of the campus to the west the rotation fields which have been under way for twenty years and the drainage field west of the grandstand must be abandoned by the Experiment Station. Advancement in our knowledge of soils, irrigation, drainage, and soil building is imperative to advancement in agriculture of the Willamette Valley. The Station must have adequate land for this work if the information expected of the College is obtained.

Veterinary Medicine. The program of investigations in Veterinary Medicine was somewhat expanded by the increase of $2,500 per annum State appropriation for additional poultry investigations and by assignment of a small amount of Purnell funds to the department. This department is one of the largest Experiment Station departments.

In livestock disease investigations, attention was centered mainly on infectious abortion in dairy cattle. The outstanding developments from this work are reported elsewhere. In addition, investigations were continued on sterility in breeding cattle.

In poultry disease investigations, outstanding results were obtained, as already stated, in developing methods of immunizing poultry against chicken-pox and methods of immunizing poultry against coccidiosis. These items have been more fully discussed under outstanding accomplishments.

Purnell funds were assigned during the biennium for limited investigation of parasitic diseases of sheep. Results helpful to flock owners were obtained in the control of liver flukes. A good start has been made in the study of lung worms and stomach worms.

Studies were continued on a small scale on the problem of salmon poisoning in dogs. Attempts at producing immunity against salmon poisoning have thus far not been successful.

The department was called upon to make 195,000 agglutination tests for bacillary white diarrhea in poultry during the season of 1927-28. Data accumulated continue to indicate that the agglutination test is a satisfactory method of diagnosis for this disease.

A resolution from the Oregon Wool Growers Association requested investigation of range sheep diseases. A resolution from turkey growers requested investigation of diseases of turkeys. About July 1, 1928, a peculiar malady appeared in Sherman county, Oregon, and continues to date; approximately 175 head of cattle have died and no positive diagnosis of the trouble has been possible.

The calls for assistance in Veterinary Medicine are constantly increasing. It is doubtful whether livestock industries can continue long without expansion of the investigations along this line.

Special investigations at Burns Station. The Legislature at its session in 1927 appropriated $8,000 for the installation of a well with deep-well pumping equipment and the placing of 80 acres of crops under this pumping at the Burns Station. A well 85 feet deep and 18 inches in diameter with high grade pumping equipment and housing was installed, and the 80 acres placed in crop within a year after the appropriation was made. The equipment, operation, and crops were inspected by the Regents and local people of Harney county August 5. The results have met with approval. The Station Superintendent deserves much credit for the vast amount of work and accomplishment in a short period.

Crop rotation investigations in Umatilla county. The Legislature at its sessions in 1927 by H.B. 590 provided a continuing annual appropriation of $2,000 for crop rotation and nursery work in Eastern Oregon. The use of the funds for crop rotation was contingent upon the people of Umatilla county furnishing the necessary land.

Cooperation from the Federal Government beginning July 1, 1928, was secured whereby $10,000 of Federal funds is made available for cooperation in establishing and maintaining a crop rotation station in Umatilla county.

With the assurance of State and Federal cooperation, Umatilla county has now purchased 160 acres of valuable wheat land and is ready to turn it over to the State Agricultural College for crop rotation experiments and demonstrations under a lease similar to the arrangement with Hood River, Jackson, and other counties cooperating in the maintenance of branch stations. It is expected that this land will be taken over in time to plant the whole to crops this fall.

MANY ADDITIONAL INVESTIGATIONS REQUESTED

Although the station program of research was materially expanded during the biennium through additional State and Federal funds, and by additional cooperation from Federal Bureaus, there are at this writing perhaps more urgent requests for investigation of other problems than at any time in the history of the Station. The following indicate the character of such requests:

Plant disease and insect pest problems.

(1) Investigations to work out control of prune thrips. (Copy of resolution is hereto attached.)

(2) Investigations to work out control of syneta leaf beetle.

(3) Investigations to develop control of strawberry crown borer. This has been undertaken in a limited way with Federal funds.

(4) Investigations for control of codling-moth in walnuts.

(5) Investigations to develop substitutes for lead arsenate sprays.

(6) Investigations for control of pea weevil on Austrian winter field peas. This crop has great promise for the Willamette Valley, but damage by the pea weevil is a limiting factor.

(7) Investigations of leaf nematodes, root knot nematodes, and other nematodes. Quarantine measures have been necessary this year to control the spread of clover and strawberry nematodes. The nematode is causing losses and concern in alfalfa.

(8) Investigations for control of walnut blight, which is increasing in Oregon.

(9) Investigations of perennial canker of apples. This has been taken care of largely as a result of appeals from the Station to the Federal Department of Agriculture.

(10) Investigations into the nature and control of what is apparently a mosaic disease of rose stocks. Rose growers are confronted with a prospective quarantine against shipment of stalks from Oregon.

(11) Investigations to establish freedom of Oregon strawberry plants from a disease known as "strawberry yellows." California markets for Oregon plants to the extent of about $45,000 are involved in inability to certify freedom from this disease.

(12) Investigations of mosaic in greenhouse tomatoes, an increasingly troublesome disease. Chase & Son, Eugene, have sustained severe losses.

(13) Investigations of foot rot in wheat. Some 1200 acres of winter wheat were seriously injured by this disease in Wasco county this year.

(14) Calls for investigation and assistance in connection with wilt of horseradish, cucumber mildew in greenhouses, root rot of beans, tomato blight, diseases of ornamental shrubbery, diseases of hyacinths, asters, peonies, bulbous iris, and cherry bud blight.

With such problems as the complicated spray residue difficulties, codling-moth control, perennial canker, pear blight, red spider on pears, strawberry weevil, many species of aphids, diseases of potatoes, diseases of bulbs, the destructive curly top of vegetables, etc., already before the Station, in addition to thousands of calls for assistance, investigation of the problems listed above cannot be looked for within the next two years, without an increase in funds.

Animal disease problems.

(1) Disease known as "stiffness in lambs." Losses estimated at $150,000 per annum.

(2) A disease of ewes carrying lambs. Losses estimated at $120,000 per annum.

(3) Chronic pneumonia in sheep. Losses estimated at $50,000 per annum.

(4) Investigation of an apparently new disease or poisoning among cattle in the Columbia Basin. About 175 head died within a month in the vicinity of Grass Valley, Oregon, this year. In spite of all efforts, no remedy has been found.

(5) Diseases of turkeys and management problems of turkeys. Practically nothing has been done for the turkey growing industry in the state.

(6) Range paralysis in poultry. Losses slight but increasing.

(7) Infectious dysentery of cattle. Losses estimated at $25,000 per annum.

Other problems.

(1) Control of weeds. Oregon agriculture, like agriculture in other states, is confronted with a growing problem of weed control. Such weeds as wild morning-glory, Canada thistle, Russian Knap weed, and Hoary Cress are a constant menace. Limited experiments looking to eradication have been undertaken, but little progress has been made, due to lack of funds.

(2) More thorough investigations to devise ways of improving pastures. Lack of suitable pasture is the limiting factor in dairying and livestock production on farms in Oregon.

(3) Use of combines as harvesters of small seeds.

(4) Potato storage investigations.

(5) The study of poultry feeds. The importance of this problem is evidenced by the effort of the poultrymen to secure special appropriations for such work in 1926.

(6) Duty of water studies in connection with adjudication of water rights in the John Day Valley.

(7) A survey of drainage and flood problems of the Coquille Valley.

(8) Costs and efficiency in honey production.

(9) Railroad rate information.

A small part of the problems listed will perhaps be undertaken within the next biennium if present appropriations are continued without reduction.

LAND NEED IMPERATIVE

The need for land has been stressed as urgent in past reports. The situation at the close of this biennium is more acute than heretofore. The expansion of the campus westward has taken over crop rotation experiments which have been under way for some twenty years.

Only about 100 acres of land owned by the College is available for Agricultural Experiment Station work in Farm Crops, Horticulture, Soils and Irrigation. Such acreage is meager compared with a farm of more than 500 acres at Washington State; 1400 acres at Kansas State; about 2,000 acres at Indiana; more than 600 acres at Idaho; about 600 acres at Colorado. Meantime, problems in the fields of Farm Crops, Soils, and Horticulture are increasing, owing to changes in agricultural practices, and the development of new crops such as flax, vetches, pasture and seed crops.

The situation as regards land for both experimental and teaching needs has been carefully studied the past few months. Under date of April 25 a special report on the subject was submitted jointly by the Dean of the School of Agriculture and the Director of the Agricultural

Experiment Station. The following was recommended as a land program which should be adopted at the earliest possible moment:

Kind of land (soil type)	Farm Crops	Horticulture	Soils	Total
	acres	*acres*	*acres*	*acres*
Brown valley floor soil (Willamette silty clay loam)	340	.....	80	420
Upland	80	168	40	288
River-bottom	80	65	20	165
	500	233	140	873

The joint recommendation of the Dean and the Director is for purchase first of 420 acres of brown valley floor soil for Farm Crops and Soils. This is needed for experimental plantings in the fall of 1928. If not secured by purchase, such land must be rented, or important experimental work must be curtailed. No suitable land has been found available for rent.

As second purchase the 288 acres of hill land was recommended in order to meet the needs of Horticulture and certain needs for experiments in Farm Crops and Soils.

The purchase of approximtely 165 acres of river-bottom land was recommended as the third item of purchase, not because experimental work of this type is less important, but the Station now has under rental approximately 150 acres of this land which can be held for a few years.

Each of these land types represents a large area of agriculture in Western Oregon—agriculture which depends more and more upon the Experiment Station and the College for facts as to crops and methods basic to success. Rented land is not only unsatisfactory for experimental work, but is uneconomical. Continuous record, which is of primary importance, is not possible on rented land, nor is it possible to adopt a cropping system and management, which should be a part of the experimental work over a period of years. This means operating under conditions so that efficiency is impossible. The need for land can not be emphasized too strongly if the Station is to function as it should in meeting its growing responsibilities.

STORAGE FACILITIES

The need for storage facilities for the care of valuable seed stocks and for experimental work has been called to attention in previous reports. Such space is needed for service by all departments.

There is now no suitable common storage for use in properly caring for seed stocks and materials which must be carried over from year to year.

Many thousands of dollars are being expended, for example, in studies of potato diseases, bulb diseases, and diseases of other crops. These studies necessitate the carrying of planting stocks and experimental materials, especially bulbs and potatoes, in large numbers under conditions which will satisfy experimental control. It is a problem each year to find a way to take care of these materials without jeopardizing the entire experimental work.

The need is perhaps even greater with experimental work in Farm Crops. Many varieties of seeds must be carried over clean, and stored under conditions satisfactory to experimental procedure. This department is forced now to handle its seed under conditions that a practical seed grower would not consider. The situation is such as to endanger seed stocks of great value, promote loss of seed, and impair prestige of the Station work with both dealers and growers.

There is real need for storage shed facilities for equipment, including automobiles. Machinery and cars are now stored in every nook and corner which may offer temporary shelter. There is no opportunity to encourage systematic, business-like management and procedure. The changes in conditions and the expansion in the Experiment Station program have resulted in a condition of totally inadequate storage space for all lines. Plans should be considered for providing institutional storage space.

ADDITIONAL OFFICE AND LABORATORY SPACE NEEDED

Construction of the new Poultry-Veterinary Building during the biennium has been of material assistance in relieving crowded conditions for laboratory and office space in the Veterinary Medicine department. The Station work of this department had grown to include five to seven full-time workers, besides three project leaders on part-time. This whole staff was housed in approximately the same space that the department had when there was very little Experiment Station work. This relief was timely, as the increasing requests for assistance in the control of animal diseases indicate necessity for still further expansion in the Veterinary Medicine research.

Botany and Plant Pathology needs more space. The increasing number and serious nature of plant disease problems have led to maximum effort in securing cooperation from Federal bureaus and offices. As indicated under Federal Cooperation, the Bureau of Plant Industry is now financing a large part of our cooperative investigations on diseases of bulbs, diseases of potatoes, and "curly-top" disease of vegetables. In addition, the department has one man assigned here working on insecticides and fungicides, and a man assigned here in charge of white pine blister rust control. As a result of this cooperation, primarily, Botany and Plant Pathology has had more than 100 percent increase in staff without any increase in office space. Conditions are now too crowded for satisfactory and efficient work. One laboratory formerly used by two men is now used by four men. A temporary arrangement is being worked out for the present year. The list of requests for additional investigations indicates that work in this field will have to be expanded, either at the Oregon Station or by some other agency. The probable expansion and need for additional space, therefore, must be kept in mind.

Botany needs now three additional rooms as follows:

1. One room large enough for M. B. McKay and assistant, with space for drafting table, table for microscopic work, and office equipment, approximately 600 square feet.

2. One room with at least 400 square feet for work on Pine Blister Rust Control. This is State and Federal cooperation.

3. Laboratory of 400 square feet for Professor H. P. Barss and assistant adjoining Room 220, Agriculture Hall.

To meet this need the Botany department has requested rooms 214, 212, and 210 now used by Animal Husbandry should they become available in the future.

Entomology needs more space and an insectary. Entomology, like Botany and Plant Pathology, has an increasing number of problems. Attempt has been made the past few years to expand the staff in this department by using advanced and graduate students. As in the case of Plant Pathology, also, effort has been made to arrange cooperation with the Federal Bureau.

At present the Experiment Station workers have office desks in the Station laboratories. Graduate research workers and Government entomologists have desks in these same laboratories. Eight men are now occupying two Station rooms, and during the college year certain advanced classes in Economic Entomology meet in these same Station laboratory rooms. The coming and going of visitors, conferences with growers and members of the College staff, the mixing of sprays and emulsions, and other disturbing activities all take place in these same two rooms.

Obviously, the situation is not conducive to most effective work. As far as practicable, every research man should have a desk somewhere away from confusion and disturbance.

Entomology is much in need of an insectary. A building screened on four sides, with a shingled roof, is needed for rearing and studying insects under outdoor conditions. This would probably not cost in excess of $300.

This department must have rooms 305 and 306 Agriculture Hall, or an equivalent space elsewhere. Any other location will mean dividing the department and will tend to impair its efficiency. Rooms 305 and 306 total 3,450 square feet.

Entomology, as also Pathology, is in need of land. The land recommended for purchase for Experiment Station, however, covers requirements of these two departments.

Space for Director's Office needed. The Director's Office consists of two very small rooms. The program of investigations through increased funds and greatly increased Federal cooperation is about three times what it was in 1920. With eight branch stations and many contacts in the field, and with the increased number of reports and requirements in the administration of both State and Federal work, efficiency in the research work necessitates additional help in the Director's Office. A man qualified in agriculture, but having ability to assist with preparation of publications, reports, publicity, and meeting the public is needed for most effective handling of the Station work.

Request for such help has been delayed because of lack of office space. Brief consideration of the program of investigations; the wide contacts of the Station; the amount of publications; and the Director's present limited office space should make clear the need for additional space and the additional assistance.

The Director's office now has a total space less than 21 feet by 18 feet to provide for Director's office, secretary, stenographic help, files, maps, conference space, and all features in the administration of 14 departments and 8 branch stations. The space must be enlarged. There is no available space on the ground floor. New space should be provided to a *minimum* of 1,200 square feet, the equivalent of three rooms 20x20 feet. Rooms 210 and 212 Agriculture Hall, now used by Animal Husbandry, could be partitioned off to serve, if no ground floor location can be had. This space is needed by Botany, but is also about the only future opportunity for the Director's office unless moved to another building.

Other departments crowded. Farm Management has two Station men and from one to four statistical clerks working in one room of approximately 640 square feet. Into the Soils Department cooperation with the Federal Government has brought two additional men, with the prospect of a third. The regular staff and an increasing number of graduate students make the department overcrowded.

Within a few years serious consideration should be given to the possibility of an Experiment Station building to provide space for administration and for laboratories suitable for the research work. The Station is now continually readjusting in an effort to adapt space designed for Resident Instruction to research purposes.

GREENHOUSES

In preceding biennial reports greenhouse space has been set forth as a most urgent need. The completion of the new greenhouses during the biennium has made available 6,600 square feet of greenhouse space in two units, exclusively for Station work. In addition, certain Station investigations are conducted in two other similar units assigned primarily to Resident Teaching. These greenhouses are strictly modern, and meet satisfactorily a most urgent need. They are already effectively in use.

ORGANIZATION AND STAFF

There were but slight changes in the Station organization or staff membership during the biennium. As a whole, the morale of the staff is excellent. Also, the spirit of cooperation is such that today group attack, bringing several branches of science to work on a single complex problem, is almost a daily procedure. The importance of these two items cannot be overstated. The Horticulturist, the Soils Specialist, the Chemist, the Crops Specialist, the Pathologist, the Entomologist, and perhaps the Animal Husbandman or the Poultry Specialist or Dairy Specialist may contribute materially, for example, in deciding the most satis-

factory and most economical way of building up and maintaining desired fertility in orchards. Many problems are complex far beyond the proper scope of a single branch of science. Yet specialization must be maintained to keep abreast of the rapid progress in scientific work. Consequently, *staff morale and staff cooperation* are of increasing importance to effective research and effective service in problems of agriculture. The policy of the Station Administration is constantly to promote such spirit.

The following additions to the staff, all in Agricultural Economics, were made during the biennium:

W. H. Dreesen, Associate Agricultural Economist.

E. B. Mittelman, Associate Agricultural Economist.

W. H. Belden, Assistant Agricultural Economist.

Under provisions of the Federal Purnell Act, investigations were started on additional phases of agricultural economics, July 1, 1927. Dr. Dreesen began investigations on taxation; Dr. Mittleman on price studies, and Mr. Belden on marketing. This new work represents a new department in the Station organization.

In addition the following changes in staff took place:

Appointments

Name	Title	Date of appointment
J. R. Haag	Chemist	January 1, 1927
Donald Hill	Assistant Agronomist	February 1, 1927
G. W. Kuhlman	Assistant in Farm Management	September, 1927
E. Milton Dickinson	Assistant Poultry Pathologist	July, 1927
A. M. McCapes	Assistant Veterinarian	July, 1927

Resignations

Name	Title	Date of resignation
V. E. Smith	Laboratory Technician	July, 1928
Floyd Marven Edwards	Assistant in Animal Husbandry	October, 1927

SUMMARY OF MOST URGENT NEEDS

1. The need for land as recommended for the Corvallis Station can not be overemphasized. The College can not possibly meet its responsibility in agriculture without this land. Further, we now understand that $4,000 to $5,000 for Federal cooperation in forage crop investigations will be transferred elsewhere unless land is made available this fall. In addition, a possibility of securing additional Federal cooperation in Crops work can not be considered without land.

2. Additional office and laboratory space will be urgent within the year for Botany, Entomology, and the Director's Office, as indicated. Other departments could use space to advantage, but these items are urgent. In arranging for assignment of Federal funds and men to cooperate with the Station on Oregon problems the institution must naturally furnish office and laboratory space, land, greenhouses, and in many

cases transportation as a vital part of the institutional contribution. This is reasonable because the Federal Government can not wisely undertake the establishment of such facilities, and certainly the State and the institution should not encourage the Government to do so. We can not reasonably ask for any additional Federal cooperation until the facilities along this line are expanded.

3. As indicated throughout this report, the urgent requests for additional investigations can not possibly be met merely with a continuation of the present state appropriations. This statement is not intended as any recommendation or complaint, but merely a statement of facts, on the assumption that the Station staff is responsible for making clear the actual situation.

Respectfully submitted,

JAMES T. JARDINE,
Director of the Agricultural Experiment Station.

REPORT OF THE EXTENSION SERVICE

To the President of the College,

Sir: The Extension Service is charged with the duty of carrying the benefits, advantages and available information of the College and of the United States Department of Agriculture to every portion of the state and to all those persons who for any reason are unable to come to the College. In brief, the Extension Service represents the medium, both independently and in hearty cooperation with all other organized forces for betterment, for enlarging and enriching the agricultural and home interests of Oregon.

These pages do not carry a full and detailed report of all Extension Service activities for the years 1926 and 1927. Space in this publication would not permit such a report. The aims and accomplishments of the several lines of work covered by written projects are listed, however, and particularly are results given that lend themselves to definite measurements of progress on a statewide or regional basis.

BOYS' AND GIRLS' 4-H CLUB WORK

The Boys' and Girls' 4-H club project is carried on in cooperation with the State Superintendent of Public Instruction and the United States Department of Agriculture. The work is conducted in the counties by county club agents, county school superintendents, county agricultural agents, home demonstration agents, and rural school supervisors, ably assisted by hundreds of volunteer local leaders.

The cooperation extended by many organizations in the state has contributed much to the actual results obtained in the project. Among these organizations are parent-teacher associations, bankers' associations, granges, farmers' union, State Bee Keepers Association, livestock breed associations, the Poultry and Pet Stock Association, chambers of commerce, the Kiwanis, Rotary, and Lions clubs. These organizations have not only supported the work but they have actively assisted it through such activities as aiding in the selection of local club leaders and assisting club members in getting their exhibits to fairs.

Club work is carried on under definite projects conducted, so far as possible, in the homes and on the farms of the workers and under the supervision and direction of a competent leader. Lectures, demonstrations, bulletins, circulars, correspondence and personal visits are utilized by those who direct the work. Each club member selects the project he or she wishes to undertake and as the work progresses keeps an accurate cash and labor record. During the year 1927 members were enrolled in 25 different projects including the following: alfalfa, berries, beekeeping, beef calf, corn, canning, cookery, dairy calf, dairy herd, farm accounting, farm mechanics, garden, goats, health and growth, homemaking, home beautification, marketing, potato, poultry, rabbit, roses and flowers, sheep, swine, sewing, and wheat.

Through systematically organized lessons prepared by members of the College staff, club members are taught improved methods and practices in agriculture and home economics and in addition are given valuable experience in organization and leadership. Each club has its president, vice-president, and secretary. Regular meetings are held. Demonstrations and exhibits are other features of the club program.

Enrollment figures and other data since 1920 show the magnitude of 4-H club work in Oregon:

Year	Number of clubs	Enrollment	Total number completed	Percentage of completion	Value of products	Profit
1920	610	5,115	2,929	42.0	$111,584	$55,942
1921	724	6,487	4,189	52.0	127,359	66,778
1922	854	6,579	4,257	64.0	134,046	56,537
1923	742	5,777	3,971	68.9	120,940	45,166
1924	725	6,047	4,572	75.6	140,113	49,831
1925	912	7,583	6,081	80.1	162,601	58,195
1926	1082	8,186	6,341	77.0	169,528	65,947
1927	1210	10,154	8,273	81.4	186,744	66,662

One indication of the sound growth of this work is the steadily mounting percentage of members who complete all of their work. The record in this respect since the year 1914 when club work was organized on its present basis follows:

Year	Percentage of members who completed all work for which enrolled
1914	2
1915	4
1916	8
1917	16
1918	25
1919	33
1920	42
1921	52
1922	64
1923	68.9
1924	75.6
1925	80.1
1926	77.0
1927	81.4

Seven counties in the state now have county club agents: Clackamas, Douglas, Jackson, Klamath, Lane, Multnomah, and Tillamook. In addition a full time club leader is employed in the city of Portland. The effectiveness of county club agents is indicated by the figures shown in the table below. It will be noted that the 7 Oregon counties employing club agents in the past five years have enrolled practically as many club members as the remaining 29 counties of the state combined and have actually completed more work than the 29 counties. In the year 1926 the percentage of club members completing their work in club agent counties was 89.8 percent of the total enrolled whereas in the counties without the services of club agents the percentage completing their work was only 64. In the year 1927 95.9 percent of the enrolled members in club agent counties completed their work, while in other counties of the state the figure was 68 percent.

RECORD OF CLUB ENROLLMENT AND COMPLETIONS IN CLUB AGENT COUNTIES AND COUNTIES WITHOUT CLUB AGENTS

Year	Number of counties with club agents	Total enrollment		Total number completing	
		Counties with club agents	All other counties	Counties with club agents	All other counties
1923	7	2,426	3,351	2,132	1,839
1924	7	3,772	2,275	3,063	1,509
1925	7	3,714	4,869	3,286	2,795
1926	7	4,263	3,923	3,830	2,511
1927	7	4,822	5,332	4,626	3,647

The high standard of work done by club members is illustrated by the number of places taken by them in open competition in livestock classes at the Oregon State Fair in the years 1926 and 1927. Club members competed on the same basis as adult exhibitors. The record of places won is as follows:

PLACES WON BY CLUB MEMBERS IN OPEN COMPETITION IN LIVESTOCK CLASSES AT THE OREGON STATE FAIR, YEARS 1926 AND 1927

Places	1926	1927
Grand Championships	2	1
Championships	8	3
First Places	16	11
Second Places	9	20
Third Places	8	21
Fourth Places	12	18
Fifth Places	11	15

WORK OF COUNTY AGENTS AND AGRICULTURAL SPECIALISTS

The activities described under the project headings that follow include examples of typical work that revolves around the county agricultural agent. County agents use many means of carrying on their work. These are illustrated by the following summary (figures are averages per county):

	1920	1921	1922	1923	1924	1925	1926	1927
Office callers	1021	1247	1427	1781	1800	2100	2212	2161
Letters written	870	1144	1291	1234	1413	1446	1513	1616
Farm visits	281	340	389	506	509	547	618	640
Field demonstrations	.....	.....	76	107	135	166	93	185
Meetings at demonstrations	13	30	38	36	34	44	36	51
Miscellaneous meetings	.....	.....	.....	.....	.....	46	52	51

The work of county agricultural agents and the agricultural specialists is so closely related that the activities of the two groups are best reported upon together. Work of the Extension Service in this field is organized under ten different projects as follows: agricultural economics and marketing; animal husbandry; agricultural engineering; dairy husbandry; farm crops; farm management; horticulture; poultry; rodent and pest control; soils. The aims and accomplishments for the two years 1926 and 1927 in each of these are reported in turn.

AGRICULTURAL ECONOMICS AND MARKETING

The Extension Service has long recognized the importance of rural organization and cooperation as means of placing rural life on the highest possible plane. Activity in agricultural economics during the years 1926 and 1927 was conducted along three major lines as follows:

To aid existing rural organizations, including the grange, farmers' union, farm bureau and rural community clubs, so that they may have a more effective influence in the improvement of rural life.

To lend material assistance and support in the conduct of the present existing cooperative marketing organizations and to assist in the organization of legitimate and practical new ones.

To collect, interpret, and disseminate timely agricultural information and timely information on economics in order that the farmers of the state might be advised of planting or breeding information that will enable them to adjust their plans and thus to a degree stabilize production and balance it with market demands.

Statewide Grange debate. The Extension Service cooperating with the State Grange lecturer promoted a statewide debate among subordinate granges in Oregon and supplied 225 grange lecturers with reference material on the question: "Resolved, That the Federal government should not begin the development of any new reclamation projects until there is a demand for agricultural products that will pay cost of production plus a reasonable profit." Final contest in this debate was won by Mrs. Stella Henry and Mrs. Georgia Cook representing Brush College Grange of Polk county.

Grange Lecturers' School. A three-day school for grange lecturers was held at the College January 10-12, 1927 in cooperation with Mrs. Minnie E. Bond, state lecturer. Attendance was 100.

Agricultural economic conferences. In 1923 the Extension Service made the following declaration: "The present need in Oregon is for a comprehensive program based upon a thorough analysis of both production and marketing possibilities to serve as a guide to all agencies in the further development of our agriculture."

That declaration was followed by an attempt to assemble information and statistics of the most reliable character bearing upon the history and development of our agriculture, the adaptability of our soils and climate to the production of various cereals, fruits, vegetables, livestock and livestock products, the quantity of these commodities being produced, the comparative cost of production and comparative quality here and in competing regions, our domestic consumption requirement, quantities exported, distance to markets, shipping costs, etc. In short, we attempted such an analysis of our eight hundred million dollar agricultural industry as a manufacturing concern of equal magnitude would be expected to make as a basis for a production and sales policy.

State Economic Conference. In January 1924, the State Agricultural Economic Conference was held. The invitation to this conference bore the following message: "Farming in Oregon can be made more profit-

able by the adoption of a comprehensive program of production and marketing." More than five hundred of the state's leading farmers and others interested in farming responded to the invitation, considered the facts previously assembled, and took part in the formulation of a State Agricultural Program. Definite recommendations were made pertaining to dairying, farm crops, horticulture, livestock, poultry, beekeeping, land settlement, and marketing. These recommendations were printed in a 78-page bulletin entitled "Report of Oregon Agricultural Economic Conference." The following are a few of the many recommendations contained in the report.

"No reduction in Oregon winter wheat acreage. Reduce spring wheat acreage in counties of low production and replace it to some extent with approved varieties of barley. Replace oats in some of the lower yielding areas of Western Oregon with barley, clover, vetch, and other more profitable crops. Grow more red alsike and white clover seed on Western Oregon and irrigated farm lands. Produce more grass seed in Western Oregon. Increase production of hairy vetch seed, with considerable caution. Do not increase potato acreage. Extend seed potato production, and develop market in Southeastern states reached by water transportation. The present apple acreage is sufficient to meet market needs. Moderate increase in winter varieties of pears is advisable. Moderate plantings of walnuts and filberts is advisable for some time to come in Oregon. Increased plantings of Royal Anns where present acreage is insufficient to meet local cannery or fresh fruit demand. Increase plantings of Bings and Lamberts east of the Cascades where the demand for fresh fruit is greater than supply. The prune acreage should not be increased. Maintain the present number of beef cattle and build for permanence and stability. Market steers at two years of age. Increase the number of range sheep slightly, only up to the normal capacity of the ranges. Increase farm flocks on larger farms of Western Oregon and in irrigated sections. Do not expand the pig industry faster than feed production. Goats are strongly recommended on all brushy areas. Oregon is justified in promoting poultry keeping as a specialized industry. Butter manufacturers should receive first consideration in improving dairy conditions. Expansion of cheese manufacture should be encouraged only where there is an effective organization to advertise and stabilize the produce."

County Economic Conferences. While the State Economic Conference was yet in session representatives of many agencies participating approved a plan submitted by the Extension Service for conducting a series of county economic conferences for the purpose of developing county programs in general harmony with the state program. At this date conferences have been held in the following twenty-one out of Oregon's thirty-six counties: Lane, at Eugene, February 13-15, 1924; Jackson, at Medford, February 18-20, 1924; Josephine, at Grants Pass, February 21-22, 1924; Deschutes, at Redmond, February 26-27, 1924; Crook, at Prineville, February 28-29, 1924; Malheur, at Ontario, March 6-7, 1924; Union, at La Grande and Union, March 7-8, 1924; Polk, at Dallas, November 18-19, 1924; Wasco, at The Dalles, December 2-3, 1924; Hood River, at Hood River, December 4-5, 1924; Benton, at Corvallis, January 13-14, 1925; Multnomah, at Gresham, January 15-17, 1925; Clack-

amas, at Oregon City, January 27-28, 1925; Washington, at Hillsboro, January 28-29, 1925; Coos, at Coquille, November 16-17, 1925; Douglas, at Roseburg, November 19-20, 1925; Columbia, at St. Helens, December 11-12, 1925; Klamath, at Klamath Falls, February 9-10, 1927; Yamhill, at McMinnville, February 17-18, 1927; Wallowa, at Enterprise, March 17-18, 1927; Baker, at Baker, November 15-16, 1927. The report of each of the county conferences except the one held in Douglas county was published in bulletin form.

In each case a county production and marketing program was developed based on a study of the state conference recommendations as applied to local conditions. Each county conference report constitutes a program for the development of the agriculture in that county.

Wheat Growers' Economic Conference. This conference, held at Moro, February 11 to 13, 1926, considered the economics of wheat production in Eastern Oregon, especially the Columbia Basin. The resulting printed report has been termed the most comprehensive study of wheat production ever attempted in Oregon.

Umatilla Project Economic Conference. This conference, held at Hermiston, February 15 and 16, 1926, was the first to study an entire reclamation project as a unit. The printed report is recognized as an authoritative guide for the most profitable types of farm enterprises under conditions prevailing on the project.

Northwest Dried Prune Convention. This convention, held at Corvallis, May 31 and June 1, 1927 and July 9, 1927, brought together the most representative body of prune growers and packers ever assembled in the Pacific Northwest. One hundred and thirty delegates regularly elected at 20 community meetings held in the dried prune producing centers of Oregon and Washington were in attendance. The leading packers and distributors of the Pacific Northwest were represented. The state market agent, the manager of the marketing department of the Portland chamber of commerce, the State dairy and food commissioner, and the head of the Federal warehouse administration participated in the convention.

The circumstances leading up to the Convention of One Hundred may be briefly stated as follows (quotation from Foreword of the published conference proceedings):

"Shortly after passage by the 68th Congress of the United States of an act establishing the Division of Cooperative Marketing in the United States Department of Agriculture, Senator Charles L. McNary of Oregon, himself a prune grower, and familiar with the depressed conditions of the industry, requested this new governmental division to make an economic survey of the prune industry. On November 1, 1926 Mr. Chris L. Christensen, in charge of the Division of Cooperative Marketing, appeared before a representative group of prune growers and packers, and others, in the city of Portland, and presented a tentative outline of the scope and nature of the proposed survey. Mr. Christensen was accompanied by Mr. B. H. Critchfield, who remained in the state for the purpose of assembling all available information pertaining to the study. Individual growers, cooperative managers, private packers and distributors,

College Agricultural Experiment Station and Extension Service representatives, all cooperated fully with Mr. Critchfield.

"The official representatives of the United States Department of Agriculture extended the study into twenty-nine of the large markets of the East, Middle West, and Canada, interviewing 350 wholesale distributing agencies, 100 brokers, 250 jobbers, wholesale grocers, dried fruit managers, buyers for chain stores and mail order houses, 700 retail managers, and 800 housewives. Facts pertaining to world production and consumption were assembled. The analysis, in short, was complete and comprehensive.

"On April 12th, 1927, Lloyd S. Tenny, Chief of the Bureau of Economics of the United States Department of Agriculture, Chris L. Christensen, in charge of the Division of Cooperative Marketing, and B. H. Critchfield, in charge of the prune survey, appeared before a meeting of prune growers and packers in Salem and presented their report. In conformity with the action at the Salem meeting, Mr. C. J. Hurd, marketing specialist, and Mr. Clayton L. Long, horticulturist, both of the Extension Service, discussed the problems set forth in the Federal report at local meetings held in the following twenty communities: Forest Grove, Albany, Dallas, Brush College, Corvallis, Monmouth, Eugene, Oakland, Roseburg, Myrtle Creek, Riddle, Oregon City, Estacada, Scotts Mills, Salem, Springbrook, Dundee, Sheridan, Yamhill, and Vancouver, Washing. Six hundred and eighty-two persons attended these meetings. Each meeting elected its allotted quota of delegates to the Convention of One Hundred. The delegates were assigned to five different committees as follows: (1) Production, (2) Grades and Sizes, (3) Warehousing and Finance, (4) Marketing Organization, (5) Sales Service and Advertising. A representative of the College staff was appointed to serve as secretary of each of these committees and assemble material in advance of the convention for their consideration."

At least four thousand farmers and bankers, business and professional men interested in farming have taken part in the conferences listed above. While the task upon which we have made this beginning is not complete and while changing conditions will give rise to needed changes in the programs from time to time, yet it is true that our agricultural resources have been quite thoroughly surveyed from the standpoint of both production and marketing, and programs have been adopted that represent the combined judgment and experience of practical producers and professional agricultural workers.

These programs are the most complete and adequate answer to the question, "How can we best use and develop the agricultural resources of Oregon?" They should therefore be observed and supported by every agency concerned with agricultural welfare.

Oregon was the first state to follow the methods herein described for the development of agricultural programs. Many states, particularly in the West, have since followed a similar procedure, but no state has as yet proceeded as far on a state, county, regional, and commodity basis, as has Oregon.

Improving marketing conditions. Efficient marketing of agricultural products is both a state and national problem of generally recognized

importance. Farmers as a rule are not well informed regarding the principles and practices of marketing; consequently, they are handicapped in their efforts to establish successful cooperative marketing organizations and in preparing products of standard quality and pack to meet market demands as to kind, quality, etc. The work of improving marketing conditions to some extent has been carried on by every one of the twenty-seven Oregon county agents.

Marketing education. In all of the Western Oregon counties where the production of dried prunes is of economic importance, county agents were responsible for the scheduling and conduct of meetings to consider and discuss the report of the Bureau of Agricultural Economics by B. H. Critchfield on "The Demand, Marketing and Production of Oregon and Washington Prunes." These 19 meetings more than anything else gave the prune growers an understanding of their problem as analyzed by the Bureau of Agricultural Economics and were preliminary to the Convention of One Hundred prune growers which met at Corvallis May 31 - June 1, 1927 to develop a complete economic program for the state in the financing, production, and marketing of prunes.

During the year 1927 marketing schools were organized and conducted in Deschutes county, where dairying and poultry were emphasized, and in Douglas county, where prunes and broccoli were the major commodities discussed. At the former meeting there was an attendance of 120 and at the latter an attendance of 125. In addition, marketing schools were held in two counties not then employing agents—at Woodburn in Marion county and at Newberg in Yamhill county.

A short course in marketing was held at the College February 24 to 26, 1926, with an attendance of 315.

Marketing organization. Each new movement for organization of cooperative marketing agencies, while similar in many respects to others, presents new problems. There are many chances for failure as well as for success. Inasmuch as there can be little opportunity for maintaining an intimate contact with a large number of cooperative organizations, the policy of giving technical assistance where desired as to feasibility, in preparing suitable documents and in setting up the organization, leaving promotional and administrative matters in the hands of the interested growers, has been followed. In this capacity county agents acting under the advice of the specialist in marketing organization have rendered conspicuous service in a number of instances during the years 1926 and 1927.

The marketing specialist in 1926 drew up plans and by-laws for a state creamery association and prepared a plan of organization by-laws and incorporation papers for the Accredited Hatcheries and Breeders, Cooperative.

It is impractical to report in detail the marketing activity of each county. Excerpts from the county agents' reports, however, for the year 1927 are indicative of accomplishments in the field of marketing.

Turkey marketing (1927). Because of the rapid expansion of the turkey growing enterprise in Eastern Oregon and the total absence of any marketing organization or uniformity in birds produced, need for work

in improving turkey marketing was apparent. To meet this need the county agents in Baker, Umatilla, Morrow, Deschutes, and Crook counties, with the assistance of the specialist in agricultural economics, scheduled a series of meetings at which the subject of cooperative marketing of turkeys and particularly the success of the Idaho turkey pools were discussed. Mrs. C. G. Brink of Boise, Idaho, secretary and manager of the Idaho Turkey Growers Association, participated in these meetings and gave information on the function of the association and the preparation of turkeys for market. As a result of these meetings turkey growers at Baker, Hermiston, and Redmond affiliated with the Idaho association. This is indicated by the following paragraph taken from the report of the county agent of Deschutes county:

"Over fifty turkey growers signed contracts to market through this Idaho Turkey Growers' association. As a result of this act the price to the growers of turkeys was raised for the Thanksgiving market, according to the best judgment of individuals, from five to six cents per pound over what it would have been had not the turkey growers affiliated with the Idaho association."

Berry cooperative in Clackamas county (1927). Eight meetings were arranged by the county agent of Clackamas county in which the specialist in economics participated. Organization of the Clackamas Producers' Cooperative Association resulted. This is a berry growers organization modeled closely after the successful Woodburn Berry Growers' Association. The members are bound by rigid contract to deliver their berries to the cooperative, which sells them in a pool.

Egg marketing (1927). Assistance was given the Central Oregon Poultry Producers, a marketing association, in increasing its membership. This was important in order to provide sufficient volume for efficient operation. Meetings were scheduled by the county agent of Deschutes county for this purpose and the service of the specialist in agricultural economics was obtained. Out of this meeting came the request that a district conference of Eastern Oregon poultrymen be arranged at The Dalles in order to discuss means by which the various poultry producing districts east of the Cascades might more effectively market their eggs. This meeting was called by the specialist in agricultural economics and to it the various county agents brought leading poultrymen from their respective counties. A thorough discussion resulted regarding the whole situation including production, marketing, transportation rates, and the possibilities for securing more favorable special rates. While there was no tangible accomplishment at this meeting, a motion prevailed asking for the county agents to assist in calling meetings in each producing district for the purpose of discussing these matters with a larger number of producers and to select representatives who are to be called together at a later date for a conference at which formal action as to a marketing plan may be taken.

The agent of Josephine county, in cooperation with the agent of Jackson county, assisted the Southern Oregon Poultry Producers to expand in territory and volume. "Assisted by the marketing specialist, Mr. C. J. Hurd, contracts were gone over, various meetings were held for producers, and the entire situation reorganized. Some 20,000 hens were

signed in Josephine county and the new and old birds in Jackson county brought the total to approximately 100,000. The larger percentage of eggs of commercial flocks in Josephine county go to the association, which seems to be functioning fairly well. At the time of the organization of the association in the spring standard eggs were bringing sixteen cents a dozen. Ten days after the association began to function, prices were four cents higher, and for the first time in the history of Josephine county eggs during the spring and summer months sold at a higher price than they did in the market at Portland. The association during the spring months exported three car-loads of storage eggs and one car-load of fresh eggs to the New York market.

Peppermint marketing (1927). A meeting of peppermint growers interested in the possibilities of cooperative marketing of peppermint oil was called by the Columbia county agent. The specialist in economics presented information desired by the growers on marketing peppermint and the possibilities for the success of a cooperative organization. No definite organization, however, came out of this preliminary meeting.

Dairy marketing. The county agent of Coos county at the request of dairymen during 1927 arranged a number of meetings for the purpose of considering the organization of a cooperative creamery at Coquille. "Fifteen hundred cows were actually signed up for this organization and such interest has been manifest that there is excellent promise of establishing such a concern during 1928."

Organization of a cooperative creamery in Central Oregon and a cheese factory in Union county were advised against in 1926.

Broccoli marketing (1927). In Douglas county the agent called a meeting of broccoli growers in Roseburg on June 11 at which "a committee representing each of the broccoli shipping associations met and made tentative plans for the organization of the Umpqua Broccoli Advisory Council, composed of one representative from each of the shipping associations doing business in Douglas county." This council has general supervision over grading and packing, and makes recommendations to its members regarding production. Uniform crates have been adopted and much is expected of the council toward keeping the broccoli industry on an even keel.

Polk County Cannery Association (1927). In Polk county the private individuals who had theretofore operated the Falls City cannery announced their retirement from the field but offered to lease their property to those interested in continuing. The county agent "cooperated with the Commercial club and the growers of that community in holding two meetings at which an organization was discussed and this resulted in the forming of the Luckiamute Cannery association. The pack for the 1927 crop was only 5,000 cases, largely strawberries and prunes."

In addition to the foregoing examples of marketing assistance the Extension Service has extended tangible assistance to the Pacific Cooperative Wool Growers Association and the Pacific Cooperative Poultry Producers Association.

Agricultural standardization. Work in connection with the establishment of official standards of quality, grades, packs, and packages is

recognized as important in improved marketing. Many county agents have carried on educational work of this kind. Excerpts from their 1927 reports are herewith listed as typical of this activity.

Douglas county. At the request of a number of turkey growers and dealers, the county agent of Douglas county assisted in establishing standard grades for the marketing of the 1927 turkey crop. A meeting arranged for this purpose was participated in by the specialist in economics. Fifty growers and dealers were present. Grades of the Idaho Turkey Growers' Association were adopted. The 1927 crop was sold on the basis of these grades. Growers and dealers mutually agree that if Douglas county is to compete with Idaho and Eastern Oregon in the various turkey markets, they must similarly standardize their product.

Josephine county. The agent in Josephine county assisted in the work of inspection of packs of grapes and in standardizing the strawberry packs.

Deschutes county. In Deschutes county meetings of potato growers were held at Tumalo and Redmond "to discuss the advantages of an organization of an educational and protective nature to improve the cultural methods practiced by the potato growers in an endeavor to improve the quality and grade of the potatoes offered for sale. This organization was perfected during the month of October."

Malheur county. In Malheur county the agent continued to supervise shipping point inspection of fruits and vegetables under State and Federal agencies.

Lake county. In Lake county the county agent "has done considerable work in educating the shippers of potatoes in the matter of preparing grades. Every car of potatoes that has been moved out of Lakeview the past year has been inspected by the agent for grade condition. Copies of the Oregon potato grades were mailed to all growers in the Goose Lake Valley before the 1927 harvest began."

Gathering and disseminating economic information. One of the outstanding accomplishments in the rural economics project during the years 1926 and 1927 was the development of a system of assembling and distributing current economic information.

The adjustment of long time and current production to prospective marketing demands so far as may be possible is one of the major problems confronting the agricultural industry. Without doubt this problem will become more acute as production efficiency increases, competition becomes more keen, and the agricultural industry becomes more and more complex. It is doubtful whether satisfactory results will be obtained until farmers generally recognize the relationship of price and supply and work for effective control of production. In the face of these difficulties, recognizing the importance of this work, the Extension Service has developed an economic information service consisting of annual outlook reports, monthly reports on the agricultural situation, and market news releases. A specialist is employed who collects information on crop and market conditions from various sources and compiles it for dissemination. Cooperative relations are maintained with the Division of Crop and Livestock Estimates of the U. S. Bureau of Agricultural Eco-

nomics. County agricultural agents have an important part in reporting upon current conditions in the state and in disseminating the economic information. The various departments of the School of Agriculture and the Agricultural Experiment Station contribute information.

Agricultural Outlook Report. An agricultural outlook report for Oregon prepared by a state outlook conference at the College was distributed by the Extension Service in February, 1927. Various departments of the College cooperated in the publication of this report and 2000 copies were distributed by county agents and through other channels. The report contained 31 pages devoted entirely to the agricultural outlook in 1927 for the various agricultural commodities produced in Oregon. It was based on the Federal outlook report and local data. A similar report was issued in February, 1928.

Economic Outlook conferences. Following the publication of the outlook report in 1927 an economic outlook conference at which the contents of the report were discussed was held in Lane county March 19, 1927, the purpose being to consider the various factors tending to influence the production and marketing of agricultural products, and to plan future breeding and planting operations accordingly. Those in attendance indorsed the plan of the Extension Service to carry this type of conference into other counties of Oregon. Accordingly ten such conferences were scheduled and conducted in 1928 as follows: Lane, at Eugene, February 17-18, 1928; Polk, at Dallas, February 21-22, 1928; Clackamas, at Oregon City, February 21-22, 1928; Malheur, at Ontario, February 21-22, 1928; Washington, at Hillsboro, February 23-24, 1928; Benton, at Corvallis, February 23-24, 1928; Union, at La Grande, February 24-25, 1928; Josephine, at Grants Pass, February 28-29, 1928; Deschutes, at Redmond, February 28-29, 1928; Columbia, at St. Helens, February 28-29, 1928.

Agricultural Situation. In July, 1926, the first issue of a monthly mimeograph called "Agricultural Situation" was prepared by the Extension specialist in agricultural economics. This mimeograph contains current, economic, statistical, and marketing information of particular importance in the state. Information used in the monthly report is obtained from the Bureau of Agricultural Economics of the United States Department of Agriculture and from other sources deemed reliable. The mailing list includes agricultural leaders throughout the state, members of the College staff, Smith-Hughes teachers, marketing association officials, and others.

County agents in Polk, Lake, Douglas, Coos, Malheur, Yamhill, and Wallowa counties issued publications during the year 1927 which they called "Agricultural Notes." The primary purpose of these publications was to disseminate timely economic information taken from the State Agricultural Situation reports.

Each month county agents filed with the specialist in agricultural economics reports giving the agricultural situation in their respective counties. This was summarized and introduced into the State Agricultural Situation.

Special Commodity Reports. From time to time during the year 1927 at the request of various agents the specialist in economics prepared data on the situation relating to special commodities. Such reports were pre-

pared on the dairy industry, clover seed production, peppermint oil production, and prunes.

An example of how these reports served the farmers of the state is found in Coos county where because of the high price of peppermint oil the two years preceding (the price went as high as $12.00 per pound) a movement was on foot to put in a large acreage of mint. At two different meetings the county agent presented the facts about peppermint oil production. These facts showed that the normal requirement for domestic consumption was about 450,000 pounds of oil which could be supplied by some 35,000 to 40,000 acres, while the acreage had actually been increased to 60,000. The average price for oil per pound over a period of thirty-two years was $2.56, much below the $12.00 per pound which the growers had in mind. Dissemination of these facts at the proper time prevented general planting which would have been followed by appreciable losses since prices of peppermint oil have been consistent with what the facts indicated they would be. Growers in Coos county have expressed appreciation for this service.

Weekly Commodity Market Reviews. Beginning in May, 1927, the weekly wheat market review of the Federal Bureau of Agricultural Economics was mimeographed and distributed through county agents' offices and the daily papers in wheat districts and was supplied individually to leading growers.

AGRICULTURAL ENGINEERING

Pyrotol distribution. Distribution of pyrotol and demonstration of its use in stump blowing and ditch blasting constitute the major activity in the agricultural engineering project during the years 1926 and 1927.

During the last five years the Extension Service has been in charge of the distribution of surplus war explosives (sodatol and pyrotol) made available by the U. S. Department of Agriculture for agricultural purposes. County agricultural agents directed the distribution in their respective counties. The five-year record of distribution is summarized in the accompanying table.

SODATOL AND PYROTOL DISTRIBUTION
(Figures are in pounds)

County	1923	1924	1925	1926	1927*
Benton	.....	40,350	85,550	102,000	143,400
Clackamas	50,900	183,950	158,200	211,200	203,250
Clatsop	18,850	71,300	39,100	43,000	22,000
Columbia	34,050	100,800	89,850	150,900	197,800
Coos	.....	.....	43,600	20,000	38,500
Douglas	.....	20,900	55,250	.....	69,550
Hood River	25,550	.....	67,100	43,400	74,000
Jackson	.....	.....	.....	.....	35,500
Josephine	.....	24,150	18,000	20,000	51,150
Lane	.....	30,250	140,700	126,200	167,100
Lincoln	.....	.....	23,750	27,250	.....
Marion	24,200	93,300	233,750	190,000	182,350
Morrow	.....	.....	.....	11,200	40,000
Multnomah	21,000	36,800	73,000	79,500	68,000
Polk	.....	.....	.....	17,300	28,000
Tillamook	.....	49,400	50,250	87,850	106,950
Union	.....	.....	.....	.....	20,000
Wallowa	.....	.....	.....	.....	16,000
Wasco	.....	.....	24,200	89,600	85,000
Wasco-Hood River	.....	66,850	.....	.....	.....
Washington	46,000	216,950	277,550	250,350	374,100
Yamhill	.....	44,400	104,000	94,850	101,850
Totals	220,550	979,400	1,483,850	1,564,600	2,024,500

*Pyrotol distribution only.

The Extension Service does not have exact information as to the total amount of land cleared with war explosives. An area equivalent to 100 sixty-acre farms was reported for Washington county alone by the economic outlook conference there.

When compared with the cost of commercial stumpage powder, the saving to farmers through purchase of pyrotol was more than $100,000 in 1926 and approximately $160,000 in 1927.

In connection with pyrotol distribution, county agents organized 22 blasting demonstrations in 1926 attended by 570 persons. Subjects discussed and demonstrated were: proper method of carrying caps, the use of a cap crimper as a necessity for safety in blasting work, best method of setting fuse and improved practices in handling hangfires, proper blasting tools, and use of a blasting machine and electric caps.

In 1927 major emphasis in pyrotol distribution was placed upon use of this explosive in blasting drainage ditches. County agents organized and conducted with the assistance of the agricultural engineering specialist 46 ditch or stump blasting demonstrations with a total attendance of 1259.

Until the last two years use of powder as a means of drainage ditch construction had been given comparatively little attention in the state. The Extension Service demonstrations, however, proved the method expedient and economical. The economy factor is illustrated by a result in Lincoln county where the county agent and agricultural engineering specialist supervised a ditch blasting job on the farms of Louis Holton and H. A. Hostetler of Delake. A ditch 2700 feet long was blown through a piece of bottom-land and brush to take the place of a winding creek that had become filled up and dammed by willows to such an extent that water stood on a considerable portion of 200 acres all winter and part of the spring. When finished the ditch was 7 feet wide and averaged from 3 to 4 feet deep. Six men put it through in a day and a half at a total cost of 7 cents per lineal foot. The cost by any other method would have been at least five times as much because of the marshy, brushy condition of the land.

An aggregate of 2977 feet of ditches were blown in 11 demonstrations in Clatsop county. These varied from 2½ to 8 feet in depth and 4 to 8 feet in width. Money outlay for these jobs averaged 4.7 cents per lineal foot.

In Union county the County Court had constructed a 1000-foot ditch 4 feet deep and 12 feet wide to straighten the channel of the Grande Ronde river. Teams and scrapers were used at a total cost of $400.00. This ditch was deepened to 9 feet with pyrotol for a total cost of $50.00 for materials. The deepening was done by two men in two days.

ANIMAL HUSBANDRY

Economic aspects of the livestock industry have been emphasized by Extension workers to the end that permanence and stability in the industry might prevail rather than alternating inflation and contraction with resulting losses.

Beef cattle. The Extension Service is working toward the elimination of causes of relatively low return in the beef-cattle business. Among the important factors of management which can contribute to such low returns are the following: (1) High death losses. As much as ten percent, with an average of five percent, exists in the range areas of the state. (2) Abuse of grazing practices has greatly reduced carrying capacity of ranges and the possibility of gathering fat stock off the grass feed. (3) The average calf crop in the state is 65 percent with many ranches running as low as 40 percent. (4) Heavy feeding during winter on expensive feed has greatly reduced ultimate profits.

Orderly marketing aided. County agents have rendered assistance in the operation of an orderly marketing plan conducted by the Oregon Cattle and Horse Raisers' Association. County agents in Crook, Baker, and Grant counties have been particularly active in this work and have functioned as zone managers. These zone managers assembled current information from stock raisers on the number of cattle to be marketed and on the approximate dates that they were ready for shipment. This information was sent to a central marketing agency at Portland which in turn advised the zone managers of the condition of the market and also the number of cattle that were likely to be received on various days. The zone manager then submitted this information to stock growers and shipments were made in accord with the information available. So far the plan has tended to stabilize the beef-cattle market and to a considerable extent has prevented broad fluctuation of prices resulting from cattle arrivals far in excess of consumption requirements.

Blackleg vaccine distributed. County agents distributed more than 10,000 doses of blackleg vaccine in 1926 and 16,370 doses in 1927. Previous to the employment of a county agent in Grant county losses from blackleg were prevalent and very little aggressin, which gives life immunity from the disease, was used. During the year 1927 this county agent conducted 41 blackleg vaccinating demonstrations and personally vaccinated 4,470 calves.

Truth in meats exhibits. An exhibit, "Truth in Meats," was prepared under the supervision of the Extension livestock specialist and was shown with the cooperation of the College exhibit committee, in 1926 and 1927 at the Pacific International Livestock Exposition and in 1927 at the Oregon State Fair as well as three county fairs. The exhibit featured cuts representing various grades of beef and was planned to show consumers the difference between good and poor quality beef.

Economic information provided. During the year 1927 economic information regarding the beef cattle industry, especially emphasizing costs of production, was presented to stockmen. A budget plan for operating a livestock enterprise was presented to the Oregon Cattle and Horse Raisers' Association.

Sheep. Among factors which seriously diminish profits for the wool grower are: (1) An average fleece weight of nine pounds for the two million sheep in Oregon, and a great variation in weight of fleeces—varying from four to 13 pounds. (2) Low lamb crops. (3) Approximately 25 percent of the lambs produced in Western Oregon go to market as bucks

or at least with long tails. (4) Abuse of grazing privileges has reduced the carrying capacity of the ranges. (5) Losses caused by internal parasites and diseases. (6) Lack of uniformity of type in many of the sheep bands of the state.

Continuation of the wool improvement project, disease control, flock management and control of intestinal parasites were lines of Extension work in this field conducted during the years 1926 and 1927.

Wool improvement. This work is well illustrated by results on the Ned Sherlock ranch in Lake county where for five years a wool improvement demonstration has been under way. Each year the county agent and Extension livestock specialist at shearing time assisted Mr. Sherlock in locating the light-shearing ewes and marking them so that they might be culled in the fall. The ewes were culled on a basis of age, condition, conformation, ability to produce lambs, and shearing ability. The five-year record on this flock is given in the accompanying table.

A NUMERICAL RECORD OF FLEECE WEIGHTS

Ned Sherlock Ranch, Lake County, 1923-1927

	1923	1924	1925	1926	1927
Shearing dates	May 14-17	May 2-6	May 15-19	May 9-12	May 14-17
Total sheep sheared	1,545	1,651	1,612	1,824	1,889
Culling standard pounds	7	7.5	8	8	8
Number shearing below standard	241	170	150	209	181
Number shearing above standard	1,304	1,481	1,462	1,615	1,708
Total wool weights	12,825.5	16,309.2	16,107.2	17,804.7	18,346
Average fleece weights	8.3	9.8	9.9	9.7	9.7
Percent branded for culling	15.7	10.2	9.3	11.5	9.5
Number shearing 10 lbs. or above	180	465	771	774	790
Number shearing from 4 to 4.9 lbs.	15	6	0	1	0
Number shearing from 5 to 5.9 lbs.	38	16	10	5	4
Number shearing from 6 to 6.9 lbs.	181	62	37	35	26
Number shearing from 7 to 7.9 lbs.	406	236	101	168	151
Number shearing from 8 to 8.9 lbs.	409	423	301	343	396
Number shearing from 9 to 9.9 lbs.	316	415	390	498	522
Number shearing from 10 to 10.9 lbs.	130	278	365	388	414
Number shearing from 11 to 11.9 lbs.	33	120	242	236	243
Number shearing from 12 to 12.9 lbs.	14	51	108	104	89
Number shearing from 13 to 13.9 lbs.	3	16	35	39	32
Number shearing from 14 to 14.9 lbs.	.....	.....	.....	7	11
Number shearing from 15 to to 15.9 lbs.	.....	.....	.....	.....	1

It will be noted that the number of ewes shearing more than ten pounds has increased from 180 the first year to 790 in 1927. In 1927 only 181 ewes sheared less than 8 pounds while in 1923, 640 were below that standard.

Similar work is being carried on with Charles Dear, Yoncalla, Douglas county, and W. H. Cleveland, Heppner, Morrow county.

Farm flock owners assisted. The number of farm flocks of sheep in the state has greatly increased in recent years bringing a corresponding increase in demand for assistance in this field. During 1927 county agents arranged for 28 flock-management and disease-control meetings to discuss feeding, management, and disease control. Typical disease-control work is described in the 1927 report of County Agent D. E. Richards, Grant county, as follows:

"The best illustration of liver fluke control was on the Elmer Kimberling ranch, which is located some seven miles above Prairie City. Mr. Kimberling has a farm flock of some 100 ewes. Last winter they began to die, and some twelve were lost in a few days. We autopsied a few of them and found great numbers of flukes in their livers. All of the sheep in the flock had similar symptoms; they were getting thin, 'potbellied,' had a swelling under the jaw, and looked generally dejected.

"We treated the flock by giving each ewe a 1-c.c. carbon tetrachloride capsule. They immediately began to get stronger and no more died. The cost of this treatment was one and one-half cents per ewe. The treatment, worked out by the Veterinary department of Oregon State Agricultural College, is of great value to the sheepmen of Oregon."

Swine. Work with swine has consisted principally in a broader distribution of facts on the economic aspects of pork production in Oregon. As a result, there is a decreasing tendency for farmers to rush into the pork production enterprise thereby bringing about a large surplus and lower prices. Oregon produces about 52 percent of the pork required for local consumption. In many parts of the state there is insufficient grain produced for economical hog production. The Extension Service program in swine production is based upon the recommendation of the Oregon Agricultural Economic Conference of January 23-25, 1924, specifying that pork production in this state should not be extended beyond one pig for every dairy cow, one pig for every 5 to 20 acres of grain (except in the wheat farming areas where the harvest is especially clean, or where pasture and stock water are not available), and one pig on the average farm to consume the garbage. This program has been generally accepted in the state. Production has thereby become based upon utilization of waste products rather than making hog production a major enterprise.

DAIRY HUSBANDRY

During the five-year period 1920-1925 the number of producing dairy cows in Oregon increased from 180,462 to 204,890. This increase took place most rapidly in the irrigated districts of Eastern Oregon, where the percentage of increase was 21.2 percent. In Western Oregon the increase was 11.3 percent. This expansion was continued during the year 1926 as a result of favorable prices and dairying has assumed a more important place as an agricultural enterprise in the state. At the end of the year 1927 it is estimated that there were about 214,000 dairy cows of milking age in the state. The industry ranks third in total income among Oregon's agricultural enterprises and is surpassed only by cereal production and livestock.

During the two years 1926 and 1927 the county agents and Extension dairy specialist gave attention to problems of production and marketing along the following lines: (1) Higher average production per cow through improved breeding and better feeding methods. Average production is now 170 pounds butter-fat annually. (2) A better cropping program to permit better feeding. (3) Use of more proved sires. About 48 percent of the dairy sires now in use are pure-bred. (4) An increase in the number of economical herd units on dairy farms. (5) Work to control contagious and infectious diseases. These diseases are not localized but have about the same degree of intensity in all areas. (6) Production of a higher quality of butter.

Cow testing associations. With good prices prevailing and greater interest among dairymen in improving the quality of their herds there has been definite progress in cow testing association work during the years 1926 and 1927. At the close of the year 1927 more cows were on test than ever before in the history of the state. The accompanying table summarizes the status of cow testing work in Oregon during 1926 and 1927.

STATUS OF COW TESTING WORK DURING 1926 AND 1927

Counties	Number of herds		Number of cows		Number of boarders rejected		Kind of organization	
	1926	1927	1926	1927	1926	1927	1926	1927
Baker	15	33	282	876	0	0	Club	Association
Benton	.....	12	.....	169	.....	8	.....	Club
Clackamas	33	48	650	643	24	54	Association	Association
Columbia	43	55	842	798	70	62	Association	Association
Coos	123	124	2,468	2,465	81	161	3 associations	3 associations
Central Oregon	.....	37	.....	614	.....	.....	.....	Association
Deschutes	21	.....	150	.....	19	.....	Club	.....
Klamath	4	.....	65	.....	4	.....	Club	.....
Lane	35	35	642	642	17	25	Association	Association
Lincoln	37	18	291	177	7	.....	2 clubs	2 clubs
Marion	.....	36	.....	714	.....	25	.....	Association
Tillamook	71	83	1,674	1,926	166	108	Association	Association
Union	21	.....	184	.....	21	.....	Club	.....
Union-Wallowa	.....	37	.....	728	.....	.....	.....	Association
Umatilla	.....	39	.....	632	.....	.....	.....	Association
Totals	387	557	8,168	10,384	409	443	7 associations 6 clubs	12 associations 3 clubs

An outgrowth of cow testing association work in Tillamook county has been sale of baby calves from dams producing 300 pounds of fat or more annually and sired by pure-bred bulls. During the year 1926, 408 of these calves were sold for an average of $12.00 per head. In 1927, 354 were sold at the same price. This work was developed and is conducted by the Tillamook county agent. It is not only providing increased returns to Tillamook dairymen but it is also enabling the de-

veloping dairy districts of the state to purchase and grow high producing dairy cattle at a minimum cost.

Pure-bred sire work. Although no organized pure-bred sire campaigns have been conducted, county agents in most counties have stimulated interest in better sires and have rendered definite assistance in location and purchase of these animals. The accompanying table shows the extent to which county agents were instrumental in the introduction of pure-bred sires during the years 1926 and 1927.

RESULTS OF PURE-BRED SIRE WORK

County	Number of sires placed 1926	1927
Baker	6	....
Crook	11	10
Deschutes	11	....
Jackson	5	....
Josephine	29	....
Klamath	12	10
Lake	8	1
Umatilla	8	....
Union	4	....
Totals	94	21

Better feeding. Better feeding of dairy cattle and better cropping systems are closely related projects. In many cases dairy cattle would be better fed were the proper feed produced on the farm in adequate amounts. Consequently every encouragement has been given cropping projects along this line and frequent conferences have been held between county agents and the Extension crops specialist to determine proper cropping systems and assistance that could be rendered dairymen. Results are becoming apparent. The coast areas are growing more legumes. Much more corn was sown in the Willamette Valley in 1927 than ever before. More legumes are being grown in the Willamette Valley. One county in this section has adopted a slogan "one acre of alfalfa for each dairy cow." The alfalfa growers of Eastern Oregon are giving more attention to growing root crops and there is also increased interest in pasture crops there.

Tuberculosis and other infectious diseases. Operation of the compulsory tubercular testing law has practically eliminated the necessity for county agents to give assistance in control of tuberculosis. In 21 counties compulsory testing is enforced. In counties not covered by the law, however, county agents supervise and direct testing campaigns. Such activity was carried on in 1927 by agents in Baker, Union, Jackson, Umatilla, Morrow, Klamath, and Lake counties.

In cooperation with the Veterinary department of the Agricultural Experiment Station county agents are assisting in the establishment of abortion-eradication tests. The effectiveness of this work is illustrated by four-year results in one community of the state shown below:

PROGRESS IN ABORTION ERADICATION IN ONE OREGON COMMUNITY

Year	Number of cows	Number of reactors	Percentage of reactors
1923	120	50	41
1924	88	19	22
1925	73	7	10
1926	101	9	8.9

Bull associations and clubs. County agents have assisted in organizing pure-bred bull associations and clubs. At the end of the year 1927 there were 24 of these associations with 81 dairymen cooperating. Counties affected were Clackamas, Clatsop, Columbia, Crook, Josephine, Linn, and Umatilla.

Dairy demonstration train. From April 25 to April 30, 1927 a dairy demonstration train was conducted through the Eastern Oregon irrigated districts by the Extension Service in cooperation with the Union Pacific System. Stops were made at Hood River, The Dalles, Bend, Redmond, Maupin, Boardman, Irrigon, Hermiston, Stanfield, Pendleton, La Grande, Elgin, Joseph, Enterprise, Wallowa, Union, Haines, and Baker. Total attendance was 9,068. One car of the train was filled with charts and exhibits featuring dairy subjects. Two cars were filled with livestock including two grade cows and a pure-bred bull of the Guernsey, Holstein, and Jersey breeds. The cows were from cow testing associations and had records of production. The bulls were sires of record daughters.

FARM MANAGEMENT

Definite progress has been made in farm management demonstration work during the year 1926 and 1927, even though this project had but half time service from a specialist. The attention of the county agent staff has been directed so far as farm management work is concerned to the matter of "how farming can be made more profitable in Oregon." The answer to this question is largely contingent upon the solution of the following problems upon which attention has been focused: (1) Proper selection of enterprises. (2) Developing a larger volume of business. (3) Adoption of low cost practices. (4) Adoption and wider use of business methods in managing the farm. (5) Wider use and local interpretation of economic trends in production in prices and outlook of a specified crop. (6) Developing profitable sidelines in one-crop areas.

Farm organization work. The outstanding activity in the farm management project during the year 1927 was the farm organization work conducted on the Umatilla irrigation project in Umatilla and Morrow counties, on the Klamath irrigation project in Klamath county, and on the irrigation projects in Deschutes and Crook counties in Central Oregon. Analysis of existing agriculture on each of these projects was made by means of a survey from which was drafted a definite series of recommendations covering the most desirable combination of enterprises, the importance of increasing volume of business, and measures which tend toward greater economy in production. Reports of the studies on the Umatilla project and on the Klamath project were completed and published. To consider the survey findings on the Umatilla project three

demonstration field meetings were held on three successful farms and 14 general meetings were arranged in the district at which there was a total attendance of 550 men.

From the farms surveyed on the Umatilla project six were selected because they were considered "reasonably successful." They were not held up as model farms but rather as examples of selection of enterprise combinations that are enabling the owners gradually to get ahead. Factors that contributed to profits on these farms were charted and discussed at the meetings mentioned above. One of the charts follows:

WHY ARE THESE UMATILLA PROJECT FARMS REASONABLY SUCCESSFUL?

The success of these farms may be attributed to those important principles of good farm management—"Large Volume of Business, Higher than Average Production per Unit, and Economy of Production."

Elements which contributed to their success

	Type of farm and organization						
	Dairy, Poultry, Potatoes (1)	Sheep, Dairy, Hogs, Seed (2)	Dairy and Hogs (3)	Poultry and Dairy (4)	Poultry and Dairy (5)	Poultry and Bees (6)	Alfalfa hay (7)
Labor income	2,202	1,419	1,588	1,269	433	347	549
Size of business							
Gross receipts	8,778	3,673	4,257	2,995	2,062	4,166	2,567
No. cows	19	7	19	5	6	6	4
No. hens	550	60	50	325	325	700	20
No. sheep	.....	72	.....	.....	.....	.....	.....
No. hogs	.....	27	6	.....	.....	.....	.....
No. horses	6	3	3	2	3	4	5
Receipts per unit							
Receipts per cow	198	134	191	240	129	95	145
Receipts per hen	4.07	4.10	3.00	4.28	3.47	4.10	1.25
Receipts per $100 inv.							
In cows	126	150	151	124	168	108	97
In poultry	400	415	300	466	347	255	.....
In sheep	.....	131	.....	.....	.....	.....	.....
In hogs	.....	167	105	.....	.....	.....	.....
Economy of production							
Expense per $100 gross income	65	44	47	47	49	73	45
Gross income per crop acre	56	99	109	153	59	112	39
Gross value per acre all crops except pasture	31	20	23	34	14	19	20
Total expenses per crop acre	37	44	51	72	29	62	18
Net income per crop acre	19	55	58	81	30	30	21

Note: Farm No. 7 selected because it is a specialized hay farm. It is used for comparison only and does not represent a type of farming recommended for the district.

Farm costs and farm accounting schools. Six farm account demonstration schools were held in four counties during the year 1926. Attendance was 80. In 1927 similar schools were held in Crook, Deschutes, and Klamath counties. Simple and effective methods of keeping business records were explained and those in attendance recorded their own inventories and entered at least two pages of receipts and expenses representative of the district concerned.

Enterprise efficiency work. During 1927 two meetings were held in Washington county with egg producers for the purpose of discussing

efficiency factors and costs of egg production. The material for these meetings was based upon the study on cost of egg production in Oregon made by the Agricultural Experiment Station.

Conferences were held with pear growers in Jackson county to present efficiency practices in pear production and to explain methods of keeping records on a pear farm. The data given out and recommendations made were based on a study covering the cost of producing pears on 58 Jackson county orchards in the Rogue River Valley.

The farm management specialist made a study of apple prices in the Hood River Valley and presented this study to the State Horticultural society meeting at Hood River, December 13, 1927.

FARM CROPS

General crops such as cereals, hay, and forage provide by far the greatest portion of Oregon's agricultural income. This is especially true when the relation of these crops to income from dairy and livestock is considered. Practically all Extension work in this field is based on the field demonstration plan. Associated with the demonstrations have been crop tours, field meetings, press articles, and winter meetings to discuss results. The number of crops demonstrations arranged in the past five years is summarized below:

Year	Number of demonstrations
1922	600
1923	1,202
1924	1,009
1925	1,169
1926	1,852
1927	1,320

Grade standardization and seed improvement. The ultimate goal of the work in grain standardization is to reduce the varieties of grain grown commercially in the state to those recommended by the Agricultural Experiment Station and to see that an adequate supply of pure seed of these varieties is available in every district.

Federation and Hard Federation wheats. These two varieties were unknown in 1920 and were grown on more than 180,000 acres in 1927. They have become standard in Oregon and were established through the crops demonstration methods carried on by county agents with the assistance of the Extension crops specialist.

Markton oats. Markton oats, a smut-proof variety, was demonstrated or tested in 1927 in practically every county east of the Cascade Mountains. Because of its smut-proof qualities and high-yielding ability the acreage of this variety is increasing. In Union county it has outyielded all other varieties and is rapidly becoming standard. It was one of the two high-yielding varieties in Wallowa county and in Central Oregon.

Hannchen and Trebi barley. Hannchen and Trebi are two barley varieties which county agents in the state have been emphasizing—Hannchen for Western Oregon and Trebi for the irrigated lands of Eastern Oregon. The advantages of growing barley as a feed crop rather than

spring wheat or oats have been emphasized especially because of the superior yielding qualities of barley. Western Oregon usually seeds about 60,000 acres of spring oats, most of which is used for home feed. The usual experience has been that two acres of Hannchen barley in this district will produce as much feed as three acres of spring oats. A summary of the acres of Hannchen barley seeded in each of the five years 1922 to 1926 inclusive is given below:

INCREASE OF HANNCHEN BARLEY ACREAGE

Year	Acres seeded
1922	3,000
1923	4,500
1924	5,500
1925	11,500
1926	16,800

Trebi barley has been expanded through the demonstration method in the irrigated sections and the moist sub-irrigated sections of Eastern Oregon. It stands up better than most of the varieties, is of better quality, and yields more. The increase in acreage for this variety is shown in the table below:

TREBI BARLEY ACREAGE INCREASE

Year	Acres seeded
1922	1,200
1923	3,100
1924	4,413
1925	9,200
1926	9,500

Grain certification. The grain certification work conducted by the Extension Service is a vital part of the grain standardization project in that supplies of pure seed of desired and recommended varieties are located. The extent of this work by years from 1918 is shown in the table below.

GRAIN CERTIFICATION BY YEARS

Year	Number of counties	Acres passed
1918	5	12,563
1919	6	14,400
1920	11	19,036
1921	14	23,170
1922	18	23,505
1923	18	25,004
1924	20	22,038
1925	22	26,817
1926	16	4,839
1927	16	8,990

Potato standardization and improvement. Production of improved commercial and seed potatoes has been advanced by county agents in all the potato counties of the state. Noteworthy progress has been made during the years 1926 and 1927 in a development of improved seed in Klamath, Lake, Clackamas, Multnomah, Wallowa, and Union counties. In Washington, Deschutes, Crook, and Umatilla counties, where this

work has been progressing for several years, effective results have been noted.

Potato improvement in Washington county. Effectiveness of systematic work in this project is illustrated in Washington county, where potato improvement has been a major project for seven years. Before this work was started Washington county potatoes gave poor yields and were of low grade. Difficulty was experienced in marketing them. This situation has been reversed. Washington county potatoes are now known for their quality and find a ready market. The table that follows shows results on this project.

POTATO IMPROVEMENT, WASHINGTON COUNTY

Year	Farmers co-operating	Farmers having potatoes passed as nearly disease free	Acreage passed as nearly disease free
1921	22	None	None
1922	34	1	2
1923	26	4	17
1924	11	8	32⅝
1925	41	10	33¾
1926	62	31	97
1927	107	49 Certified 12 Standard	139.2 62.7

Potato certification. Inspection of potato fields entered for certification together with listing the fields that fulfill the requirements for certification is an essential part of the Extension Service potato standardization and seed improvement project. A summary of the certification service by years since 1920 is given in the following table:

POTATO CERTIFICATION BY YEARS*

Year	Acres inspected	Number growers entered	Passed field inspection		
			Acres certified seed	Acres standard seed	Number of growers
1920	3,735	119	208	-----	-----
1921	1,354	288	-----	-----	-----
1922	3,025	517	558	-----	85
1923	1,367	223	159	-----	28
1924	1,650	207	172	407	101
1925	1,871	266	272	613	128
1926	2,368	342	359	775	175
1927	3,026	412	655⅝	544⅝	216
Total	18,396	2,374	2,383⅝	2,349⅝	733

*Does not include bin inspection.

Many of the leading potato buyers prefer to operate in those sections where certified seed has been distributed, claiming that the stock is so much better that they can afford to pay several dollars a ton more than in other districts. Leading potato dealers are now advocating the use of certified seed.

Potato expansion in Klamath county. An outstanding development in potato production is found in Klamath county, where expansion of the potato acreage has been a project concentrated upon during the past three years. In 1924 Klamath county grew 600 acres of potatoes and in 1927, 5000 acres. Reasons back of this development are that a sandy

loam soil and a high altitude permit production of an excellent quality potato which finds a ready market in California—a market which can be reached at relatively low freight cost. To keep up the quality of production and yield, potato certification was extended to Klamath county for the first time during 1927. Fifty-five acres met the requirements for certified seed and 27 acres met the requirements for standard seed.

Forage crop improvement. The ultimate goals in this phase of the crops project are to have 100,000 acres of Grimm alfalfa in Western Oregon and plant no other alfalfa than Grimm in Eastern Oregon; at least 10 percent of the present cultivated area utilized for pasture and to increase pastures in certain dry-land areas; to supplant grain and wild hay with vetch and clover in the Coast counties; expand the use of recommended soiling crops for summer feed and increase the use of roots for winter feed.

Outstanding work in forage crops has been the expansion of the Grimm alfalfa acres in Western Oregon, and of Japanese millet in Coast counties, and the increase in acreage of productive pastures throughout the state.

Grimm alfalfa. As a result of the Extension Service program during the past several years the acreage of Grimm alfalfa has been constantly increasing until there are now more than 30,000 acres of this variety in Oregon. Experiment Station results in the high elevations of central and south central Oregon and in the Blue Mountain region as well as in Western Oregon show that Grimm outyields common alfalfa at least one ton per acre. Field results show, too, that Grimm is of better quality than common, stands pasturing better, and maintains a stand for a longer period. The acreage of Grimm alfalfa in this state is entirely a product of Experiment Station and Extension Service activities. Demonstrations arranged by county agents have been largely responsible for the increase that has been noted. A summary of the demonstration work by years since 1919 is shown in the accompanying table.

DEMONSTRATIONS OF GRIMM ALFALFA

Year	Pounds of Grimm seed sold	Number of counties	Number of demonstrations
1919	40,000	2	.....
1920	9,618	5	.....
1921	6,931	6	60
1922	10,217	6	81
1923	70,675	10	164
1924	65,250	17	318
1925	68,185	21	512
1926	72,400	24	710
1927	85,000	25	356

All Western Oregon counties showed marked advancement in their alfalfa acreage. This has been especially true in Washington county, where in 1923 there were 55 acres of this crop while in 1927 at least 4,000 acres were recorded. Yamhill county increased its alfalfa acreage by 1200 acres in 1927. Polk county had 100 acres of alfalfa in 1925 and grew 800 acres in 1927. In Western Oregon alfalfa meets a twofold need—a need for more legume hay and for a summer green feed either as a soil-

ing crop or in the form of pasture for dairy cattle, hogs, and sheep at a time when practically no other green feed is available.

Japanese barnyard millet. Japanese barnyard millet, the merits of which were determined at the Astoria Branch Experiment Station, has been introduced and expanded as a soiling crop in all of the Coast counties by the respective county agents. Practically all the agricultural income in these Coast counties is that derived from dairying. By far the greater portion of the area of these counties is devoted to pastures to maintain dairy cows. In Tillamook county, for instance, 74,000 of the 85,000 acres in farms are devoted to pasture and only 11,000 acres to the production of field crops. In most years the critical season for dairymen is from July 15 to late September when the fall rains come. During this period pastures dry up and cows drop sharply in production.

Experiment Station results and experiences of dairymen all along the Coast who have conducted demonstrations in the use of Japanese barnyard millet prove that dairy profits can be very largely increased by the use of this soiling crop. In Tillamook county there were only four acres of the millet grown in 1925 while in 1927, 200 acres were recorded providing sufficient green feed for 2000 cows. Similar progress has been made in Clatsop county. An acre of this crop provides sufficient green feed for 10 cows for two months.

Pasture crops. A survey in the state shows that there are few crops, particularly under irrigated conditions, which give a larger per-acre return than do pastures used with dairy cows or sheep. Results of demonstrations in Eastern Oregon indicate that Ladino clover, where sufficient water is available, gives highest carrying capacity, sweet clover being second, followed by mixed grass pastures. Blue-grass and white clover, the prevailing pastures used, bring up the rear.

During the year 1927, county agents arranged 324 pasture demonstrations. In 1926, 227 of these demonstrations were in operation. Either tours or field meetings were arranged to view these demonstrations. Records of carrying capacity were kept in many instances and wide publicity was given to those records and to the grass mixture or the variety of clover used.

ACREAGE OF IRRIGATED PASTURES IN OREGON

Year	Acres seeded
1922 (estimated)	1,000
1923	1,700
1924	3,515
1925	2,005
1926	1,910

Ladino clover has played an important part in the pasture demonstration program. In Crook county carrying capacity of a five-acre field of this crop under irrigation was 5⅓ cows per acre for four months. In the Willamette Valley two or three acres of Ladino clover under irrigation will provide sufficient pasture for an average dairy herd through the dry summer season until soiling crops are available. This crop is also adapted to the river bottoms and tide-lands of the Coast counties. During the year 1927, 163 Ladino clover demonstrations were established in 14 counties by the respective county agents, who distributed a total of 1,690 pounds of seed.

Winter blue-grass being tested. In Jackson county and throughout Southern Oregon, a demonstration meeting arranged by the county agent and attended by 100 farmers focused attention on poa bulbosa, or winter blue-grass. Under conditions which prevail in this section of mild winters, this grass, which grows during the winter months and remains dormant during the summer months, offers great possibilities as a winter pasture grass and as a seed grass, the seed to be used for golf courses and greens in the southern portions of the United States. There are now 100 acres of it in Jackson county, 60 acres of which yielded 600 pounds of seed per acre in 1927. Demonstrations of it have been established by county agents in all of the Southern Oregon counties and in a number of counties in the Coast district.

Seed production. The objective in this part of the farm crops program is to make small seed production the major cash crop on the irrigated lands; in the Willamette Valley to expand the growing of grass seeds on white lands as a substitute for the short-time pastures found there; and to establish in the state the production of Grimm alfalfa seed in sufficient quantities to meet state requirements.

Production of clover and grass seeds has been especially noticeable on the irrigated lands of Crook, Deschutes, Malheur, Lake, and Klamath counties. In Deschutes county, for instance, where there was no small seed harvested five years ago, more than 50,000 pounds of red clover, alsike clover, white clover, alfalfa, and mixed grass seeds were harvested in 1927. It is estimated that in 1928, 1000 acres of Deschutes county land will be producing small seed. In Klamath county 50 acres of red clover were harvested for seed in 1927, the first to be threshed in that county. In Lake county the production of clover seed has become a regular part of the farming program.

Control of crop diseases. Work in control of crop diseases has included notable results in the cases of wheat smut and clover mildew.

Wheat smut. In the strictly wheat sections of the state 95 percent of the wheat is now treated for smut with copper carbonate rather than bluestone or formaldehyde. Better stands, less weeds, greater yields, and saving in time are advantages listed for copper carbonate. There is no advantage in better control of smut. Spread in the use of copper carbonate is not so great in Western Oregon where smut is not so much a factor in wheat production and where the farms are small, making it difficult for farmers to purchase commercial treating machines.

Spread of the copper carbonate treated acres of wheat is shown in the accompanying table.

DEMONSTRATIONS OF COPPER CARBONATE METHOD OF CONTROLLING WHEAT SMUT

Year	Number of demonstrations	Acres of wheat treated with copper carbonate
1920	0	0
1921	88	125
1922	252	38,845
1923	14	305,075
1924	16	525,000
1925	0	650,000
1926	0	780,000

Clover mildew control. Clover mildew, which has become a serious menace to the clover seed production enterprise, has been controlled by methods which grew out of tests established by county agents in Josephine and Malheur counties. This disease reduces seed yields from one to two bushels per acre. Cost of treating ranges from 50 cents to one dollar per acre. The sulfur dust control method is in general use in Josephine and Malheur counties and is being extended to all other counties where the disease is prevalent.

Sixteen clover mildew control demonstrations were arranged in five counties in 1927 as follows:

Benton	1
Deschutes	3
Klamath	3
Lane	3
Malheur	6

Weed control. Throughout the state and particularly in the summerfallow wheat-growing districts, perennial weeds, such as wild morning-glory and Canada thistle, are becoming more and more a problem. As a means of testing various methods of control, county agents in 11 counties established 61 weed control demonstrations. Various methods were utilized in these demonstrations including a number of sprays, carbon bisulphide, salt, and clean cultivation. While in some instances 100 percent kills were obtained, results were not found to be uniform.

In Umatilla county, the agent discovered puncture vine, one of the most serious weeds found in the United States, and took immediate steps for its eradication in that county.

HORTICULTURE

The horticultural program of the Extension Service during the years 1926 and 1927 revolved around three phases of fruit growing: (1) balancing production with marketing possibilities, (2) standardization upon the most desirable varieties, (3) economic production.

Balancing production and marketing. Problems of greater diversity and better balance between production and marketing received due consideration at the agricultural economic conferences and outlook conferences held during the years 1926 and 1927. Analysis of the horticultural situation in Yamhill, Union, and Columbia counties and on the Umatilla Irrigation Project in Umatilla and Morrow counties was made in this period and programs of horticultural development were worked out. These development programs included recommendations for diversification or adjusting horticultural production, better production methods for improving the quality and decreasing the cost of production per unit of produce.

Standardization upon most desirable varieties. A list of varieties of fruits recommended for the different fruit producing regions of the state was completed during the year 1927. These varieties are being made known by county agents through economic conferences, news articles, and meetings.

The districts covered and the varieties recommended for each are herewith listed:

FOR COMMERCIAL USE IN WILLAMETTE VALLEY

Apples: Yellow Newtown, Ortley, Red Gravenstein, Red Delicious.
Pears: Bartlett, Anjou, Bosc, Winter Nelis.
Cherries: Royal Ann (Napoleon) with suitable pollenizers, Montmorency.
Peaches: J. H. Hale, Elberta, Crawford, Muir.
Strawberries: Gold Dollar, Oregon, Marshall, Ettersburg 121.
Prunes and plums: Italian, Petite (improved).
Raspberries: Red: Cuthbert.
Black Caps: Plum Farmer, Munger, Cumberland.
Grapes: Campbells Early, Agawam, Worden, Delaware.
Gooseberries: Oregon.
Loganberry:
Blackberry: Evergreen.

FOR COMMERCIAL USE IN THE COLUMBIA RIVER BASIN, OREGON

Apples:
Pears: Bartlett, Anjou, Bosc.
Cherries: Royal Ann (Napoleon), Bing, Lambert, (with suitable pollenizers).
Peaches: J. H. Hale, Orange Cling, Elberta.
Strawberries: Clarke's Seedling, Marshall.
Prunes and plums: Italian.
Raspberries: Red: Cuthbert.
Black Caps: Cumberland, Plum Farmer, Munger.
Grapes: Concord.
Gooseberries: Oregon.

FOR COMMERCIAL USE IN HOOD RIVER VALLEY

Apples: Yellow Newtown, Spitzenburg, Red Delicious, Arkansas Black, Winter Banana.
Pears: Bartlett, Anjou, Bosc, Winter Nelis.
Cherries: Royal Ann (Napoleon), Bing, Lambert, (with suitable pollenizers).
Peaches: J. H. Hale.
Strawberries: Clarke's Seedling, Ettersburg 121.
Prunes and plums: Italian.
Raspberries: Red: Cuthbert.

FOR COMMERCIAL USE IN THE COASTAL REGION, OREGON

Apples: Red Gravenstein, Winter Banana, King.
Pears: Bartlett.
Strawberries: Oregon, Marshall, Ettersburg 121.
Raspberries: Red: Cuthbert.
Black Caps: Plum Farmer, Cumberland, Munger.

FOR COMMERCIAL USE IN GRANDE RONDE VALLEY

Apples: Winesap, Rome, Red Delicious, Jonathan.
Cherries: Royal Ann (Napoleon), Bing, Lambert, (with suitable pollenizers).
Strawberries: Marshall, Trebla, Clarke's Seedling.
Prunes and plums: Italian.
Raspberries: Red: Cuthbert.
Black Caps: Munger, Cumberland, Plum Farmer.

FOR COMMERCIAL USE IN SNAKE RIVER VALLEY, OREGON

Apples: Winesap, Rome, Red Delicious, Arkansas Black, Jonathan.
Cherries: Royal Ann (Napoleon), Bing, Lambert, (with suitable pollenizers).
Prunes and plums: Italian.

FOR COMMERCIAL USE IN UMPQUA VALLEY

Apples: Yellow Newtown, Spitzenburg, Winter Banana, Jonathan.
Pears: Bartlett, Anjou, Bosc, Winter Nelis.
Cherries: Royal Ann (Napoleon), Bing, Lambert, (with suitable pollenizers).
Strawberries: Gold Dollar, Oregon, Marshall.
Prunes and plums: Italian, Petite (improved).
Raspberries: Red: Cuthbert.
Black Caps: Cumberland, Munger, Plum Farmer.
Grapes: Flame Tokay, Malaga.

FOR COMMERCIAL USE IN ROGUE RIVER VALLEY

Apples: Yellow Newtown, Winesap, Red Delicious, Winter Banana.
Pears: Bartlett, Anjou, Bosc, Winter Nelis, Comice, Seckel.
Cherries: Royal Ann (Napoleon), Bing, Lambert, Montmorency, (with suitable pollenizers).
Peaches: J. H. Hale, Crawford, Muir. Elberta, Phillips Cling.
Strawberries: Gold Dollar, Marshall, Ettersburg 121.
Raspberries: Red: Cuthbert.
Black Caps: Cumberland, Munger, Plum Farmer.
Grapes: Flame Tokay, Malaga.
Blackberries: Evergreen.

FOR COMMERCIAL USE IN WALLA WALLA VALLEY, OREGON

Apples: Winesap, Red Rome, Red Delicious, Arkansas Black, Winter Banana, Jonathan.
Pears: Bartlett, Anjou, Winter Nelis, Flemish Beauty.
Cherries: Royal Ann (Napoleon), Bing, Lambert, (with suitable pollenizers).
Peaches:
Strawberries: Clarke's Seedling.
Prunes and plums: Italian.
Raspberries: Red: Cuthbert.
Black Caps: Cumberland, Plum Farmer, Munger.

Economical production. Efficient production is the first problem of the fruit grower. This phase of the horticulture project aims at more effective soil management, more systematic pruning and training, general use of timely application of sprays, pest control in accord with recommendations of the Agricultural Experiment Station, and establishment of more systematic thinning of fruit including apples, pears, apricots and peaches.

Pruning. The long or high renewal system of pruning advocated by the College is well established in all of the 14 counties of the state where horticulture is a major enterprise.

In the year 1926, 36 pruning demonstrations were conducted with an attendance of 980. This work was continued during 1927. Advantages of the pruning method shown at these demonstrations are: quality (especially color) is improved and the yield is increased because of greater bearing surface.

Orchard soil management. The soil management phase of economic orchard and small fruit production is recognized as one of the major means of increasing yields per acre thereby decreasing cost of production. County agents with the assistance of the Extension horticultural specialist have emphasized early plowing as a means of conserving soil moisture and of increasing the quality and size of the fruit crop. More cover crops and straw and more constructive use of commercial fertilizers are other things especially emphasized.

During the year 1926, 24 general orchard management meetings were conducted by county agents attended by 1,549 fruit growers. Similar meetings were held during 1927.

Results of the soil management program are illustrated in the orchard of D. G. Lilley, a Washington county prune grower, who has cooperated with the Extension Service during the past six years in putting into effect the soil management recommendations.

The orchard in which this work was conducted consisted of a seven-acre tract of 35-year-old trees. During the six years Mr. Lilley has been

acting as a demonstrator, his yields have averaged a little better than two and one-fourth tons of dried prunes per acre, and his sizes have run forty-fifties and larger. In 1926, which was a notoriously dry year, he received twenty and three-fourths tons of dried fruit, of which one-half were forty-fifties and larger. For this crop he received four and one-half cents per pound, and his production costs amounted to a little less than three and one-half cents per pound. In other words, Mr. Lilley made twenty-one and one-half percent on his prune crop from a thirty-five year old orchard, in addition to wages, interest on his investment, depreciation on equipment, and all other items of cost, cash or non-cash. This profit was made during a year of notoriously low prices and exceptional drought. This is an example of what the soil improvement and pruning work are doing for those growers who are putting it into effect. It is apparent that this phase of work is as important in the horticultural industry as any of the other features, such as marketing, varieties, standardization, and the like.

Pest control. Campaigns to control the cherry fruit-fly were carried on both in 1926 and in 1927. Cherrymen of the state almost unanimously say that these campaigns have been effective and have resulted in delivery of practically no cherries carrying maggots.

The control of the strawberry root-weevil has received attention by county agents in strawberry sections. Ten tons of bait were used in the Gresham district in 1927. This work was carried on also in Washington, Clackamas, Polk, and Benton counties.

Thinning work. As a result of continued demonstrations apple growers have generally adopted thinning as an annual practice. The work has also been carried on with pear and apricot growers.

Spray residue removal. During the year 1926 enforcement of Federal regulations limiting the amount of arsenical residue on certain fruits created an emergency activity. County agents in every important fruit area rendered maximum service in an effort to protect growers' interests. In most of the counties the agents were deputized as dairy and food commissioners and assumed the responsibility of taking samples, having them inspected for arsenical residue and issuing certificates of approval or ordering reconditioning as a result of inspection. In the summer and fall of 1927 county agents with the assistance of the Extension horticultural specialist held a series of spray residue meetings previous to harvest in the important pear and apple producing communities of the state. Status of spray residue removal was explained and the necessity of preparing for the task emphasized.

POULTRY HUSBANDRY

Oregon has experienced great development in commercial poultry keeping during the past decade. In this period Oregon changed from an importer of eggs to a state producing a large surplus most of which must find a market 3,000 miles across the continent. Improvement in the quality, size, and color of eggs produced in Oregon has become a problem of paramount importance and it was to this end along with improved marketing that the efforts of the Extension poultry specialist and county agents in all parts of the state have been directed in recent years.

Poultry Extension work has been organized to bear directly on many outstanding problems that have developed along with expansion of the state's poultry industry. Among the major objectives that have been held in view are: (1) Improvement of management practices so that strong, vigorous, healthy and well matured pullets may be reared. This is basic. (2) Discouragement of intensified poultry farming on small acreages. (3) Development of side-line flocks of not less than 400 hens and commercial flocks of not less than 1,000 hens. (4) Encouragement of the present system of cooperative marketing of eggs. Security of the poultry industry in Oregon depends upon the success in marketing the surplus. (5) Control of coccidiosis through use of a concrete yard during the brooding season.

Progress toward these objectives has been marked in recent years. Some measurable results are listed as follows:

There has been practically no new development of poultry farms on small acreage tracts.

Of the commercial poultrymen who brood 500 chicks or more 85 percent are using portable houses, alternate yards or concrete yards, to avoid damages to young stock caused from soil contamination.

Of the commercial poultrymen 80 percent are moving their pullets to free range on new soil after the brooding period of 8 to 10 weeks.

During the year 1926 the Oregon Accredited Hatchery and Certified Breeders corporation was organized and placed in successful operation. As a result of the work of this corporation purchasers of baby chicks will be protected against inferior breeding and disease-infected stock. The corporation was accomplished through a special committee of the Oregon Poultrymen's association.

The Pacific Cooperative Poultry Producers' Association has expanded materially in membership and volume of eggs handled, a development that is traced in part at least to support extended by the Extension Service.

Concentrated poultry producing areas were established in Josephine and Deschutes counties by the respective county agents and the Extension poultry specialist in 1926. Such centralization of production simplifies problems of marketing, encourages introduction of improved management practices and contributes to the feasibility of cooperative purchase of feeds and similar supplies. In 1921 there were two commercial poultry farms in the Josephine county district while in 1926 the number had increased to 31 owning 10,815 hens. In Deschutes county a survey showed 129 poultry keepers owning 18,827 hens. Twenty-seven new poultry houses were built in 1926 in the Deschutes area.

RODENT, PREDATORY ANIMAL, AND PEST CONTROL

Campaigns against harmful rodents, predatory animals, and other crop-destroying pests in most counties of the state formed an important part of county agents' activities during the years 1926 and 1927. Cooper-

ation of the United States Biological Survey was had in the control of rodents and predatory animals.

Squirrel-poisoning campaigns. County agents mixed and distributed squirrel poison, keeping supplies of poisoned grain on hand and distributing additional supplies as the need required to poison depots located in various communities in their respective counties. The extent of poisoned grain distribution during the years 1926 and 1927 is indicated below:

Activity	1926	1927
Pounds of grain distributed	106,460	111,155
Number of farmers using poisoned grain	10,463	8,148
Number of counties involved	30	27
Cost of the grain used	$11,355	$10,369
Pounds of cyanide used	17,178	6,505

Gophers and moles. During the years 1926 and 1927 control of gophers assumed considerable importance in Benton, Deschutes, Grant, Jackson, Josephine, Lake, Malheur, Polk, Wasco, Umatilla, Washington, and Yamhill counties. Four hundred and twelve ounces of poison were used in conducting gopher-poisoning demonstrations in the two years.

Jack-rabbits. In several of the sage-brush counties of Eastern Oregon jack-rabbits are a menace to crops. During dry summers particularly, they migrate from the sage-brush areas into the irrigated districts and cause serious damage. In the winter time, when the snow covering makes feed rather scarce, they come into the haystacks and it is not unusual to see the stacks almost undermined. Thus, rabbit-poisoning work is a constant necessity. During some seasons conditions are not such as to permit effective work but in 1927 rather uniformly good results were experienced. This was true particularly in Malheur county, where 1,110 ounces of strychnine were used in poisoning rabbits. This work reached practically every community where rabbits constituted a serious crop pest. Poisoning campaigns were also conducted on a more limited scale in Lake, Klamath, Morrow, and Umatilla counties.

Coyotes. County agents in all counties where coyotes are found have been active in arranging control demonstrations and in obtaining the cooperation of stockmen and county officials in the support of Federal hunters. In most of the county agent offices in Eastern Oregon a supply of tasteless strychnine is carried for distribution to sheepmen and trappers. Instructions are also given out on the method of preparing baits. Results of this work are difficult to measure but reports of success are frequently made. For instance, a rancher in Grant county killed five coyotes in one night by placing baits around one carcass.

SOILS

The soils project as carried on by county agents and the Extension soils specialist includes work in soil fertility, drainage, and irrigation. This project is recognized as one of fundamental importance inasmuch as profitable production can be obtained only on fertile and well drained soil even though the right varieties and best growing methods are used.

Drainage. The drainage problem in Oregon consists in aiding in the reclamation of the wet lands, which amount to about 500,000 acres on the Coast, in the lake counties and along the lower Columbia and other streams, and approximately two million acres in the Willamette Valley, other valleys of Western Oregon and the irrigated valleys of Eastern Oregon. Altogether there are at least three million acres of wet land that can be reclaimed or greatly improved by drainage.

Extension work in drainage has been divided into two phases. First, working out underdrainage or tile drainage systems on individual farms and, second, working out community or drainage district problems. Below is a summary of the tile drainage work during the years 1926 and 1927.

Nature of work	1926	1927
Number of farm drainage projects established	19	38
Acres involved	700	1,127
Feet of tile designed	83,240	35,000
Feet of open ditch	69,000	48,700

A very successful phase of drainage work during these two years was the demonstration of effectiveness of the use of explosives in blasting drainage ditches (see Agricultural Engineering, pages 225-226).

Irrigation. Problems pertaining to irrigation to which the county agents and the soils specialist have given attention are divided into three units. First, to bring about the use of more efficient methods of distributing water on thousands of acres of land under gravity projects already established in Oregon. Second, to study the need of farmers in non-irrigated sections of the state and to determine whether or not irrigation waters can be obtained at a cost which will permit of an agriculture more profitable than that which now prevails. Third, to give assistance in the installation of individual pumping and gravity units and the distribution of water from such units where previous investigations show that they will be profitable enterprises.

Expansion of the irrigated acreage in Western Oregon was a significant development during the years 1926 and 1927. There are some 800 acres of land in the vicinity of Eugene producing vegetables for cannery purposes. In this enterprise irrigation has been found to be immensely profitable. The irrigated pasture program in connection with irrigation development in Western Oregon is rapidly becoming one of the major incentives for installation of irrigating systems. Ladino clover had never been raised with any degree of success in the Willamette Valley until under the advice of the Lane county agricultural agent Enoch Nulf in northern Lane county seeded a six-acre field to Ladino clover and irrigated it. From this field Mr. Nulf harvested 900 pounds of seed, which was sold at one dollar per pound; in addition excellent pasture was furnished for three to four months. In the Greenwood community in Polk county W. O. Morrow irrigated a one and three-quarter acre field of alfalfa by use of a five-inch centrifugal pump and took from that field four cuttings during the season of 1927. His total yield was 4½ tons of hay to the acre.

During the year 1927 county agents and the Extension soils specialist gave assistance to 26 farmers in the installation of irrigation systems involving 1125 acres. Sixteen of the 26 systems are in the Willamette Valley.

Soil fertility. Major objectives of extension work in soil fertility are, first, to establish soil management practices on Oregon farms which will maintain fertility of the newer lands and build up the fertility of the old crop lands and, second, to carry on demonstrational and test work in the use of commercial fertilizers so as to show their place in the farming program and also to protect farmers against expenditures for fertilizers which will not bring a return commensurate with the investment.

Cover crop fertilizer trials. Work in soil fertility which is being received with widespread interest and offers promise of holding great economic importance is the demonstration of cover crop fertilizers in orchards. This demonstration program is being carried on by the various county agents in cooperation with the fertilizer department of Swift and Company and some of the other fertilizer concerns.

This project has been conducted during the past two years and will be continued for a five-year period. Its purpose has been to demonstrate in the various fruit-growing districts that commercial fertilizers can be used profitably to increase the growth of cover crops and thereby build up soil fertility in orchards low in fertility. In establishing the plots it has been the policy to apply fertilizers at the rate of about $6.00 per acre, rather than put on a certain number of pounds of different fertilizers. This work has been carried on in fourteen different orchards, located in eight different counties. Results in 1927 showed that sulfate of ammonia applied in February at 150 pounds per acre gave better yields than any other fertilizing material when a cereal was seeded alone or with vetch.

Fertilizers on potatoes. In 1926 fertilizer demonstrations with potatoes were conducted on 26 different farms in Crook, Deschutes, Malheur, Multnomah, Klamath, Clackamas, Washington, Linn, and Umatilla counties. In 1927, 24 such demonstrations were laid out and carried to completion in seven counties.

Alfalfa fertilizers. While sulfur as a fertilizer for alfalfa is beyond the demonstration stage in Southern and Central Oregon it is an outstanding example of county agent work in the state. County agents still aid in assembling orders for sulfur although it has now become a regular article of commerce. During the year 1927, 18 alfalfa fertilizer demonstrations were established in seven Western Oregon counties and the results were measured and recorded.

Use of lime on legumes. The successful production of vetch and clover in the Coast counties has been established through the use of lime and inoculation of seed. A fundamental phase of county agent work in every Western Oregon county has been that associated with the increase of legume crops such as clover, alfalfa and vetch badly needed to feed adequately the dairy cattle and maintain fertility. This project has been made effective through the establishment of demonstrations in various communities showing that by the use of lime and inoculation legume production is successful.

During the year 1926 Western Oregon county agents reported 701 tons of lime purchased in their counties. That figure does not include Polk and Marion counties, where farmers hauled direct from the state lime plant at the penitentiary. In 1927 county agents reported the use of 790 tons of lime.

HOME ECONOMICS EXTENSION WORK

Home economics extension is the newest branch of organized project work conducted by the Extension Service. It is conducted through any community organization which will make the necessary local arrangements and hold the meetings in some centrally located hall or home, inviting all the women of the community. Home Economics Extension work is most frequently done through women's clubs, granges, farmers' union locals, parent-teacher associations, ladies' aid societies, and similar groups. The work is outlined on a project basis, including clothing, home improvement, foods and nutrition, and miscellaneous activities.

CLOTHING

The purpose of the work in the clothing project has been to impart: (1) A knowledge of the fundamentals of color, line, texture and pattern selection sufficient to enable a woman to adapt the materials now available to her needs and to the needs of the family. (2) Assistance in analyzing needs and determining values. (3) A working knowledge of efficient clothing construction principles.

A summary of work accomplished on the clothing project for the years 1926 and 1927 follows. The clothing specialist resigned March 31, 1927 and her place was not filled.

CLOTHING PROJECT SUMMARY 1926 AND 1927

	1926	1927
Communities served	93	59
Meetings held	217	159
Attendance at meetings	3,494	1,695
Articles made	1,093	974
Savings reported (by comparison with purchased articles)	$3,199	$2,843
Families adopting better practices	1,528	.....
Women adopting better practices	.....	965
Girls adopting better practices	.....	138

HOME IMPROVEMENT

This project includes work in kitchen improvement, living-room improvement, house planning, house sanitation, rural engineering, and more attractive home grounds. Work on this project has been conducted through lectures, demonstrations, testing circles, home visits, demonstration houses, and exhibits.

In 1926 this work was carried on in 33 communities of the state. Ninety-nine homes reported adoption of improved practices in home management, while 55 followed a systematized plan of work for the first time and 77 obtained additional equipment. A total of eight kitchens were rearranged and five homemakers kept accounts and made budgets.

Improved practices in home furnishings were reported by 59 homes and 37 living-rooms were improved. A total of seven homes reported installation of water systems and septic tanks.

In the year 1927 home improvement work was carried on in 38 communities of the state. A total of 101 meetings were held in these communities with an attendance of 3,770, representing 1,467 different families. Practices discussed and recommended at these meetings were adopted by 808 women and 10 girls.

The Josephine county home demonstration agent planned as a part of her work during 1927 a type of demonstration house different from the usual. This house was located just across the road from the county fair grounds and was open for inspection during the three days of the fair. It was developed not as a demonstration of the best way of furnishing and finishing a home but as the cheapest way of making an attractive interior. The house originally had three rooms with an unattractive interior in poor condition. Furniture which was borrowed and bought was in a dilapidated condition. When completed and opened for inspection the house and furniture represented a cost as to the homemaker of $24.28. A barrel and pump hot water system was installed at a cost as to the homemaker of $22.41. Labor costs in refinishing furniture, making curtains and rugs, and installing the water system were not included in these totals. A thousand people visited the house and expressed their delight, approval, and amazement at the transformation wrought.

FOODS AND NUTRITION

Family food selection, food preservation, health clinics, and food in relation to health are lines of work included under this project.

During the year 1926, 53 groups of women totaling 1,183 individuals met with the Extension specialist in nutrition and with home demonstration agents to study family food selection problems. A total of 123 meetings were arranged in connection with that phase of the project, the total attendance being 2,068. Improved nutrition practices were adopted by 360 families. In all phases of food and nutrition work that year 920 homes reported adoption of improved practices.

In 1927 nutrition work was carried on in 108 communities of the state; 266 meetings were held in connection with the project; and the attendance totaled 7,062, representing 2,247 families. A total of 1,042 homes reported adopting improved nutrition practices.

MISCELLANEOUS HOME ECONOMICS EXTENSION WORK

Homemakers institutes. These institutes were first organized in 1925 and proved very popular. The program usually was of three days' duration. In general each morning was given over to clothing and nutrition or other home economics subjects with an hour in the afternoon devoted to health talks and an hour to inspirational addresses. In 1926 institutes were held in Washington, Union, Klamath, and Jackson counties. Total attendance was 2,060 with 868 different women registered.

In 1927 a similar institute was held in Clatsop county with an attendance of 284.

Portland Extension classes. In 1926 two Home Economics courses were given in Portland by members of the School of Home Economics staff. One was on child care and training by Mrs. Sara W. Prentiss, assistant professor of household administration. A total of 183 different people registered as auditors and 45 registered for credit.

The second course was in foods and nutrition given by Mrs. Jessamine Chapman Williams, head of the foods and nutrition department at the College. There were a total of 134 auditors and 15 registered for credit.

Miscellaneous meetings. In 1926 members of the Extension Service home economics staff participated in 138 meetings other than those having to do with organized project work. Total attendance was 13,559. In 1927, 96 meetings of this kind were recorded with a total attendance of 6,177.

DEPARTMENT OF INFORMATION AND VISUAL INSTRUCTION

This department of the Extension Service was created in July, 1923 as the Office of Information and Exhibits. Activities have been assigned to it from time to time until it now includes distribution of slides and films, direction of radio programs, preparation of news articles pertaining to Extension Service project work and a program service for rural organizations.

Slide and film service. The aim has been to develop the use of films and slides as an aid to the accomplishment of projects to which the Extension Service is committed. Films and slides have been extensively used by members of the Extension staff, especially the county extension agents. Groups before which College slides or films have been shown include parent-teacher associations, high schools, grade schools, granges, community clubs, chambers of commerce, and farmers' unions. No charge is made for use of College-distributed slides and films except that the user pays transportation costs both ways.

Film service. The Extension Service has acted as a depository and a distributing agent for College-owned motion picture films since 1920. In addition to College-owned films the Extension Service during the years 1926 and 1927 has distributed films lent by the United States Department of Agriculture and various industrial and commercial concerns. The use of films distributed by the Extension Service has steadily increased as is shown in the accompanying table.

SEVEN-YEAR COMPARATIVE STATEMENT OF FILM SERVICE

	1921	1922	1923	1924	1925	1926	1927
Number of films available for distribution	23	28	20	37	49	85	126
Total film attendance	16,246	12,590	5,572	11,525	19,473	80,672	139,190
No. of different meetings where films were shown	.....	.....	.....	.....	.....	.....	291
Total attendance at meetings where films were shown	.....	.....	.....	.....	.....	.....	35,513
Number of different counties served	7	23	10	19	15	31	27
Number of different communities served	.....	.....	.....	.....	.....	.....	163

Note: Attendance of fairs, included in above total film attendance, was as follows:

1921	1350		
1922	0	1925	3600
1923	0	1926	1208
1924	300	1927	28050

Slide service. There has been comparatively little expansion in the slide service since 1920, when distribution of slides was first undertaken by the Extension Service. Some sets have been discarded and other subjects added while in other cases old sets have been brought up-to-date.

The record of slide distribution since 1920 is shown in the accompanying table.

SEVEN-YEAR COMPARATIVE STATEMENT OF SLIDE SERVICE, 1920-1927

	1920	1921	1922	1923	1924	1925	1926	1927
Number of sets available for distribution	53	50	51	53	54	55	46	61
Attendance at meetings	3,194	3,023	5,260	9,456	2,465	1,933	8,190	10,652
Attendance automatic baloptican at fairs	.....	.....	295,000	316,250	227,000	140,000	50,000	67,000
Counties served	20	16	22	21	14	7	14	21
Communities served	.....	24	29	56	23	9	72	71

Radio. A 500-watt College broadcasting station was completed in the late summer of the year 1925 and was placed in operation October 2 of that year. Programs from this station, KOAC, were broadcast on Monday, Wednesday, and Friday nights through the year 1926 and until September 26, 1927, when the station went to a five-night schedule including Monday, Tuesday, Wednesday, Thursday, and Friday of each week.

Emphasis in KOAC's programs has been placed on those things in which the College is peculiarly fitted to serve the state. It has been the special and distinctive aim of the program director to extend the benefits of this institution into the thousands of homes of the state equipped with radio receiving sets. Programs are confined to the work and activities of the several schools and departments of the College.

Below is given a summary of the total time KOAC was on the air and kinds of material broadcast in the academic years 1925-26 and 1926-27.

TIME ON THE AIR AND CLASSIFICATION OF PROGRAMS FOR YEARS 1925-26 AND 1926-27

Type of broadcast	October 2, 1925 to August 1, 1926	September 13, 1926 to September 23, 1927
Agricultural lectures, service material, and news	51 hours 37 minutes	81 hours 40 minutes
Boys' and girls' club programs	3 hours 33 minutes	17 hours 19 minutes
Lectures and service material other than agricultural	59 hours 9 minutes	94 hours 25 minutes
Entertainment (music, readings, athletic games)	59 hours 40 minutes	61 hours 31 minutes
Miscellaneous programs	12 hours 4 minutes	46 hours 41 minutes
Total time on the air	186 hours 12 minutes	301 hours 36 minutes

Note: 1. "Miscellaneous" programs include special announcements and introduction of program numbers.

2. KOAC was silent between August 1, 1926 and September 13, 1926.

During the period October 2, 1925 to August 1, 1926 a total of 119 different faculty members appeared before KOAC's microphone 361 times.

In the period September 13, 1926 to September 23, 1927, 101 different faculty members appeared a total of 630 times. Distribution of these appearances by schools and departments is shown in the accompanying table.

SUMMARY OF FACULTY PARTICIPATION

1926=October 2, 1925 to July 28, 1926.
1927=September 13, 1926 to September 23, 1927.

Schools	Departments 1926	Departments 1927	Number of different faculty members 1926	Number of different faculty members 1927	Total number of appearances 1926	Total number of appearances 1927	Total time on the air 1926	Total time on the air 1927
Agriculture (other than Extension Service)	11	8	35	23	154	213	31 hrs. 3 min.	41 hrs. 35 min.
Extension Service	....	....	12	20	44	182	9 hrs. 35 min.	40 hrs. 39 min.
Basic Arts and Sciences	4	7	11	14	25	92	6 hrs. 39 min.	22 hrs. 9 min.
Commerce	5	3	9	5	20	48	4 hrs. 57 min.	20 hrs. 8 min.
Chemical Engineering	....	1	....	1	....	1	.....	15 min.
Engineering	5	7	9	17	15	27	3 hrs. 50 min.	6 hrs. 2 min.
Forestry	2	1	4	1	4	2	44 min.	21 min.
Home Economics	3	2	18	3	61	5	16 hrs. 45 min.	1 hr. 19 min.
Mines	....	2	....	3	....	14	.....	3 hrs. 29 min.
Pharmacy	....	1	....	1	....	1	.....	17 min.
Vocational Education	1	....	2	....	4	....	53 min.	.....
Department, Physical Education—Men	1	....	....	4	....	33	.....	6 hrs. 20 min.
Department, Physical Education—Women	1	....	3	1	6	1	1 hr. 38 min.	18 min.
Department, Library	1	....	11	6	23	9	3 hrs. 41 min.	1 hr. 18 min.
Other departments	....	....	5	2	5	2	1 hr. 19 min.	35 min.
Totals	34	32	119	101	361	630	81 hrs. 4 min.	144 hrs. 45 min.

The favor with which College radio programs are received is typified by extracts from 19 letters selected from 683 examples of listener correspondence. These follow:

Ed. Graville, Junction City, Oregon, Route 4, October 6, 1927:

"I am pleased with KOAC's new broadcasting schedule. When you added late Associated Press dispatches you sure hit the right spot. They give a farmer some idea of what is happening and sure fill a long-felt want."

Mr. and Mrs. David Francis, Creswell, Oregon, October 6, 1927:

"This note is in appreciation of your cooperation with the granges of Oregon and with Mrs. Bond. We were delighted when we heard of your plan and have enjoyed the programs as broadcasted, and are making plans for many radio parties this winter in order that others may listen in too. We wish to assure you that we are proud of our Agricultural College."

George M. Brown, Salem, Associate Justice, Oregon Supreme Court, October 13, 1927:

"While listening in the other evening I heard your historical talk on the air and I desire to express my appreciation thereof . . . I believe that the Oregon State College is rendering a public service in supplying programs so entertaining and informative in character."

Mrs. Mary M. Burns, Albany, Oregon, 426 Denver Street, October 27, 1927:

"KOAC has become my favorite station and I never fail to see what you are doing."

Mrs. C. W. Hay, Philomath, Oregon, November 3, 1927:

"I listen in on KOAC and enjoy the programs very much, especially the 'Chats with the Homemaker.'"

J. W. Willbroad, Route 2, Box 22, Aurora, Oregon, November 9, 1927:

"I listen every night to KOAC. The suggestions I received through you on getting my hogs to eat worked fine. The hogs eat to beat the band now."

Isabel Evans, Granite, Oregon, November 14, 1927:

"I hope I am not too late to get one of your radio cook books. I live several miles from the postoffice so don't get to send out mail very often since we are snowbound. Radio is our only sure way of hearing from the outside world for the next five months."

P. A. Phesson, Halsey, Oregon, November 17, 1927:

"Your broadcasting programs are my greatest evening pleasure —instructive and educational. Just the thing for a farmer, and all to be had just for the turning of a knob."

Mrs. C. L. Lerwill, Brownsville, Oregon, November 23, 1927:

"We are regular listeners to KOAC's programs. Especially like Dr. Horner's history talks."

Mrs. J. C. Dowdell, Stryker, Montana, December 2, 1927:

"Your programs are very beneficial and much enjoyed, and we have received much enjoyment as well as enlightenment from KOAC which comes in here very good in comparison with other stations."

Glen DeHaven, Dallas, Oregon, December 3, 1927:

"I listen to your instructive lectures and varied programs and wish to express my appreciation. I consider that you have arranged well balanced programs and I enjoy hearing over the air voices that I have heard in person on former occasions."

Mrs. Cyrus H. Kramer, 1510 Palou Avenue, San Francisco, California, December 7, 1927:

"I will further state that my husband and myself always enjoy listening to your station as you always have such interesting subjects."

Howard Painter, Shedd, Oregon, Route 1, December 9, 1927:

"I listen in on KOAC every night and like the programs very much."

E. S. Lowden, Crawfordsville, Oregon, December 15, 1927:

"We have a radio and listen in on your programs. There are very few of them, I tell you, that we don't get some good points from. Keep up the good work."

Mrs. Ray Beisell, Marcola, Oregon, December 15, 1927:

"I wish to thank the college for their fine radio programs."

V. C. Canfield, Eugene, Oregon, March 1, 1928:

"We enjoy your *air talks* on poultry raising very much."

Charles Sterling, Brownsville, Oregon, March 12, 1928:

"Enjoy your noon programs on KOAC. Sure comes in strong over here."

Mrs. Ella Herron, Junction City, Oregon, Route 4, March 9, 1928:

"We like your programs very much. The lectures are good. The radio is certainly a great invention."

Mr. and Mrs. W. J. Rickert, Box 21, Crow, Oregon, June 21, 1928:

"We certainly enjoy your programs at the noon hour and hope it will continue to come as it has been coming."

Program service for rural organizations. The Extension Service since June 1, 1925 has maintained a program service for rural organizations. Talks on a wide list of topics in agriculture and home economics have been outlined and reference material supporting the outlines provided. An outline and the accompanying reference material is then mailed upon order to representatives of farm organizations who request it. The aim has been to make it possible for members of organizations to give talks of interest to their groups without the necessity of calling upon outside speakers.

A summary of distribution of program material follows:

DISTRIBUTION OF PROGRAM MATERIAL FOR RURAL ORGANIZATIONS

	June 1, 1925 to May 31, 1926 (12 months)	June 1, 1926 to Nov. 30, 1926 (6 months)	Dec. 1, 1926 to Nov. 30, 1927 (12 months)
Number of different program aids available	27	28	26
Total copies requested	101	120	251
Number of Grange lecturers using the service	31	19	65
Number of Farmers' Union secretaries using the service	1	----	----
Number of community club secretaries using the service	1	----	1

NEEDS FOR ADDITIONAL SERVICE TO THE STATE

This report would be incomplete without reference to opportunities and needs for additional service to the state which cannot be rendered adequately, and in some cases not at all, with funds now available.

1. **Technical agricultural specialists.** During the past twelve years the number of county Extension employees, including agricultural agents,

boys' and girls' 4-H club leaders, and county home demonstration agents, has trebled, while the number of technical specialists in the employ of the Extension Service has stood practically stationary. The fact is significant because appropriations for county agents have been approved at budget meetings where taxpayers have sought to eliminate every item deemed non-essential. The result, however, has been an unbalanced organization. The increase in county employees increases rather than decreases the demand for technical specialists, bulletins, correspondence, educational films, lantern slides, and other services rendered by the Extension staff at the College.

We should have two Extension specialists in farm management to carry at once to all parts of the state the type of work referred to in the Farm Management section of this report.

The most conspicuous change in Oregon agriculture during the past decade has been the growth of fruit and vegetable canning business. This is highly technical. Oregon could well afford to support this growing industry by making available the services of a technical specialist familiar with fruit and vegetable varieties, use of commercial fertilizers, pest control, etc.

We derive our greatest income from farm crops and we need two specialists in this large field, one for Eastern Oregon, one for Western Oregon. There is great need for service in connection with farm machinery, farm building construction, and use of power and electricity on farms. Practice is lagging behind science in this field.

One marketing specialist is wholly inadequate. We cannot begin to meet the demands in this field. Cooperative marketing occupies a large place in the Nation's agricultural improvement program and it is unfortunate that we are not in position more adequately to meet the needs in this field in the State of Oregon.

2. **Gathering, analyzing, and disseminating market news, agricultural statistics, and other economic information.** Oregon is one of the few states that has not already set up a State Agricultural Statistical Department. Because we are a state that is far removed from the important markets of the country, and because we engage extensively in the production of specialties, we are in greater need of a statistical service than many other states. The Extension Service is going as far as it can possibly go in providing this service without additional funds. We can provide the service at less cost to the state and carry it on more effectively through our organization of county agents and specialists, than could any other agency.

We have tried to get annual reports on changes in acreage, numbers of livestock, etc., through volunteer reporters, but have found it impossible. A relatively small fund would make possible a sample annual census such as is urgently needed. The staff of specialists to handle this service would include an agricultural economist, market news analyst, secretary and file clerk, and stenographer. Extensive use of the telegraph and radio would be required. Certain statistical research should be carried on simultaneously in connection with this service because of its dependence upon basic index numbers and price studies.

Service in the field of market grades and standards should be mentioned as one of our great deficiencies at present. Here, again, great savings can be effected by utilizing Extension agencies when this needed service is established.

3. **Home economics extension.** The women of the state have protested against the small amount of service available to them compared with that received by farmers and stock men. It is, of course, not feasible to discontinue established work in order to develop new activities; nevertheless, the demand on the part of the women of the state is legitimate and justifiable and will doubtless be continued with insistence. We need specialists on our staff in such subjects as clothing, child care and training, and household management, in addition to the nutrition specialist now employed.

4. **Correspondence courses.** This is one of the few institutions not offering correspondence courses, both credit and non-credit. We have constant demand for such courses. They could be coordinated with our radio program service and made of the greatest value. At present we are without funds to establish such courses.

5. **Commercial and Industrial Extension.** One of the greatest educational opportunities open at the present time is in the field of workers' education. There is strong demand for such service. The success of the few business institutes held shows the possibilities of increased aid along that line to retail business men. Through trade group conferences the services of our Engineering and Mechanical departments should be made available to the various trade and industrial groups in the state. We can now render but meager service in any of these fields.

6. **Radio program service.** We now have a well equipped radio station and our programs can be received in practically all parts of the state. Neither our operating department nor our program department is now adequate. The situation in fact is acute and our staff members are working over time and carrying loads that cannot be continued permanently. We should look upon the radio as one of the most economical and inexpensive methods of disseminating useful and practical information to the people of the state.

Respectfully submitted,

PAUL V. MARIS,

Director of the Extension Service.

REPORT OF THE TREASURER

To the Honorable Board of Regents,

Oregon State Agricultural College,

Gentlemen: Herewith I submit my report for the biennium beginning July 1, 1926 and ending June 30, 1928. The vouchers and other evidences of payment are on file in the office of the Manager of the Business Office.

Yours respectfully,

B. F. IRVINE,
Treasurer.

The Treasurer's Report presents the accounts of the institution on the basis of the fiscal year; that is, a year beginning with July 1 of one year and ending with June 30 of the next. The biennial period covered in this report, therefore, begins with July 1, 1926 and ends with June 30, 1928.

The Income of the College is made available through State, Federal, or County appropriations and miscellaneous receipts.

Separate reports are given for each of the three principal divisions of the College organization, Resident Instruction, the Agricultural Experiment Station, and the Extension Service.

I. RESIDENT INSTRUCTION

1. From the State of Oregon.

(a) *Millage Tax Fund.*

Provided for in Chapter 136 of Oregon Laws of 1913 and in Chapter 36 of Oregon Laws of 1920. This fund covers Resident Instruction, including "payment of salaries of instructors and employees, current expenses, construction of additional buildings, purchase of land, purchase of equipment, purchase of library books and periodicals, purchase of laboratory supplies and apparatus, making necessary repairs." For 1927-28 this fund amounts to $1,220,795.

2. From the Federal Government.

(a) *Land-Grant Interest Fund.*

Through Congressional Act approved July 2, 1862, public land was granted for the endowment of land-grant colleges. The income from the sale of these lands constitutes a perpetual fund, the interest from which shall be used for education related to Agriculture and the Mechanic Arts. Approximately $10,500 is received annually from this source.

(b) *Morrill-Nelson Fund.*

Through acts of Congress dated August 30, 1890, and March 4, 1907, provision is made "for more complete endowment and maintenance" of land-grant colleges through an annual appropriation of $50,000.

3. Miscellaneous Receipts.

These include fees for short courses and summer session, reimbursements, etc.; also student tuitions, both resident and non-resident, which are placed in a Building Fund and used only for building construction. Receipts for the fiscal year 1927-28 were $249,881.

II. AGRICULTURAL EXPERIMENT STATION

1. From the State of Oregon.

(a) *For the Home Station at Corvallis.*

Section 1 of Chapter 390, General Laws of Oregon, 1927, provides "that there shall be and there is hereby appropriated out of any moneys in the general funds of the state treasury, not otherwise appropriated, in addition to that now provided by law, and subject to the classification as defined in the third state budget or by any rule or regulation adopted by the state budget commission or Oregon state board of control under Chapter 22, General Laws of Oregon, 1921, or Chapter 333, General Laws of Oregon, 1925; for the several objects and purposes hereinafter named, the following sums or so much thereof as may be necessary, for the two years commencing on the first day of January, 1927, and ending on the thirty-first day of December, 1928."

(1) "For the purpose of defraying the expenses of soil irrigation and drainage investigations, including soils surveys, fertility trials, feasibility agricultural surveys of proposed irrigation or drainage projects, irrigation and drainage investigations, including economic use of irrigation water, to aid in the most profitable development of the soil and water resources of the state, publication of reports and bulletins on the results of the investigations," annually $10,000.

(2) "For the purpose of defraying the expenses of investigation of crop pests and plant diseases and horticultural problems," annually $15,000.

(3) "For the purpose of defraying the expenses of investigations of diseases of dairy and beef cattle, the feeding and raising of dairy cattle, and any other problems of the dairy industry," annually $15,000.

(4) "For the purpose of defraying the expenses of the central experiment station of the Oregon Agricultural College at Corvallis, Oregon, for general agricultural investigations throughout the state of problems in the growing and feeding of hogs, sheep and beef cattle, the breeding and housing of poultry, problems involving chemical study, problems involving bacteriological study and such other agricultural problems as may occur from time to time and are not provided for by other appropriations," annually $25,000.

(5) "For the purpose of defraying the expenses of investigation of diseases of poultry, the feeding and raising of poultry and any other problems of the poultry industry," annually $7,500.

(b) *For Branch Stations.*

(1) Eastern Oregon Station, at Union, established by legislative enactment in 1901: present maintenance, as provided in Chapter 147, Laws 1911, annually $7,500.

(2) Harney County Station at Burns, established in 1911, as provided in Chapter 75, Laws 1911; and Chapter 250, Laws 1921, annually $8,000.

(3) Umatilla County Station, at Hermiston; required to match Federal appropriation in like amount, as provided in Chapter 96, Laws 1909, annually $3,000.

(4) Sherman County Station, at Moro, as provided in Chapter 61, Laws 1909, and Chapter 368, Laws 1921, annually $6,000.

(5) Hood River County Station, at Hood River; see Oregon Laws 1913, Chapter 224; Laws 1919, Chapter 297; and Chapter 307, Laws 1921; Chapter 362, Laws 1925, annually $12,000.

(6) John Jacob Astor Station, at Astoria, annually, as provided in Chapter 364, Laws 1925, $6,000.

(7) Southern Oregon Station, at Talent, as provided in Chapter 176, Laws 1911; Chapter 188, Laws 1919; and Chapter 367, Laws 1921, annually $12,000.

(c) *Special Appropriations.*

(1) Harney County Irrigation Project, as provided in Chapter 366, Laws 1927, $4,000.

(2) Umatilla County Crop Rotation Experiment, as provided in Chapter 402, Laws 1927, $2,000.

2. From the Federal Government.*

(a) Adams Fund: Annual appropriation for research work, through Congressional Act dated March 20, 1906, provided for specific projects of investigation approved in advance by the U. S. Department of Agriculture and fund expendable only for approved projects in fundamental research, $15,000.

(b) Hatch Fund: Annual appropriation for the support and maintenance of agricultural investigational work as per Congressional Act, approved, March 2, 1887, $15,000.

*The Adams, Hatch, and Purnell Funds are Federal appropriations to the Oregon Experiment Station. Their expenditure is under the direction of the Oregon Station, but the investigations for which the money is used must be approved by the Federal Department.

(c) Purnell Fund: Annual appropriation for the more complete endowment of agricultural experiment stations and for other purposes through Congressional Act, dated February 24, 1925. There was received from this fund $40,000 for the fiscal year ending June 30, 1928. This amount will be increased $10,000 annually until $60,000 is reached.

III. EXTENSION SERVICE

1. From the State of Oregon.

Note: There are four items in the State appropriation for Cooperative Extension Work in agriculture and home economics listed below. The first three of these were authorized under the provisions of Chapter 110 of the 1913 laws. The fourth provides definitely for the offset of Federal Smith-Lever money, the receipt of which is conditioned upon duplication by the State.

(a) *General Educational Extension.*

Sections 1 and 2 of Chapter 110, General Laws of Oregon, 1913, provide for an annual appropriation of $25,000 to "conduct and encourage educational extension, demonstration and field work." This fund is applied toward the maintenance of the staff of specialists in agriculture and home economics, directing projects in farm crops, dairying, animal husbandry, horticulture, poultry, farm management, nutrition, clothing, organization and markets, and land clearing. It is also used to defray in part the expense of educational exhibits, providing judges for fairs and stock shows, meeting the cost of correspondence and administration of Extension work. Annually $25,000.

(b) *County Extension Work.*

Section 3 of Chapter 110, 1913 Laws of Oregon, provides that the State shall duplicate money appropriated for cooperative Extension work in counties up to the amount of $2,000, and that, in counties having an area in excess of 5,000 square miles, the State shall duplicate money so appropriated up to $4,000. During the year 1928, twenty-seven counties certified to appropriations amounting to $86,479, which called for duplication by the State to the amount of $56,550. The County and State funds appropriated in this manner and supplemented by Federal funds meet the salaries and expenses of county agricultural agents, home demonstration agents, and boys' and girls' 4-H club leaders located in the various counties of the state. Appropriation during fiscal year 1927-28, $56,550.

(c) *Cooperative Farm Demonstration.*

An appropriation authorized in Section 6, Chapter 110, Laws 1913, amended and limited to $15,000 per annum by Chapter 281, Laws of 1915. In 1923 the U. S. Department of Agriculture certified to an allotment of $24,000 to the State of Oregon

for work carried on in accordance with the provisions of this act. The funds are used only in support of the projects receiving allotments from the $24,000 certified by the U. S. Department of Agriculture, and these projects are county agent work, home demonstration agent work, boys' and girls' 4-H club work, and farm management demonstration. Annually $15,000.

(d) *State Smith-Lever.*

This is so-called match money, appropriated first by authority of Chapter 198, of the General Laws of Oregon, 1919. The Smith-Lever Act of Congress makes a flat allotment to each state of $10,000 per annum, and apportions funds in addition to that amount to the several states on the basis of the percent of rural population of each state to the total rural population. All allotments in addition to the $10,000 are conditioned upon an appropriation of an equal amount by the respective states. During the two years, 1925 and 1926, Oregon received $82,600 of Federal Smith-Lever money, all but $20,000 (or $10,000 per annum) of which the state was required to duplicate. These funds are used to supplement the educational extension fund mentioned under paragraph (a) in financing the several projects carried on by the Extension Service. Appropriation for 1927 and 1928, as provided in Chapter 391, General Laws of 1927, annually $31,300.

(e) *Rodent Control.*

For the eradication of injurious rodents which are destructive and detrimental to crop and forage production, Chapter 393, Laws 1927, annually $2,500.

2. From the Federal Government.

(a) *Smith-Lever Fund.*

Under the terms of the Smith-Lever Act of Congress, there was made available for extension work in Oregon, during the year 1928, $41,300, conditioned on duplication by the State of all except $10,000. See explanation above under (d), Chapter 391, Laws of 1927.

(b) *Supplemental Federal Smith-Lever.*

By special acts of Congress, the Smith-Lever funds have from time to time been supplemented. The amount appropriated for the fiscal year beginning July 1, 1927, gives Oregon $9,925.

3. From Counties of Oregon.

Various counties to the number of 27 made appropriations totaling $86,479 for the year 1928 for Extension work within their own borders carried on cooperatively with the State of Oregon and the Federal Government. For State funds matching these county appropriations under Chapter 110, Laws 1913, see III, 1 (b) above.

OPERATION AND MAINTENANCE

The expenditures of the institution are made in accordance with approved budgets, under the following classifications:

Salaries and Wages—Including salaries of instructional and scientific staff and of administrative and clerical staff, also compensation for regular and irregular mechanical, skilled and unskilled service, and irregular clerical service.

Supplies—Including postage, stationery, office supplies, consumable supplies for class work and research and for the operation of plant, buildings, grounds and farms, and also public utility service.

Travel—Including all travel expense paid by the College for employees traveling on College business; also subsistence and transportation of employees temporarily in the field on agricultural or other experimental work.

Publications and Printing—Including the printing of forms, blanks, letterheads, etc., and the publishing of bulletins, catalogues, and circulars.

Repairs—Including materials used in expense of upkeep of property and equipment.

Equipment—Including apparatus, livestock, furniture, machinery, books, and permanent illustrative material.

Capital Outlay—Lands and buildings, including the purchase of lands, the cost of new buildings and of additions to buildings.

Purchases of supplies and equipment for all departments of the College, including Experiment Station and Extension Service, are made by the Oregon State Board of Control by authority of an act of the 1927 Legislature.

All claims in payment of payrolls and accounts are certified by the Auditing Committee of the Executive Committee of the Board of Regents, and filed with the Secretary of State, where such claims are audited and paid by State Warrant. Those on Federal funds are certified by the directors in charge of work for which the appropriation is made and paid by the Treasurer of the Board of Regents; these funds are audited annually by a representative of the U. S. Department of Agriculture. Financial accounts of the College are kept in, or supervised by, the College Business Office, reports being submitted annually to the College authorities.

DIVISION I. RESIDENT INSTRUCTION FUNDS

Resident Instruction at Oregon State Agricultural College is supported by funds derived from the Millage Tax, interest from loans made from the proceeds of the sale of lands granted by the Federal Government, the Morrill-Nelson Acts (for purposes of Resident Instruction only), and miscellaneous receipts.

CONSOLIDATED STATEMENT OF INCOME AND EXPENDITURES

	1926-27	1927-28	Totals
Balance July 1	$ 555,463.64	$ 667,115.25	$ 555,463.64
Income during the year	1,385,565.32	1,524,012.44	2,909,577.76
Total Balance and Income	$1,941,028.96	$2,191,127.69	$3,465,041.40
Total Expenditures for year	1,273,913.71	1,561,445.54	2,835,359.25
Balance July 1	$ 667,115.25	$ 629,682.15	$ 629,682.15

SUMMARY OF INCOME

	1926-27	1927-28	Totals
From the State of Oregon			
*Income under Millage Tax laws 1913 and 1920	$1,205,878.27	$1,220,795.01	$2,426,673.28
Less deduction for State restoration fund Chap. 170, Laws 1925	6,622.78	13,524.73	20,147.51
Total net income from Millage Tax	$1,199,255.49	$1,207,270.28	$2,406,525.77
From the Federal Government			$ 100,000.00
Miscellaneous			
Including student tuitions, fees for short courses and summer session, reimbursements, etc.	119,543.49	250,361.11†	369,904.60
Total Income during year	$1,385,565.32	$1,524,012.44	$2,909,577.76

Erratum, p. 263.

"Miscellaneous" *should read:*

SUMMARY OF CLASSIFIED EXPENDITURES

	1926-27	1927-28	Totals
Operation and Maintenance			
Salary and Wages	$ 944,771.30	$1,004,805.39	$1,949,576.69
Supplies	138,128.30	166,276.47	304,404.77
Travel	13,651.79	15,345.16	28,996.95
‡Publications and Printing	18,312.92	21,152.92	39,465.84
Materials for repairs	18,160.00	16,906.00	35,066.00
Equipment	28,612.72	26,796.09	55,408.81
Total Operation and Maintenance	$1,161,637.03	$1,251,282.03	$2,412,919.06
Capital outlay, Lands and Buildings	112,276.68	310,163.51	422,440.19
Total	$1,273,913.71	$1,561,445.54	$2,835,359.25

*For calendar year and contains income for first six months of succeeding year.

†Increase over previous year due mainly to increase in tuition to provide funds for new buildings.

‡Includes printing for departments.

Distribution of Expenditures

1926-27

Department	Salary and wages	Supplies	Travel	Publications and printing	Repairs	Equipment	Building and lands	Total
Administration:								
Board of Regents	$ 300.00	$ 25.25	$ 1,761.70					$ 2,086.95
President's Office	12,666.66	203.79	1,151.56			$ 86.06		14,108.07
Executive Secretary	5,791.67	114.37	71.33			142.10		6,119.47
Business Office	19,768.25	3,072.75	11.92		$ 37.05	191.42		23,081.39
Registrar	17,113.48	9,458.54	1,420.85	$ 1,035.32		829.49		29,857.68
Total	$ 55,640.06	$ 12,874.70	$ 4,417.36	$ 1,035.32	$ 37.05	$ 1,249.07		$ 75,253.56
School of Agriculture								
Dean's Office	$ 6,260.63	$ 195.24	$ 1,193.70	$ 62.34	$ 305.06	$ 138.73		$ 8,155.70
Animal Husbandry	17,154.00	18.90			69.19	85.16		17,327.25
Dairy Husbandry	19,351.41	30.00			21.73			19,403.14
Farm Crops	12,362.79	473.46	34.81		13.30	91.02		12,975.38
Farm Management	4,561.41	203.41			60.75	133.69		4,959.26
Agricultural Engineering	6,012.10	124.55			11.85	579.21	$ 183.67	6,911.38
Horticulture	23,670.04	207.56			114.13	369.61		24,361.34
Poultry Husbandry	8,043.80	178.42		20.55	.55	85.94		8,329.26
Soils	12,793.27	123.46				206.31		13,123.04
Veterinary Medicine	8,230.40	98.45				97.05		8,425.90
Total	$ 118,439.85	$ 1,653.45	$ 1,228.51	$ 82.89	$ 596.56	$ 1,786.72	$ 183.67	$ 123,971.65
School of Basic Arts and Sciences:								
Dean's Office	$ 6,161.40	$ 757.34	$ 70.06			$ 471.93		$ 7,460.73
Art and Rural Architecture	9,975.00	49.91				394.30		10,419.21
Bacteriology	10,819.20	143.76				233.16		11,196.12
Botany and Plant Pathology	17,984.06	146.63	98.52			279.62		18,508.83
Chemistry	44,467.43	237.76	10.08		$ 65.17	184.21		44,964.65
English	33,072.98	77.63		$ 22.37				33,172.98
Entomology	9,578.00		35.04			32.73		9,645.77
History	8,846.30	766.79				91.75		9,704.84
Mathematics	26,110.00	72.10				24.25		26,206.35
Modern Languages	7,200.00	21.64						7,221.64
Physics	19,996.80	125.49				1,424.54		21,546.83
Public Speaking	13,828.13	59.29				3.50		13,890.92
Radio	798.20	505.59			146.80	409.58		1,860.17
Zoology	13,543.33	85.55				1,369.13		14,998.01
Total	$ 222,380.83	$ 3,049.48	$ 213.70	$ 22.37	$ 211.97	$ 4,918.70		$ 230,797.05
School of Commerce:								
Dean's Office	$ 5,623.23	$ 841.19	$ 238.07	$ 1.81	$ 14.00	$ 230.94		$ 6,949.24
Economics and Sociology	22,847.43							22,847.43
Finance and Administration	19,100.00							19,100.00

Political Science	12,800.00							12,800.00
Secretarial Training	16,720.00							16,720.00
Total	$ 77,090.66	$ 841.19	$ 238.07	$ 1.81	$ 14.00	$ 230.94		$ 78,416.67
School of Engineering:								
Dean's Office	$ 9,746.46	$ 673.90	$ 278.55	$ 3.27	$ 7.00	$ 3,642.20		$ 14,351.38
Civil Engineering	17,533.33	7.00						17,540.33
Electrical Engineering	18,091.91							18,091.91
Highway Engineering	5,226.48	315.02						5,541.50
Industrial Arts	14,133.33	4.64				121.50		14,259.47
Mechanical Engineering	23,813.33	57.47				171.60	$ 7.57	24,049.97
Mechanics and Materials	12,528.33							12,528.33
Hydraulics and Irrigation	5,533.33							5,533.33
Total	$ 106,606.50	$ 1,058.03	$ 278.55	$ 3.27	$ 7.00	$ 3,935.30	$ 7.57	$ 111,896.22
Chemical Engineering	$ 4,900.80	$ 335.26			$ 8.50	$ 446.10		$ 5,690.66
School of Forestry	16,521.20	276.46	493.69		15.13	475.12	$ 4,649.42	22,431.02
School of Home Economics:								
Administration	7,524.13	4.16				1,348.53		8,876.82
Household Administration	9,200.00	7.33				573.73		9,781.06
Clothing and Textiles	21,000.00	10.86				229.66		21,240.52
Foods and Nutrition	12,633.33	517.77	467.55			133.83	116.20	13,868.68
Institution Economics	1,495.00							1,495.00
Total	$ 51,852.46	$ 540.12	$ 467.55			$ 2,285.75	$ 116.20	$ 55,262.08
School of Mines	$ 13,519.81	$ 161.38	$ 437.39		$ 61.70	$ 830.57		$ 15,010.85
School of Pharmacy	12,756.75	360.80	201.64			94.47		13,413.66
School of Vocational Education	29,227.57	878.81	594.00	$ 5.60	102.09	390.30		31,198.37
Industrial Journalism	10,613.78	941.56	115.32	87.93		35.00		11,793.59
Library	28,631.10	14,790.86	308.92	48.96	253.35	576.00		44,609.19
Military	3,600.00	762.66	3.85	38.25	29.60	105.75		4,540.11
Physical Education—Men	18,440.00	566.91	97.95			762.01		19,866.87
Physical Education—Women	15,650.00	5.33	269.24		186.75	225.16		16,336.48
Summer Session	12,439.93	2,782.12		1,887.06	80.25			17,189.36
General:								
Advertising		2,765.97		15.00				2,780.97
Clerical Exchange	9,295.11	7,283.31			74.45	259.06		16,911.93
College Editor	7,385.50	1,080.26	279.59	14,379.72	1.25	320.00		23,446.32
Commencements and Convocations	540.81	1,532.50						2,073.31
Dean of Men	4,564.40	320.94	256.54			112.70		5,254.58
Dean of Women	8,408.40	279.71	386.66			10.50		9,085.27
Directory Clerk	2,512.51	669.97	2,393.10	551.65				6,127.23
Exhibits	975.00	785.95	915.04	153.09	199.10			3,028.18
Housing and Equipment	2,058.40	3.60						2,062.00
Schedule Committee		192.62						192.62
Telegraph and Telephone	1,463.74	7,707.37						9,171.11
Total	$ 37,203.87	$ 22,622.20	$ 4,230.93	$ 15,099.46	$ 274.80	$ 702.26		$ 80,133.52

Distribution of Expenditures

1926-27

Department	Salary and wages	Supplies	Travel	Publications and printing	Repairs	Equipment	Building and lands	Total
Physical Plant:								
Campus	$ 13,919.29	$ 3,351.92	$ 29.22		$ 1,312.28	$ 590.04	$ 1.95	$ 19,204.70
Fire Protection	126.65	160.35	8.30		2.25			297.55
Heating	12,923.00	18,032.68			1,950.62	326.30	420.27	33,652.87
Light and Power	6,891.47	22,931.50	6.30		320.77	309.66		30,459.70
Plumbing	6,974.74	4,812.82				885.00		12,672.56
Roads and Walks	1,108.83	91.64			691.26		596.91	2,488.64
Campus Sewers	615.78				8.52		16.00	640.30
Superintendent of Buildings	66,696.37	17,396.99	11.30		11,559.55	500.00		96,164.21
Water		7,285.08						7,285.08
Capital Additions						6,952.50	106,284.69	113,237.19
Total	$ 109,256.13	$ 74,062.98	$ 55.12		$ 15,845.25	$ 9,563.50	$ 107,319.82	$ 316,102.80
Totals	$ 944.771.30	$ 138,564.30	$ 13,651.79	$ 18,312.92	$ 17,724.00	$ 28,612.72	$ 112,276.68	$1,273,913.71

Distribution of Expenditures

1927-28

Administration:								
Board of Regents	$ 300.00	$ 974.19	$ 1,106.53					$ 2,380.72
President's Office	14,200.00	265.22	506.72		$ 5.19	$ 784.05		15,761.18
Executive Secretary	6,500.00	109.36	166.42					6,775.78
Business Office	20,062.09	2,634.55	109.07		109.23	100.76		23,015.70
Registrar	19,564.71	8,391.05	2,532.14	$ 1,637.20	8.45	544.44		32,677.99
Total	$ 60,626.80	$ 12,374.37	$ 4,420.88	$ 1,637.20	$ 122.87	$ 1,429.25		$ 80,611.37
School of Agriculture:								
Dean's Office	$ 6,266.95	$ 96.32	$ 1,982.80	$ 88.90	$ 34.08	$ 357.34		$ 8,826.39
Animal Husbandry	17,776.79	43.76				89.67		17,910.22
Dairy Husbandry	22,094.06							22,094.06
Farm Crops	9,868.52	156.22			17.11	74.46		10,116.31
Farm Management	6,195.00	19.72				70.80		6,285.52
Agricultural Engineering	6,300.00	21.47				249.91	$ 5.55	6,576.93
Horticulture	29,138.09	153.72			38.94	338.75		29,669.50
Poultry	8,714.57	254.70		37.46	5.46	281.90		9,294.09
Soils	13,279.37	451.68			104.28	281.45		14,116.78
Veterinary Medicine	8,420.00	142.91			36.26	228.75		8,827.92
Total	$ 128,053.35	$ 1,340.50	$ 1,982.80	$ 126.36	$ 236.13	$ 1,973.03	$ 5.55	$ 133,717.72

School of Basic Arts and Sciences:								
Dean's Office	$ 6,400.00	$ 998.54	$ 571.42	.....	$ 7.75	$ 380.79	.....	$ 8,358.50
Art and Rural Architecture	11,236.50	44.39	.....	.....	.....	253.02	.....	11,533.91
Bacteriology	11,276.70	52.46	.....	.....	.....	509.03	.....	11,838.19
Botany and Plant Pathology	17,869.63	311.50	.....	.....	.....	275.06	.....	18,456.19
Chemistry	45,440.68	196.73	.....	.....	.....	174.02	.....	45,811.43
English	33,423.30	150.81	.....	.....	.....	180.74	.....	33,754.85
Entomology	9,305.00	167.96	.....	.....	.....	354.00	.....	9,826.96
History	12,013.55	799.57	.....	.....	.....	106.24	$ 39.43	12,958.79
Mathematics	26,676.67	111.50	.....	.....	.....	.....	.....	26,788.17
Modern Languages	9,100.00	21.85	.....	.....	.....	.....	.....	9,121.85
Physics	19,355.00	56.79	.....	.....	.....	1,023.07	.....	20,434.86
Public Speaking	16,173.63	91.01	.....	.....	.....	84.34	.....	16,348.98
Radio	4,681.00	.....	.....	.....	6.00	448.14	.....	5,135.14
Zoology	14,300.00	45.75	.....	.....	.....	703.07	.....	15,048.82
Total	$ 237,251.66	$ 3,048.86	$ 571.42	.....	$ 13.75	$ 4,491.52	$ 39.43	$ 245,416.64
School of Commerce:								
Dean's Office	$ 6,033.84	$ 592.75	$ 769.90	$ 8.10	$ 433.11	$ 3.20	.....	$ 7,840.90
Economics and Sociology	23,422.50	.....	.....	.....	.....	.....	.....	23,422.50
Finance and Administration	20,460.00	.....	.....	.....	.....	.....	.....	20,460.00
Political Science	11,420.00	.....	.....	.....	.....	.....	.....	11,420.00
Secretarial Training	16,494.90	.....	.....	.....	.....	.....	.....	16,494.90
Total	$ 77,831.24	$ 592.75	$ 769.90	$ 8.10	$ 433.11	$ 3.20	.....	79,638.30
School of Engineering:								
Dean's Office	$ 9,412.04	$ 1,174.64	$ 981.75	$ 1.82	$ 23.48	$ 4,196.53	.....	$ 15,790.26
Civil Engineering	24,170.00	30.00	.....	.....	.....	.83	.....	24,200.83
Electrical Engineering	15,846.90	.....	.....	.....	.....	.....	.....	15,846.90
Highway Engineering	5,613.82	405.54	.....	.....	3.94	.....	.....	6,023.30
Industrial Arts	14,070.32	.....	.....	.....	.....	.....	.....	14,070.32
Mechanical Engineering	21,150.00	.....	.....	.....	.....	.....	.....	21,150.00
Mechanics and Materials	12,410.20	.....	.....	.....	.....	.....	.....	12,410.20
Engineering Experiment Station	1,589.50	107.40	.....	221.56	11.78	397.44	.....	2,327.68
College Mechanician Shop	.....	.50	.....	.....	.....	.....	.....	.50
Total	$ 104,262.78	$ 1,718.08	$ 981.75	$ 223.38	$ 39.20	$ 4,594.80	.....	$ 111,819.99
Chemical Engineering	$ 4,569.10	$ 578.54	$ 32.10	.....	$ 3.72	$ 718.32	.....	$ 5,901.78
School of Forestry	17,760.05	379.22	550.19	13.85	4.80	699.38	.....	19,407.49
School of Home Economics:								
Dean's Office	$ 8,103.23	$ 24.31	$ 42.59	.....	.....	14.18	.....	8,184.31
Household Administration	10,054.38	.....	.....	.....	.....	.....	.....	10,054.38
Clothing and Textiles	15,100.00	1.91	.....	.....	.....	.....	.....	15,101.91
Foods and Nutrition	14,400.00	741.84	468.39	.....	.....	108.04	.....	15,718.27
Institution Economics	1,695.00	.....	.....	.....	.....	.....	.....	1,695.00
Total	$ 49,352.61	$ 768.06	$ 510.98	.....	.....	$ 122.22	.....	$ 50,753.87
School of Mines	$ 14,557.57	$ 523.02	$ 344.24	.....	$ 24.76	$ 123.57	.....	$ 15,573.16

Distribution of Expenditures (*continued*)

Department	Salary and wages	Supplies	Travel	Publications and printing	Repairs	Equipment	Building and lands	Total
School of Pharmacy	15,452.38	421.33	290.46			91.28		16,255.45
School of Vocational Education	32,732.61	1,616.49	1,089.04		1.00	1,139.80		36,578.94
Industrial Journalism	11,618.95	982.99	198.30	$ 88.61	.75	32.50		12,922.10
Library	28,437.42	18,923.55	16.50	6.41	63.76	103.71	$ 5.40	47,556.75
Military	3,600.00	895.51			225.01	42.74		4,763.26
Physical Education—Men	17,690.66	7,235.23	196.80					25,122.69
Physical Education—Women	16,341.67	401.10	108.45			62.98		16,914.20
Summer Session	14,057.17	3,057.71	46.00	2,038.51				19,199.39
General:								
Advertising		$ 3,005.68						3,005.68
Clerical Exchange	$ 5,451.70	6,689.43			25.57	2,203.18		14,369.88
College Editor	8,713.44	3,230.52	100.46	14,485.73		259.97		26,790.12
Commencement and Convocations		2,240.62						2,240.62
Dean of Men	5,330.10	288.27	256.16			71.00		5,945.53
Dean of Women	8,059.44	254.93	831.89	7.81				9,154.07
Directory Clerk	4,423.16	747.71	118.76	2,404.53				7,694.16
Exhibits	200.00	1,303.22	1,071.64	52.19	25.00	511.07		3,163.12
Housing and Employment	1,540.40			5.34				1,545.74
Schedule Committee		93.82		54.90	3.60			152.32
Telegraph and Telephone	1,767.06	8,730.65						10,497.71
Extension Service	1,701.20	36.55	685.15					2,422.90
Graduating Committee	131.60	18.43						150.03
Total	$ 37,318.10	$ 26,639.83	$ 3,064.06	$ 17,010.50	$ 54.17	$ 3,045.22		$ 87,131.88
Physical Plant:								
Campus	$ 14,668.62	$ 2,886.79			$ 621.01	$ 329.49	$ 458.67	$ 18,964.58
Fire Protection	196.04	.47						196.51
Heating	13,963.93	18,550.85			1,634.07		129.86	34,278.71
Light and Power	8,758.03	20,012.00	24.35		3,579.71	36.00		32,410.09
Plumbing	9,990.19	12,631.12				1,773.60		24,394.91
Roads and Walks	6,174.96	145.25			2,097.24		10,226.48	18,643.93
Campus Sewers	1,649.22	22.90			2.33			1,674.45
Superintendent of Buildings	77,890.28	24,347.22	114.54		7,748.61			110,100.65
Water		6,182.73						6,182.73
Capital Additions			32.40			5,983.48	299,298.12	305,314.00
Total	$ 133,291.27	$ 84,779.33	$ 171.29		$ 15,682.97	$ 8,122.57	$ 310.113.13	$ 552,160.56
Totals	$1,004,805.39	$ 166,276.47	$ 15,345.16	$ 21,152.92	$ 16,906.00	$ 26,796.09	$ 310,163.51	$1,561,445.54

DIVISION II. AGRICULTURAL EXPERIMENT STATION FUNDS

The Agricultural Experiment Station of Oregon State Agricultural College at Corvallis receives its financial support from the State of Oregon and the Federal Government.

The branch experiment stations within the State receive appropriations from the State of Oregon and receipts from sales of miscellaneous farm crops, produce and livestock.

Consolidated Statement of Income and Expenditures

	1926-27	1927-28	Total
Balance July 1	$ 42,273.48	$ 56,995.92	$ 42,273.48
Total Income for year	245,592.75	266,906.63	512,499.38
Total Balance and Income	$ 287,866.23	$ 323,902.55	$ 554,772.86
Total Expenditures for year	230,870.31	261,510.65	492,380.96
Balance July 1	$ 56,995.92	$ 62,391.90	$ 62,391.90

Summary of Income

From State:	1926-27	1927-28	Total
Agricultural Investigations, Chap. 369, p. 737, Laws 1925	$ 25,000.00	$ 25,000.00	$ 50,000.00
Crop Pests, Chap. 369, p. 737, Laws 1925	15,000.00	15,000.00	30,000.00
Dairy Investigations, Chap. 369, p. 737, Laws 1925	12,500.00	15,000.00	27,500.00
Soils Investigations, Chap. 369, p. 737, Laws 1925	8,750.00	10,000.00	18,750.00
Poultry Investigations, Chap. 381, p. 778, Laws 1925	6,250.00	7,500.00	13,750.00
Harney County Irrigation Project, Chap. 366, Laws 1927	2,000.00	4,000.00	6,000.00
Umatilla County Crop Rotation Experiment, Chap. 402, Laws 1927	1,000.00	2,000.00	3,000.00
John Jacob Astor Branch Station, Chap. 364, Laws 1925	6,000.00	6,000.00	12,000.00
Eastern Oregon Branch Station, Chap. 147, Laws 1911	7,500.00	7,500.00	15,000.00
Harney County Branch Station, Chap. 250, Laws 1921	8,000.00	8,000.00	16,000.00
Hood River Branch Station, Chap. 362, Laws 1925	12,000.00	12,000.00	24,000.00
Moro Dry Farm Branch Station, Chap. 368, Laws 1921	6,000.00	6,000.00	12,000.00
Southern Oregon Branch Station, Chap. 367, Laws 1921	12,000.00	12,000.00	24,000.00
Umatilla Branch Station, Chap. 96, Laws 1909	3,000.00	3,000.00	6,000.00
Total from State	$ 125,000.00	$ 133,000.00	$ 258,000.00
*From Federal Grants:			
Adams Act 1906	$ 15,000.00	$ 15,000.00	$ 30,000.00
Hatch Act 1887	15,000.00	15,000.00	30,000.00
Purnell Act 1925	30,000.00	40,000.00	70,000.00
Total from Federal Grants	$ 60,000.00	$ 70,000.00	$ 130,000.00

*The Federal Government also cooperates in the work of the branch stations of Sherman county and Umatilla county, expenses of which are paid direct.

Summary of Income (*continued*)

	1926-27	1927-28	Total
From Sales:			
Central Station	$ 31,724.73	$ 38,932.18	$ 70,656.91
John Jacob Astor Branch Station	2,958.99	2,516.77	5,475.76
Eastern Oregon Branch Station	15,116.68	12,610.54	27,727.22
Harney County Branch Station	935.00	1,600.00	2,535.00
Hood River Branch Station	2,227.05	2,137.89	4,364.94
Moro Dry Farm Branch Station	1,205.75	510.00	1,715.75
Southern Oregon Branch Station	1,361.37	2,601.55	3,962.92
Umatilla County Branch Station	5,063.18	2,997.70	8,060.88
Total from Sales	$ 60,592.75	$ 63,906.63	$ 124,499.38
Grand Total	$ 245,592.75	$ 266,906.63	$ 512,499.38

Summary of Classified Expenditures

	1926-27	1927-28	Total
Operation and Maintenance:			
Salaries and Wages	$ 158,289.28	$ 188,537.29	$ 346,826.57
Supplies	40,621.63	43,053.38	83,675.01
Travel	13,092.09	12,419.17	25,511.26
Publications and Printing	1,450.23	2,254.69	3,704.92
Repairs	161.87	2,806.66	2,968.53
Equipment	10,574.42	8,456.34	19,030.76
Total Operation and Maintenance	$ 224,189.52	$ 257,527.53	$ 481,717.05
Capital Outlays:			
Buildings	6,680.79	3,983.12	10,663.91
Grand Total	$ 230,870.31	$ 261,510.65	$ 492,380.96

Distribution of Expenditures
1926-27

Department	Salary and wages	Supplies	Travel	Publications and printing	Repairs	Equipment	Buildings	Total
Agricultural Investigations	$ 20,083.85	$ 557.72	$ 630.63	$ 87.93		$ 51.25	$ 14.79	$ 21,426.17
Crop Pests	13,622.73	582.06	650.21	764.99		349.57	110.79	16,080.35
Dairy Investigations	7,639.70	1,594.03	341.98	11.45		217.50		9,804.66
Soils Investigations	4,579.72	1,322.51	1,099.45			1,107.20	199.37	8,308.25
Poultry Investigations	4,319.60	1,006.18	16.15			931.63		6,273.56
Harney County Irrigation Project	682.50	836.54				2,268.24	530.80	4,318.08
Umatilla County Crop Rotation			30.80					30.80
John Jacob Astor Branch Station	5,624.78	1,382.61	80.16			153.50	137.28	7,378.33
Eastern Oregon Branch Station	13,695.73	5,360.71	421.48	74.54		1,078.25	1,112.64	21,743.35
Harney County Branch Station	5,661.00	1,637.67	180.00	3.75		299.83	342.37	8,124.62
Hood River Branch Station	9,692.00	2,609.10	759.09			774.00	1,447.18	15,281.37
Moro Dry Farm Branch Station	5,059.57	177.46	7.05			17.99		5,262.07

Southern Oregon Branch Station	9,211.99	2,249.19	231.89			93.08	168.45	11,954.60
Umatilla County Branch Station	2,375.40	4,886.91	165.08	18.05		1.50	174.45	7,621.39
Miscellaneous	9,067.48	11,540.80	2,922.27	434.93		854.56	2,442.67	27,262.71
Adams	11,997.99	1,827.09	43.22			1,131.70		15,000.00
Hatch	12,532.71	1,116.80	1,083.61		$ 161.87	105.01		15,000.00
Purnell	22,442.53	1,934.25	4,429.02	54.59		1,139.61		30,000.00
Total	$ 158,289.28	$ 40,621.63	13,092.09	$ 1,450.23	$ 161.87	$ 10,574.42	$ 6,680.79	$ 230,870.31

DISTRIBUTION OF EXPENDITURES

1927-28

Agricultural Investigations	$ 23,159.65	$ 1,398.24	$ 545.78	$ 416.75	$ 3.97	$ 299.11		$ 25,823.50
Crop Pests	11,747.52	1,028.76	1,192.80	284.89	141.10	245.40	$ 216.44	14,856.91
Dairy Investigations	11,824.27	3,372.39	764.45			72.80	102.62	16,136.53
Soils Investigations	5,761.04	1,503.51	1,198.38	182.85	325 93	486.38	206.68	9,664.77
Poultry Investigations	6,408.31	1,132.06	470.56	247.51		430.50		8,688.94
Harney County Irrigation Project	1,801.37	742.55			71.18	367.14	392.28	3,374.52
Umatilla County Crop Rotation			153.46					153.46
John Jacob Astor Branch Station	5,367.50	2,203.80	96.90	40.67	58.70	327.63	193.13	8,288.33
Eastern Oregon Branch Station	17,018.29	4,413.16	345.36		294.48	107.72	1,951.54	24,130.55
Harney County Branch Station	6,644.31	1,697.97	144.00		72.08	980.94	663.48	10,202.78
Hood River Branch Station	10,609.60	2,392.73	588.49	19.42	383.33	367.50		14,361.07
Moro Dry Farm Branch Station	7,294.28							7,294.28
Southern Oregon Branch Station	9,890.28	2,670.31	340.71		169.68	308.39	60.25	13,439.62
Umatilla County Branch Station	2,049.90	2,664.02	358.40		13.02	169.20		5,254.54
Miscellaneous	13,364.38	12,375.91	1,826.35	58.84	1,234.09	784.58	196.70	29,840.85
Adams	13,700.63	896.65	18.24		39.10	345.38		15,000.00
Hatch	12,389.15	1,998.24	446.61			166.00		15,000.00
Purnell	29,506.81	2,563.08	3,928.68	1,003.76		2,997.67		40,000.00
Total	$ 188,537.29	$ 43,053.38	$ 12,419.17	$ 2,254.69	$ 2,806.66	$ 8,456.34	$ 3,983.12	$ 261.510.65

DIVISION III. EXTENSION SERVICE FUNDS

The Extension Service of Oregon State Agricultural College is the agency for carrying the work of the College and the Agricultural Experiment Station to the people of the State and is supported by moneys derived from State, Federal, and County funds.

CONSOLIDATED STATEMENT OF INCOME AND EXPENDITURES

	1926-27	1927-28	Total
Balance July 1	$ 64,739.36	$ 82,877.36	$ 64,739.36
Total Income for year	292,464.05	275,913.84	568,377.89
Total Income and balance	357,203.41	$ 358,791.20	$ 633,117.25
Total Expenditures for year	274,326.05	290,927.67	565,253.72
Balance July 1	$ 82,877.36	$ 67,863.53	$ 67,863.53

Summary of Income

	1926-27	1927-28	Total
From State Appropriations			
General Educational Extension, Chapter 110, Sec. 2, Laws 1913	$ 25,000.00	$ 25,000.00	$ 50,000.00
Cooperative Farm Demonstration Laws 1913-15	15,000.00	15,000.00	30,000.00
County Extension, Chapter 110, Sec. 3, Laws 1913	56,750.00	56,550.00	113,300.00
State Smith-Lever, Laws 1925-1927	31,300.50	31,300.50	62,601.00
Rodent Control, Laws 1925-1927	2,500.00	2,500.00	5,000.00
Total from State Appropriations	$ 130,550.50	$ 130,350.50	$ 260,901.00
*From Federal Grants:			
Smith-Lever Federal Act 1914	$ 51,224.89	$ 51,224.89	$ 102,449.78
From Counties, Chapter 110, Sec. 3, Laws 1913	89,438.38	86,479.30	175,917.68
From Miscellaneous	21,250.28	7,859.15	29,109.43
Total Receipts	$ 292,464.05	$ 275,913.84	$ 568,377.89

*The Federal Government also allots certain funds for cooperative extension work in Oregon which are disbursed directly by the Government and are therefore not included above. The items and amounts of these funds for the fiscal year 1927-28 were as follows: Farmers Cooperative Demonstration $22,900.00; Demonstrations on Reclamation Projects $4,800.00; Rodent Control $13,000.00.

Summary of Classified Expenditures

	1926-27	1927-28	Total
Operation and Maintenance			
Salaries and Wages	$ 189,928.01	$ 200,476.51	$ 390,404.52
Supplies	22,851.19	25,149.87	48,001.06
Travel	56,291.96	59,595.77	115,887.73
Publications and Printing	2,279.93	1,795.67	4,075.60
Equipment	2,974.96	3,909.85	6,884.81
Total Operation and Maintenance	$ 274,326.05	$ 290,927.67	$ 565,253.72

Distribution of Expenditures by Projects

1926-27

Project	Salary and wages	Supplies	Travel	Publications and printing	Equipment	Total
Administration	$ 23,455.70	$ 5,297.65	$ 3,373.61	.....	$ 826.23	$ 32,953.19
Publications	1,239.00	177.76	.....	$ 2,117.09	.....	3,533.85
Information and Exhibits	11,837.75	952.02	3,721.97	.....	570.95	17,082.69
County Agents	93,533.39	10,935.94	27,698.34	162.84	1,437.22	133.767.73
Home Demonstration	4,752.27	640.84	2,785.90	.....	45.70	8,224.71
Clothing	1,950.00	29.21	644.53	.....	.....	2,623.74

Nutrition	2,412.64	27.72	951.48			3,391.84
Boys' and Girls' Clubs	26,588.39	3,476.86	9,205.94		71.59	39,342.78
Soils	1,453.00	78.63	625.02		9.90	2,166.55
Horticulture	4,000.00	40.51	1,280.35			5,320.86
Animal Husbandry	3,200.00	9.69	978.31			4,188.00
Dairy Husbandry	2,666.67	107.00	1,171.45		2.25	3,947.37
Poultry Husbandry	3,600.75	42.69	951.07			4,594.51
Farm Crops	751.50	39.15	330.30			1,120.95
Farm Management	900.00	144.17	607.19			1,651.36
Agricultural Economics	6,771.80	729.18	1,198.73		11.12	8,710.83
Agricultural Engineering	8.00	10.80	20.90			39.70
Rodent Control	807.15	111.37	746.87			1,665.39
Total	$ 189,928.01	$ 22,851.19	$ 56,291.96	$ 2,279.93	$ 2,974.96	$ 274,326.05

Distribution of Expenditures by Funds

1926-27

Fund	Salary and wages	Supplies	Travel	Publications and printing	Equipment	Total
Educational Extension	$ 15,407.43	$ 1,916.69	$ 4,187.14	$ 570.11	$ 210.01	$ 22,291.38
Cooperative Farm Demonstration	9,588.99	2,750.39	2,212.04		23.16	14,574.58
State Smith-Lever	31,100.62					31,100.62
Federal Smith-Lever	30,098.57	3,593.07	14,980.75	1,546.98	1,005.52	51,224.89
County Extension (State Appropriation)	42,113.50	1,766.18	9,206.22		320.36	53,406.26
County Extension (County Appropriations)	51,788.73	9,643.37	22,552.45	162.84	1,210.99	85,358.38
Rodent Control	807.15	111.37	746.87			1,665.39
Miscellaneous	9,023.02	3,070.12	2,406.49		204.92	14,704.55
Total	$ 189,928.01	$ 22,851.19	$ 56,291.96	$ 2,279.93	$ 2,974.96	$ 274,326.05

Distribution of Expenditures by Projects

1927-28

Project	Salary and wages	Supplies	Travel	Publications and printing	Equipment	Total
Administration	$ 22,204.96	$ 4,878.52	$ 2,947.17		$ 2,205.76	$ 32,236.41
Publications	1,152.00	244.58		$ 1,250.11		2,646.69
Information and Exhibits	10,572.90	1,862.08	3,956.75		143.52	16,535.25
County Agents	104,382.24	11,970.38	30,105.44	510.11	1,364.11	148,332.28
Home Demonstration	7,707.90	1,201.07	1,947.82	6.00	94.03	10,956.82
Nutrition	2,283.82	10.43	960.35			3,254.60
Boys' and Girls' Clubs	26,007.86	3,037.30	9,760.52	29.45	60.63	38,895.76
Soils	1,550.00	47.11	646.57			2,243.68

Distribution of Expenditures by Projects (*continued*)

Project	Salary and wages	Supplies	Travel	Publications and printing	Equipment	Total
Horticulture	4,000.00	69.79	343.61	.....	10.55	5,423.95
Animal Husbandry	3,300.00	43.88	1,295.73	.....	.....	4,639.61
Dairy Husbandry	3,300.00	116.03	1,421.94	.....	.....	4,837.97
Poultry Husbandry	3,600.00	35.79	1,021.38	.....	.....	4,657.17
Farm Management	1,016.12	52.19	600.57	.....	.....	1,668.88
Agricultural Economics	8,386.68	1,229.81	1,863.47	.....	28.75	11,508.71
Agricultural Engineering	.....	27.79	177.59	.....	2.50	207.88
Rodent Control	1,012.03	323.12	1,546.86	.....	.....	2,882.01
Total	$ 200,476.51	$ 25,149.87	$ 59,595.77	$ 1,795.67	$ 3,909.85	$ 290,927.67

Distribution of Expenditures by Funds

1927-28

Fund	Salary and wages	Supplies	Travel	Publications and printing	Equipment	Total
Educational Extension	$ 17,359.86	$ 4,192.11	$ 4,173.54	$ 372.44	$ 706.10	$ 26,804.05
Cooperative Farm Demonstration	10,588.88	1,505.86	2,743.95	4.45	21.20	14,864.34
State Smith-Lever	31,189.73	.....	.....	.....	.....	31,189.73
Federal Smith-Lever	28,718.04	4,298.62	15,669.35	877.67	1,662.21	51,224.89
County Extension (State Appropriation)	39,274.74	3,083.16	7,760.37	38.40	305.04	50,461.71
County Extension (Counties Appropriations)	65,177.08	9,514.50	25,725.51	502.71	1,178.55	102,098.35
Rodent Control	1,012.03	323.12	1,546.86	.....	.....	2,882.01
Miscellaneous	7,156.15	2,232.50	1,977.19	.....	36.75	11,402.59
Total	$ 200,476.51	$ 25,149.87	$ 59,595.77	$ 1,795.67	$ 3,909.85	$ 290.927.67

Distribution of Expenditures of State Appropriations for Counties

July 1, 1926 to June 30, 1927

County	Salary and wages	Supplies	Travel	Publications and printing	Equipment	Total
Baker	$ 908.29	$ 40.47	$ 66.44	.....	.....	$ 1,015.20
Benton	1,647.40	62.03	222.04	.....	$ 5.80	1,937.27
Clackamas	1,256.31	76.30	657.99	.....	2.45	1,993.05
Clatsop	1,009.49	125.72	923.78	.....	6.00	2,064.99
Columbia	1,641.44	35.08	606.03	.....	2.50	2,285.05
Coos	1,599.58	28.13	33.69	.....	3.00	1,664.40
Crook	1,976.77	34.09	138.72	.....	.....	2,149.58
Deschutes	1,481.07	255.05	407.26	.....	6.60	2,149.98
Douglas	1,922.04	16.72	39.99	.....	.....	1,978.75
Grant	971.50	104.16	231.87	.....	.....	1,307.53
Jackson	1,922.16	106.03	227.49	.....	4.75	2,260.43
Josephine	1,947.99	99.31	138.73	.....	1.10	2,187.13
Klamath	3,039.71	45.73	430.32	.....	.....	3,515.76

Lake	1,709.27	45.86	121.32		13.30	1,889.75
Lane	1,584.56	13.25	23.56			1,621.37
Lincoln	1,144.36	117.03	707.77			1,969.16
Malheur	2,090.29					2,090.29
Morrow	2,105.04	77.30	113.98			2,296.32
Multnomah	1,135.28	25.21	92.64		1.25	2,031.60
Polk	1,912.50	64.34	829.14			2,028.76
Tillamook	1,835.69	47.44	135.67		9.00	2,027.80
Umatilla	787.82	50.03	1,222.15			2,060.00
Union	1,548.24	90.09	187.70			1,826.03
Wallowa	685.64	25.37	588.10		100.78	1,399.89
Wasco	1,711.29	40.35	95.21			1,846.85
Washington	1,676.68	125.87	379.44		8.85	2,190.84
Yamhill	863.09	15.22	585.19		154.98	1,618.48
Total	$ 42,113.50	$ 1,766.18	$ 9,206.22		$ 320.36	$ 53,406.26

Distribution of Expenditures of County Appropriations for Counties

July 1, 1926 to June 30, 1927

County	Salary and wages	Supplies	Travel	Publications and printing	Equipment	Total
Baker	$ 2,264.33	$ 274.80	$ 575.68	$ .25	$ .30	$ 3,115.36
Benton	1,339.27	282.50	921.65		44.98	2,588.40
Clackamas	2,658.86	285.42	780.02		63.66	3,787.96
Clatsop	2,127.51	107.56	463.47		13.00	2,711.54
Columbia	1,477.43	209.99	519.95		21.40	2,228.77
Coos	1,766.36	166.71	1,024.12		219.25	3,176.44
Crook	1,383.23	356.65	403.27		28.00	2,171.15
Deschutes	1,819.88	179.12	259.60		7.50	2,266.10
Douglas	2,899.27	442.31	1,024.59		10.15	4,376.32
Grant	1,659.25	332.83	574.50		3.20	2,569.78
Jackson	3,846.00	927.64	2,814.50		86.08	7,674.22
Josephine	2,081.01	297.93	1,281.33		31.40	3,691.67
Klamath	1,844.29	695.97	2,010.66		1.50	4,552.42
Lake	1,431.06	206.10	1,253.34		2.00	2,892.50
Lane	3,037.14	346.28	1,383.58		.50	4,767.50
Lincoln	1,497.18	190.45	524.63	16.00	3.90	2,232.16
Linn		14.75				14.75
Malheur	1,901.60	475.01	785.42		12.85	3,174.88
Morrow	929.73	386.85	776.13	51.32	3.40	2,147.43
Multnomah	3,204.72	373.26	888.51		8.75	4,475.24
Polk	1,353.19	220.65	352.29		149.53	2,075.66
Tillamook	3,555.56	768.54	1,053.05		115.75	5,492.90
Umatilla	2,958.31	413.34	1,348.48		193.26	4,913.39
Union	1,893.26	247.44	547.40		44.78	2,732.88

Distribution of Expenditures of County Appropriations for Counties (*continued*)

County	Salary and wages	Supplies	Travel	Publications and printing	Equipment	Total
Wallowa	240.05	475.57	22.10	30.00	31.85	799.57
Wasco	1,153.33	238.16	561.40	31.07	.....	1,983.96
Washington	1,202.57	208.95	349.07	34.20	9.15	1,803.94
Yamhill	264.34	518.59	53.71	.....	104.85	941.49
Total	$ 51,788.73	$ 9,643.37	$ 22,552.45	$ 162.84	$ 1,210.99	$ 85,358.38

Distribution of Expenditures of State Appropriations for Counties

1927-28

County	Salary and wages	Supplies	Travel	Publications and printing	Equipment	Total
Baker	$ 1,454.92	$ 2.95	.....	.....	.....	$ 1,457.87
Benton	1,465.60	187.22	$ 377.50	.....	$ 5.85	2,036.17
Clackamas	1,195.60	94.82	133.78	.....	2.50	1,426.70
Clatsop	1,214.44	224.77	478.52	.....	.....	1,917.73
Columbia	940.31	165.75	130.93	.....	11.10	1,248.09
Coos	1,205.50	53.48	120.94	.....	48.15	1,428.07
Crook	1,077.16	38.24	84.49	.....	.....	1,199.89
Deschutes	1,185.74	336.91	372.30	.....	2.25	1,897.20
Douglas	1,408.82	31.25	172.80	.....	75.00	1,687.87
Grant	2,425.62	159.02	289.84	.....	50.00	2,924.48
Jackson	1,533.25	149.73	336.40	.....	5.58	2,024.96
Josephine	1,135.19	135.72	206.10	.....	.....	1,457.01
Klamath	2,563.07	221.24	1,266.62	7.50	.....	4,058.43
Lake	1,827.86	11.85	36.09	.....	.....	1,875.80
Lane	1,629.56	9.48	.....	.....	.....	1,639.04
Lincoln	1,367.89	247.00	285.34	.....	.....	1,900.23
Malheur	2,413.64	183.15	519.10	.....	2.06	3,117.95
Morrow	1,404.44	168.81	188.78	.....	2.45	1,764.48
Multnomah	1,397.77	201.12	288.61	.....	76.50	1,964.10
Polk	1,462.69	65.86	168.69	.....	1.00	1,698.24
Tillamook	1,302.19	106.33	550.08	.....	1.50	1,960.10
Umatilla	662.16	97.17	967.97	.....	21.10	1,748.40
Union	1,533.28	35.71	454.83	.....	.....	2,023.82
Wallowa	1,434.84	23.86	42.40	.....	.....	1,501.10
Wasco	1,411.75	52.24	134.66	30.90	.....	1,629.55
Washington	1,196.73	99.48	153.60	.....	.....	1,449.81
Yamhill	424.72	.....	.....	.....	.....	1,424.72
Total	$ 39,274.74	$ 3,083.16	$ 7,760.37	$ 38.40	$ 305.04	$ 50,461.71

DISTRIBUTION OF EXPENDITURES OF COUNTY APPROPRIATIONS FOR COUNTIES (*continued*)

1927-28

County	Salary and wages	Supplies	Travel	Publications and printing	Equipment	Total
Baker	$ 1,925.83	$ 288.20	$ 1,650.23	$	$ 68.08	$ 3,932.34
Benton	1,519.72	123.01	446.70		74.25	2,163.68
Clackamas	3,085.40	462.43	1,200.61		57.05	4,805.49
Clatsop	1,982.06	162.24	452.61		1.75	2,598.66
Columbia	2,191.83	168.30	412.30		.40	2,772.83
Coos	2,317.60	359.99	758.27		87.50	3,523.36
Crook	2,410.34	355.95	729.96		117.33	3,613.58
Deschutes	2,087.76	321.39	646.90		10.50	3,066.55
Douglas	3,374.57	403.66	988.69		2.65	4,769.57
Grant	594.38	279.92	1,421.90		112.50	2,408.70
Jackson	5,942.35	933.47	1,858.38		18.20	8,752.40
Josephine	3,709.07	611.02	916.98		28.00	5,265.07
Klamath	2,615.96	325.80	2,116.11	249.12	81.77	5,388.16
Lake	1,602.14	206.46	596.83		61.00	2,466.43
Lane	3,811.69	881.67	2,137.89		209.15	7,096.40
Lincoln	1,646.84	228.26	398.88		8.60	2,282.58
Malheur	1,621.19	384.40	1,325.65	25.95	16.00	3,373.19
Morrow	1,560.16	385.19	1,054.86	47.23	14.25	3,061.69
Multnomah	3,335.20	271.15	916.87		13.08	4,536.30
Polk	1,844.81	165.62	395.22		66.30	2,471.95
Tillamook	4,191.15	225.12	946.46		4.40	5,367.13
Umatilla	3,163.68	423.36	1,274.23		20.13	4,881.40
Union	1,709.22	323.79	826.14	64.80	6.00	2,929.95
Wallowa	1,450.16	308.08	623.82		32.10	2,414.16
Wasco	1,560.65	163.77	449.60	45.11		2,219.13
Washington	2,134.88	348.30	564.30		29.16	3,076.64
Yamhill	1,788.44	403.95	615.12	14.50	39.00	2,861.01
Total	$ 65,177.08	$ 9,514.50	$ 25,725.51	$ 502.71	$ 1,178.55	$ 102,098.35

DIVISION IV. MISCELLANEOUS

Under this division are placed all self-supporting departments, such as dormitories, farms, etc., student laboratory fee fund, and special projects, including Student Loan Fund and the new Men's Dormitory.

Dormitories Fund—Residence Halls for Women

July 1, 1926 to June 30, 1928

	1926-27	1927-28
Balance July 1	$ 29,136.36	$ 51,872.20
Income:		
Receipts	148,144.83	159,836.70
Totals	$ 177,281.19	$ 211,708.90
Expenditures:		
Salaries	$ 10,512.50	$ 10,757.50
Labor	30,691.52	31,680.04
Stationery and Office Supplies	85.13	306.28
Postage and Small Printing	258.26	73.53
Telephone and Telegraph	635.48	639.26
Freight and Express	453.74	715.44
Travel	66.22	50.95
Heat, Light, Power, and Water	13,655.29	13,412.45
Food	53,260.15	56,860.66
Supplies	1,279.96	1,391.42
Replacements and Repairs	11,393.87	8,886.19
Rents	9.00	.....
Laundry	2,049.43	2,336.02
Equipment	940.95	.....
Miscellaneous	117.49	149.59
Transferred to Men's Dormitory No. 1	.....	60,000.00
Total	$ 125,408.99	$ 187,259.33
Balance	51,872.20	24,449.57

Men's Dormitory

(Old Barracks building, replaced by New Dormitory for men, 1928)

July 1, 1926 to June 30, 1928

	1926-27	1927-28
Income:		
Balance	$ 1,167.54	$ 1,254.45
Receipts	4,882.75	3,123.82
Totals	$ 6,050.29	$ 4,378.27
Expenditures:		
Janitorial Service	$ 1,432.72	$ 671.84
Labor	100.00	50.00
Stationery and Office Supplies	.....	19.05
Telephone and Telegraph	.....	5.40
Freight and Express	.....	28.80
Heat, Light and Water	2,611.06	2,384.87
Supplies	107.27	684.86
Laundry	20.00	17.40
Repairs and Improvements	266.04	400.04
Equipment	258.75	.....
Total	$ 4,795.84	$ 4,262.26
Balance	1,254.45	116.01

Departmental Fees Fund

July 1, 1926 to June 30, 1928

	1926-27	1927-28
Income:		
Balance July 1	$ 56,473.55	$ 75,619.22
Receipts	91,493.23	92,389.00
Total	$ 147,966.78	$ 168,008.22

Expenditures

Salary	$ 3,062.50	$ 5,600.95
Labor	12,165.48	13,041.64
Stationery and Office Supplies	6,056.15	5,244.24
Postage	98.95	141.68
Telegraph and Telephone	276.20	307.43
Freight and Express	1,503.01	1,535.35
Light and Power	783.06	546.90
Fuel	183.20	1,763.43
Chemicals and Laboratory Supplies	13,206.77	16,015.30
Seeds, Plants and Supplies	22,870.89	28,209.37
Rents	20.00	24.00
Laundry	1,404.62	1,173.89
Publications and Printing	288.47	76.25
Travel	387.23	726.54
Repairs	1,879.61	1,185.39
Furniture and Fixtures	3,771.72	8,239.15
Scientific Apparatus	2,998.83	2,079.75
Tools and Machinery	201.37	1,315.21
Books, Magazines and Periodicals	683.53	853.20
Miscellaneous	505.97	880.13
Total	$ 72,347.56	$ 88,959.80
Balance	75,619.22	79,048.42

College Press

July 1, 1926 to June 30, 1928

Income:	1926-27	1927-28
Balance July 1	$ 8,360.84	$ 8,615.75
Receipts	43,942.89	48,320.49
Total	$ 35,582.05	$ 39,704.74
Expenditures:		
Salaries and Labor	$ 20,138.19	$ 20,776.96
Stationery and Office Supplies	84.31	49.49
Telephone and Telegraph	101.41	118.47
Freight and Express	67.54	96.29
Travel	31.62	83.84
Power	180.16	223.78
Consumable Supplies	370.95	439.75
Stock	21,099.46	20,270.91
Repairs	963.50	1,117.76
Equipment	1,160.00	3,331.17
Total	$ 44,197.80	$ 46,508.42
Balance	8,615.75	6,803.68

Note:

Collectable Accounts July 1, 1927 $13,871.02.
Collectable Accounts July 1, 1928 $12,425.31.

Fertilizer Inspection

Section 9025, Oregon Laws

July 1, 1926 to June 30, 1928

Income:	1926-27	1927-28
Balance July 1, 1926	$ 214.30	$ 250.11
Receipts	1,546.75	1,646.00
Total	$ 1,761.05	$ 1,896.11

Fertilizer Inspection (*continued*)

Expenditures:		
Salaries	$ 1,100.00	$ 1,040.95
Labor	115.11	
Stationery and Office Supplies	.20	12.25
Telephone and Telegraph		1.98
Freight and Express	8.83	7.91
Travel	130.22	165.80
Fuel		24.03
Chemicals and Laboratory Supplies	1.50	37.74
Seeds, Plants and Supplies	6.03	44.21
Laundry	1.25	
Bulletins, Reports, etc.	147.80	67.40
Books and Magazines		13.00
Miscellaneous		5.00
Total	$ 1,510.94	$ 1,420.27
Balance	250.11	475.84

Lime Fund

Chapter 230, Oregon Laws 1917

July 1, 1926 to June 30, 1928

	1926-27	1927-28
Income:		
Balance	$ 132.76	$ 154.25
Receipts	90.00	120.00
Total	$ 222.76	$ 274.25
Expenditures:		
Stationery and Office Supplies	$ 29.99	$ 34.36
Freight and Express		1.26
Chemical and Laboratory Supplies	16.72	61.01
Seeds, Plants and Supplies	11.80	53.06
Furniture and Fixtures		13.00
Miscellaneous	10.00	
Total	$ 68.51	$ 162.69
Balance	154.25	111.56

Standard Babcock Glassware

Section 8765, Oregon Laws

July 1, 1926 to June 30, 1928

	1926-27	1927-28
Income:		
Balance	$ 95.57	$ 159.17
Receipts	247.60	361.32
Total	$ 343.17	$ 520.49
Expenditures:		
Labor	$ 71.00	$ 126.00
Stationery and Office Supplies	16.41	24.84
Telephone and Telegraph	1.94	2.70
Freight and Express	9.11	7.02
Travel	81.34	127.03
Supplies		8.07
Miscellaneous	4.20	20.00
Total	$ 184.00	$ 316.66
Balance	159.17	203.83

Economic Poison Fund

Chapter 179, Oregon Laws 1923

July 1, 1926 to June 30, 1928

	1926-27	1927-28
Income:		
Balance July 1, 1926	$ 1,036.50	$ 331.12
Receipts	1,850.00	1,685.00
Total	$ 2,886.50	$ 2,016.12
Expenditures:		
Salaries	$ 900.00	$ 1,100.00
Labor	288.05	.....
Stationery and Office Supplies	41.67	47.94
Telephone and Telegraph	15.18	7.15
Freight and Express	111.64	19.27
Travel	247.24	112.09
Chemicals and Laboratory Supplies	595.04	206.62
Seeds, Plants and Supplies	156.56	78.74
Bulletins, Reports, etc.	200.00	.....
Books and Magazines	.....	54.50
Miscellaneous	.....	15.00
Total	$ 2,555.38	$ 1,641.31
Balance	331.12	374.81

Library Special

(Fines and Receipts)

July 1, 1926 to June 30, 1928

	1926-27	1927-28
Income:		
Balance July 1	$ 531.70	$ 286.57
Receipts	692.42	868.42
Total	$ 1,224.12	$ 1,154.99
Expenditures:		
Labor	.....	$ 26.58
Stationery and Office Supplies	$ 296.82	56.96
Postage	86.84	100.50
Books, Magazines and Periodicals	523.89	535.05
Miscellaneous	30.00	.39
Total	$ 937.55	$ 719.48
Balance June 30	286.57	435.51

Engineering Experiment Station Receipt Fund

July 1, 1926 to June 30, 1928

	1927-28
Income:	
Receipts	$ 679.80
Expenditures:	
Labor	$ 164.50
Supplies	44.98
Freight and Express	1.75
Equipment	332.50
Total	$ 543.73
Balance June 30	136.07

Farm Receipts Fund

The farms are maintained for instructional and investigational work, the receipts are from the sale of farm products and are used for operating expenses.

FARM RECEIPTS FUND (*continued*)

July 1, 1926 to June 30, 1928

	1926-27	1927-28
Income:		
Balance July 1	$ 9,460.43	$ 3,619.92
Receipts	123,465.82	116,056.02
Total	$ 114,005.39	$ 119,675.94
Expenditures:		
Salaries and Wages	$ 13,233.61	$ 12,096.75
Supplies	91,327.08	95,691.50
Travel	364.59	187.42
Repairs	2,287.59	1,109.14
Equipment	3,172.60	4,070.37
Total	$ 110,385.47	$ 113,155.18
Balance	3,619.92	6,520.76

HEALTH SERVICE

The College Health Service, inaugurated in 1916, is a department maintained with the aim of promoting the health of all the students. Prior to 1927-28, this department was a project of the Associated Students. This service is supported by student fees.

July 1, 1926 to June 30, 1928

	1927-28
Income:	
Receipts	$ 19,862.63
Expenditures:	
Salaries	$ 12,232.50
Labor	627.20
Supplies	833.72
Stationery and Office Supplies	126.74
Chemicals and Laboratory Supplies	1,560.11
Equipment	541.32
Heat, Light, and Water	313.91
Miscellaneous	492.15
Total	$ 16,727.65
Balance June 30	3,134.98

ASSOCIATED STUDENTS

This is an organization of the entire student body working under a constitution and by-laws approved by the faculty and having general authority over all student body enterprises. The organization receives its funds from student fees, gate receipts from games, track and other athletic meets, student publications, etc.

	1926-27	1927-28	Total
Income:			
Balance July 1	$ 993.41	$ 5,271.34	$ 993.41
Receipts	194,148.65	175,298.22	369,446.87
Total	$ 195,142.06	$ 180,569.56	$ 370,440.28
Expenditures	189,870.72	180,359.88	370,230.60
Balance June 30	$ 5,271.34	$ 209.68	$ 209.68

STUDENT LOAN FUND

	Balance July 1, 1926	Gifts	Income	Expenditures	Balance June 30, 1928
General Fund	$34,320.74	$ 7,541.62	$ 2,823.94	$ 4,072.96	$40,613.34
Tifft Fund	.....	5,382.80	46.86	.....	5,429.66
Total	$34,320.74	$12,924.42	$ 2,870.80	$ 4,072.96	$46,043.00

Operation of Student Loan Fund

	Loanable principal July 1, 1926	Additions 1926-1928	Loanable principal June 30, 1928	Outstanding loans July 1, 1926
General Fund	$34,320.74	$ 6,292.60	$40,613.34	$32,495.93
Tifft Fund	.	5,429.66	5,429.66	.....
Total	$34,320.74	$11,722.26	$46,043.00	$32,495.93
	Loans made 1926-1928	Loans paid 1926-1928	Loans outstanding June 30, 1928	Interest collected
General Fund	$73,973.83	$72,998.73	$33,471.03	$ 2,823.94
Tifft Fund	7,038.80	2,039.43	4,999.37	46.86
Total	$81,012.63	$75,038.16	$38,470.40	$ 2,870.80

Men's Dormitory

Authorized under the provisions of Chapter 289, Oregon Laws 1927.

April 1, 1928 to June 30, 1928

	1927-28
Income:	
Sale of $440,000 4½% bonds at $92.13	$ 405,372.00
Dormitories (Residence Halls for Women)	60,000.00
Interest on bank balances	887.15
Total	$ 466,259.15
Expenditures:	
Postage	$ 38.38
Travel	46.59
Printing	233.50
Trustees Fees	660.00
Insurance	1,000.00
Building—payments to June 30, 1928	130,792.64
Total	$ 132,771.11
Balance June 30 to cover contract obligations	333,488.04

NOTE

Pages 284-368, containing tabulations of value only to State officials and members of the State Legislature, are included in only the 250 copies of this report furnished to those officials.