EIGHTEENTH ANNUAL REPORT

OF THE

OREGON AGRICULTURAL COLLEGE

AND

EXPERIMENT STATION

FOR THE YEAR ENDING

JUNE 30, 1906

1906
OREGON AGRICULTURAL COLLEGE PRESS
CORVALLIS, OREGON

Board of Regents of the Oregon Agricultural College and Experiment Station.

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OFFICERS OF THE STATION.

STATION STAFF.

Thos. M. Gatch, A. M., Ph. D.....*President.*
James Withycombe, M. Agr.....*Director and Agriculturist.*
A. L. Knisely, M. S.....*Chemist.*
A. B. Cordley, M. S.....*Entomologist.*
E. R. Lake, M. S.....*Botanist.*
E. F. Pernot, M. S.....*Bacteriologist.*
C. I. Lewis, M. S. A.....*Horticulturist.*
George Coote.....*Florist.*
F. L. Kent, B. S.....*Dairying.*
F. E. Edwards, B. M. E.....*Chemistry.*
C. E. Bradley, M. S.....*Ass't Chemist.*
W. H. Wicks, M. S.....*Ass't Horticulturist.*

EIGHTEENTH ANNUAL REPORT

OF THE

OREGON AGRICULTURAL COLLEGE AND EXPERIMENT STATION.

REPORT OF THE PRESIDENT OF THE BOARD OF REGENTS.

To His Excellency, George E. Chamberlain, Governor of Oregon:

SIR:—I have the honor to submit the annual report of the condition of the State Agricultural College of the State of Oregon for the year ending June 30, 1906.

The financial statement of the income and expenditures for the year, taken from the treasurer's report, is as follows:

Income for the Year

Station	$15,141 65	
College	25,025-00	
State Interest	12,292.05	
Improvement	452.70	
Laboratory—formerly Chemical Breakage	3,657 74	
Local Station	1,454.30	
Special	25,000.00	$83,023.44

Balances on Hand July 1, 1905.

State Interest	$ 104.66	
Improvement	205 43	
Laboratory—formerly Chemical Breakage	1,271.26	
Local Station	285.63	
Special	3,340 49	$ 5,207.47
Total		$88,230.91
Transfer from Special to Station		704.84
Total to be accounted for		$88,935.75

Disbursements.

Station—including transfer of $704.84	$15,846.49	
College	25 025.00	
State Interest	11,931.85	
Improvement	178.85	
Local Station	1,340.04	
Special—including transfer of $704.84	26,993.65	
Laboratory—formerly Chemical Breakage	2,973.36	$84,289.24
Balance		$ 4,646.51
Total disbursements		$84,289.24
Less transfer from Special to Station		704.84
Actual disbursements		$83,584.40

The college opened on the 17th day of September, 1905, with a larger attendance and brighter prospects than in any prior year in its history. The enrollment for the year was 735, being an increase of 55 over the previous year. The prospects are very favorable for a greater increase for the year 1906-7.

The work done in the various departments is quite satisfactory. The faculty have in the past faithfully and conscientiously performed their labors in the various departments to which they are assigned, and their labor has been rewarded by the marked increase in the number of students attending and the general interest taken by the people of the State of Oregon in the results attained at the college and station.

The law creating the college defines its purposes as follows:

"Corvallis College in Benton County is hereby designated and permanently adopted as the Agricultural College of the State of Oregon, in which all students sent under the provisions of law shall be instructed in accordance with the requirements of the Act of Congress, approved on the second day of July, 1862, granting public lands to the several states and territories, which might provide colleges for the benefit of agricultural and mechanical arts." (Section 3530, Bellinger and Cotton's Code).

The Act of Congress of July 2, 1862, referred to, as the basis for the act of the legislature above mentioned, among other things, provides that all money, derived from the sale of lands aforesaid by the states to which land grants are apportioned and for the sale of land script heretofore provided for, shall constitute a perpetual fund, the capital of which shall remain forever undiminished, and the interest of which shall inviolably be apportioned by each state, which may take and claim the benefits of this act, to the endowment, support and maintenance of at least one college where the leading objects shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agricultural and mechanical arts in such a manner as the legislature may provide, in order to promote liberal and practical education of the industrial classes in the several pursuits and professions of life.

This act was supplemented by the Act of Congress, approved August 30, 1890, which act, among other things, provides as follows: There be and hereby is appropriated annually out of any money in the treasury not otherwise appropriated, arising from the sale of the public lands, to each state and territory, for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established or which may hereafter be established in accordance with the Act of Congress, approved July 2, 1862, * * * shall be $25,000.00, to be applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematics, physical, natural and

economic science, with special reference to their application to the industries of life, and to facilities for such instruction.

The purposes for which colleges of this character were created are therefore to instruct in (1) Agriculture, (2) Mechanic Arts, (3) English Language, (4) Various branches of Mathematics, (5) Physical Science, (6) Natural Science, (7) Economics, (8) Military Tactics, (9) To promote liberal and practical education, (10) To educate the youth of the state to be good citizens, capable of performing all of the duties devolving upon them as members of the community.

The Board of Regents have endeavored to so direct the affairs of the college as to carry into effect the letter and spirit of the law before quoted. It is not the purpose to advance one of the objects of the school to the detriment of another, but to advance all equally, the intention of Congress and the State Legislature evidently being to emphasize the great importance of educating the youth along practical lines.

The Board of Regents have endeavored to put into operation these evident intentions by providing to be taught the following courses of study for a liberal education along practical, useful and industrial lines: Agriculture, Forestry, Household Science, Mechanical Engineering, Electrical Engineering, Mining Engineering, Civil Engineering, Pharmacy, Literary Commerce.

All of these require English, mathematics, history, elocution, free-hand drawing, and other branches requisite to a practical and complete education. Ample provisions have been made to give instruction in all branches usually taught in colleges of this character, and we feel assured that the work being done is equal to that of any institution of a like character.

There is connected with the college an experiment station, created under the law passed by Congress on the second day of March, 1887, known as the Hatch Act, appropriating for the maintenance of an experimental station, in connection with agricultural colleges in the several state and territories, the sum of $15,000.00 a year, payable quarterly. This money must be used for paying the necessary expenses of conducting original investigations and experiments and in printing and distributing the results.

Congress passed an act known as the Adams Act on the sixteenth day of March, 1906, from which the college will receive an additional appropriation for the more complete endowment and main-

tenance of agricultural experiment stations. By this appropriation, there will be received by the college $5,000.00 before July 1, 1907, and $2,000.00 additional will be received each year until the annual appropriation amounts to $15,000.00.

This appropriation can only be used for paying the necessary expenses of conducting original researches or experiments bearing directly upon the agricultural industries of the state. The money must be used for experimentation and research alone; none of this fund can be spent for buildings, demonstration, or administrative work, or for printing the result of the experiments. The state must provide some other means for the dissemination of the results of the researches and experiments.

The Director of the Station reports that the work is steadily increasing in its scope and usefulness. Each department during the year just past shows a material increase in its correspondence and general research work.

The changing conditions in agriculture and the development of new industries have brought to the various departments of the station much work. This is especially apparent in the department of chemistry. In order to adequately meet the demands of this department, the Director informs the Board that it will be absolutely necessary to provide additional assistants.

The Director of the Station also reports that the demands made upon the entomologist are constantly growing, and that this department is rapidly becoming of great economical value to the agricultural and horticultural interests of the state, and that good progress is made evolving methods for the control of fruit pests, and the department is engaged in valuable cooperative experimental work with farmers in various parts of the state.

All the departments connected with the station are crowded to their limit by the demands made upon them from persons engaged in either agricultural or horticultural pursuits in different parts of the State of Oregon. The work at the station has more than tripled since its establishment, and its usefulness and benefits have been beyond computation.

The last legislature made an appropriation of $60,000.00 for the purpose of building a girls' dormitory and a drill shed at the college. Owing to the appropriation being suspended on account of the referendum being called upon the general appropriation bill, nothing was done in that direction until the meeting of the Board

of Regents in July, when an order was made to let the contract to build the girls' dormitory. The contract for which is awarded, and the contractors are in the actual construction thereof. The building will be a large, commodious structure, capable of accommodating 300 young ladies. It is presumed to be large enough to accommodate those desiring accommodation at the dormitory for some years to come.

The Board of Regents concluded that the appropriation for the drill shed was inadequate, owing to the increased price of material and labor, and have concluded not to attempt the construction of the building at the present time.

I beg leave to submit herewith the report of the Secretary of the Board of Regents, the President of the College and the Director of the Station. I am Yours truly,

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

TREASURER'S REPORT.

CORVALLIS, OREGON, July 18, 1906.

To the Honorable the Board of Regents, Oregon Agricultural College:

GENTLEMEN:—Herewith I submit my report for the year ended June 30, 1906. The vouchers and other evidences of payment are on file in the office of the Clerk and Purchasing Agent.

Very respectfully,

B. F. IRVINE, Treasurer.

INCOME FOR THE YEAR.

Station	$15,141.65	
College	25,025.00	
State Interest	12,292.05	
Improvement	452.70	
Laboratory—formerly Chemical Breakage	3,657.74	
Local Station	1,454.30	
Special	25,000.00	$83,023.44

BALANCE ON HAND JULY 1, 1905.

State Interest	$ 104.66	
Improvement	205.43	
Laboratory—formerly Chemical Breakage	1,271.26	
Local Station	285.63	
Special	3,340.49	$ 5,207.47
Total		$88,230.91
Transfer from Special to Station		704.84
Total to be accounted for		$88,935.75

DISBURSEMENTS.

Station—including transfer of $704.84	$15,846.49
College	25,025.00

State Interest	11,931.85	
Improvement	178.85	
Local Station	1,340.04	
Laboratory—formerly Chemical Breakage	2,973.36	
Special—including transfer of $704.84	26,993.65	$84,289.24
Balance		$ 4,646.51
Total Disbursements		84,289.24
Less transfer from Special to Station		704.84
Actual disbursements		$83,584.40

BALANCES BY FUNDS.

State Interest	$ 464.86	
Improvement	479.28	
Local Station	399.89	
Laboratory—formerly Chemical Breakage	1,955.64	
Special	1,346.84	$ 4,646.51

MISCELLANEOUS RECEIPTS (included above) AND THEIR DISTRIBUTION.

Source.	Amount.	Local Station.	Improvement.
Agriculture	$ 835.85	$ 835.85	
Dairy	588.95	588.95	
Horticulture	29.50	29.50	
Miscellaneous	452.70		$ 452.70
Totals	$1,907.00	$1,454.30	$ 452.70

DISBURSEMENTS BY SALARIES, INCIDENTALS, TOTALS.

DEPARTMENT OR ITEM.	SALARIES.	INCIDENTALS.	TOTALS.
Printing	$ 1,780.00	$ 1,035.93	$ 2,815.93
Agriculture	3,080.00	4,529.75	7,609.75
Horticulture	1,293.30	3,103.68	4,396.98
Botany	1,600.00	336.63	1,936.63
Chemistry	5,817.50	4,564.29	10,381.79
Bacteriology	1,600.00	94.35	1,694.35
Entomology	2,680.00	749.15	3,429.15
Mechanics	5,483.85	1,768.18	7,252.03
Household Economy	1,560.00	185.27	1,745.27
Military	.....	872.30	872.30
Library	600.00	696.69	1,296.69
Drawing	900.00	20.60	920.60
Salaries outside departments	18,350.00	.....	18,350.00
Sanitary		233.00	233.00
Furniture		328.34	328.34
Traveling expenses		1,203.67	1,203.67
Advertising		327.60	327.60
Fuel		2,748.63	2,748.63
Insurance		54.00	54.00
Postage		395.18	395.18
Freight		765.28	765.28
Telephones and telegrams		170.50	170.50
Scientific apparatus		355.67	355.67
Tools and machinery		446.70	446.70
Building repairs		1,905.26	1,905.26
Miscellaneous labor		1,060.91	1,060.91
Miscellaneous supplies		381.34	381.34
Janitors' labor		821.08	821.08
Miscellaneous and current		585.70	585.70
Cauthorn Hall		327.13	327.13
Alpha Hall		1,138.59	1,138.59
Live stock		441.90	441.90
Lewis & Clark		1,074.44	1,074.44
Real Estate		6,000.00	6,000.00
Vacation Tour—Cordley and Shaw		118.01	118.01
Totals	$44,744.65	$38,839.75	$83,584.40

REPORT OF FINANCE COMMITTEE---TREASURER'S REPORT.

CORVALLIS, OREGON, July 18, 1906.

To the Board of Regents of the State Agricultural College:

GENTLEMEN:—We, your Finance Committee, would respectfully report that we have examined the books and vouchers in the office of the Clerk and Purchasing Agent of the College and Station and we find the same well kept, neat and correct.

We find that the balance on hand July 1, 1905, to be accounted for by the Treasurer were as follows:

State Interest	$ 104.66	
Improvement	205 43	
Laboratory	1,271.26	
Local Station	285.63	
Special	3,340.48	$ 5,207.27

We find the revenue for the year to have been:

Station—Hatch	$15,000.00	
Check No. 162—for salary of James Withycombe for the month of May, 1906—returned to Treasurer	141.65	$15,141.65
College—Morrill	25,000.00	
Check No. 5405—for salary of James Withycombe for the month of May, 1906—returned to Treasurer	25.00	25,025.00
State Interest		12,293.05
Improvement		452.70
Laboratory		3,657.74
Local Station		1,454.30
Special		25,000.00
Total		$88,230.91
Transfer from Special to Station		704.84
Total to be accounted for		$88,935.75

We find the disbursements to have been:

Station—including transfer	$15,846.49	
College	25,025.00	
State Interest	11,931.85	
Improvement	178.85	
Local Station	1,340.04	
Special—including transfer	26,993 65	
Laboratory	2,973.36	$84,289.24
Balance on hand		$ 4,646.51
Total disbursements less transfer of $704 84 to Station from Special		$83,584.40

We have examined the report of the Treasurer of the Board for the year ended June 30, 1906, and find it correct as to the amount of money to be accounted for, namely, $83,584.40.

We have checked up the drafts and receipted bills on file and find them correct as set forth in the report of the Clerk and Treasurer except the following:

STATION FUND.

Checks No. 213, 214, 215, 216, 222, 230 have been sent with bills to be receipted—said receipts being now in transit.

MORRILL FUND.

Check No. 5429 in favor of J. B. Horner has not been receipted for.

STATE INTEREST.

Check No. 3456 in favor of J. B. Horner has not been receipted for.
Check No. 3461 in favor of Wm. T. Shaw has not been receipted for.

LABORATORY.

Checks No. 56, 57, 58, 59 have not been receipted for—being in transit.

SPECIAL.

Checks No. 340, 360, 343, 346 have not been receipted for—being in transit.

The proper vouchers for the above items will be duly filed as they are received at the office of the Clerk and Purchasing Agent.*

From the foregoing it will be seen that there is no account of any monies having been received or disbursed on account of the Act of the last Legislature appropriating $2,500 annually for the purpose of defraying the expenses of institute work. There should have been $2,500 available December 31, 1905, from this act and the six months ended June 30, 1906, would have amounted to $1,250 more, making the sum of $3,750 in the fund of which we have no account in the records of this office. We find from the account of the Director of the Station that there has been expended $1,174.73 on account of the fund. Respectfully submitted,

J. T. APPERSON,
CLARA H. WALDO,
AUSTIN T. BUXTON,
Finance Committee.

*All the bills referred to above have been duly received and filed—fully receipted. The pay rolls—Morrill and State Interest—have been regularly signed by Profs. Horner and Shaw.

September 15, 1906. T. H. CRAWFORD, Clerk.

REPORT OF FINANCE COMMITTEE---APPROPRIATIONS.

CORVALLIS, OREGON, July 18, 1906.

To the Board of Regents of the State Agricultural College:

GENTLEMEN:—We would respectfully report that we estimate the income for the ensuing year as follows.

STATION AND ADAMS FUND.

Station—Hatch	$15,000.00	
Adams	7,000.00	
Adams for the year ended June 30, 1906	5,000.00	$27,000.00

On account of the Farmers' Institute Fund to June 30, 1906	3,750.00	
Less amount expended	1,174.73	
	$ 2,573 27	
Amount for the ensuing year	2,500.00	$ 5,075.27
Estimated income from Local Station	$ 1,600.00	
Balance in Local Station Fund	399.89	$ 1,999.89
Totat estimated income from Station, Adams and Local Station Fund		$34,075 16

We estimate the income of other College funds:

College—Morrill	$25,000 00	
State Interest	10,000.00	
Special	25,000 00	
Balance on hand June 30, 1906	4,646.62	$64,646.62
Total estimated income from all sources		$98,721.78

We recommend that the whole of the amount as shown above on account of the Station and kindred funds, $34,075.15, or so much thereof as may be found necessary be appropriated for the running of the Station work for the ensuing year.

We also recommend that all of the Morrill Act fund—$25,000.00 —State Interest—estimated at $10,000 and $18,000 of the Special fund Act of February, 1903, be appropriated for the paying of the salaries and incidental expenses of the College for the ensuing year. The balance of said estimated income, $11,246.62, of the College funds, be reserved for the order of the Board for its expenditure.

Respectfully submitted,

J. T. APPERSON,
CLARA H. WALDO,
AUSTIN T. BUXTON,
Finance Committee.

REPORT OF THE PRESIDENT.

To the Honorable Board of Regents of the Oregon Agricultural College and Experiment Station:

GENTLEMEN:—I beg leave to submit my report for the College year ending June 13, 1906:

ATTENDANCE.

Graduate Students	18
Seniors	49
Juniors	46
Sophomores	104
Freshmen	293
Sub-Freshmen	110
Unclassified	37
Music	50
Dairying	28
Total	735

making 55 more than the total enrollment of last year, an increase of per cent which is somewhat less than the average increase for the past eight years.

Of the number enrolled this year 523 were men and 212 women.

NEW INSTRUCTORS.

John H. McDougal, A. B., a graduate of Leland Stanford University was chosen as Assistant Professor of Mechanical and Electrical Engineering in place of E. C. Hayward, resigned. Mr. McDougal entersd upon his duties, October 1, 1905. His work has proved satisfactory, and I recommend that he be continued.

Thomas Bilyeu having resigned, Mark D. McCallister, B. S., a graduate of our College, was chosen as Instructor in Woodwork at the beginning of the last term.

He has proved himself a popular and apt instructor. I recommend that he be continued in the position.

Professor Claude I. Lewis, B. S., the newly appointed Professor of Horticulture reported for duty May 12, 1906.

Lieut. Dennis P. Quinlan, Professor of Military Science and Tactics, was relieved from duty March 19, 1906. I appointed Major Frank Edwards to the position. Major Edwards' management of the Military Department has been very satisfactory and I recommend that he be continued.

ASSEMBLY HALL.

Our Chapel is not large enough to seat the students in attendance. From 150 to 200 are shut out from devotional exercises every morning, which leads to confusion and disorganization.

When a visitor of note speaks, stairways and halls leading to the Chapel are crowded with students anxious to hear

A larger assembly hall is an imperious want of our College. It might be thought that the Armory would answer, but this is impracticable for the large room is in constant use for drill and physical exercise which requires the floor to be free from obstruction, such as chairs and benches.

DEPARTMENT OF PHARMACY.

To supply in some degree the immediate wants of this department a small addition was made to the building. Although in a crowded condition this can be made to answer for another year. When the Woman's building is completed, Alpha Hall can not be put to better use than to devote it to Pharmacy. There rooms can be had commensurate with the demands of this department.

Dr. John M. A. Laue, who on behalf of the State Board of Pharmacy, lately conducted the examination of our Pharmacist graduates, was well pleased with their proficiency. He offers a prize of $50.00 for the student who the coming year secures the highest grades in this department.

I recommend that Mr. Clarence M. McKellips be advanced from the position of Instructor to that of Assistant Professor.

MECHANICS AND PHYSICS.

Liberal appropriations have been made for other departments but during the past eight years the department of Mechanics and Physics has moved along with a meagre equipment as regards apparatus and machinery. I suggest that $2,000.00 be devoted to the purchase of needed appliances.

ADDITIONAL STUDIES.

Among the questions to be answered by the Inspecting Officer sent by the War Department is this:—"Does the curriculum cover fully the subjects in which a candidate for appointment as second lieutenant from civil life is examined? If not, what additions should be made to the course?" To this Major J. T. Dickman who inspected our Military Department, April 23, 1906, replies—"Constitutional and International Law not taught."

To meet this want as well as for the reason that the studies in themselves are highly interesting and instructive. It would be well to place Constitutional Law and International Law in all our courses except, perhaps, Household Science, even if other studies have to be omitted to make room therefor.

COURSES EXTENDED.

It is advisable to keep close to the people and not add to our entrance requirements. Still it is advisable to extend our courses and retain our graduates who otherwise would go East or to California for more advanced work. In accordance with the expressed wishes of the Board we have added a fifth or graduate year to each of the courses of Agriculture, Mathematics, Chemistry and Mining. We propose to graduate students with the degree of B. S. at the close of the fourth year, as formerly, but we shall encourage them to remain a fifth year and receive an engineering degree. This fifth year will be counted, also, as one of the two years required for the Master's degree. The plan is well received and doubtless in a year or two will be adopted by many students.

COURSE IN FORESTRY.

In conformity to the wishes of the Board a Course in Forestry has been arranged. The Professor of this department has had extensive correspondence not only with scientific men skilled in that science, but with practical lumber and timber men and has secured their hearty cooperation in the work.

SEPTIC TANK.

The sewer leading from Cauthorn Hall and the cess-pool connected therewith often gets in a deplorable condition. The land back of the Hall is inclined and admirably suited for a septic tank. The invention may not be all that is claimed for it, for instance, the overflow may not be pure and uncontaminated water, but it is certain that the septic tank has proved a decided success in numerous instances. Besides, its construction would count experimentally. During the past year the City of Walla Walla and other inquirers have desired information on the question. In every case I have been compelled to refer to other institutions for advice.

WATER SUPPLY.

I know that our inadequate supply of water has for a long time been a source of anxiety to the Board, but I have to say that during the past year we have suffered greater inconvenience therefrom than ever before. Meals have been postponed in the boarding houses for want of water to cook with, those in charge have often called me up to say they had not water enough to wash the dishes, work in the laboratories has been interrupted and the water closets in the buildings have been closed a greater part of the year.

ABOUT ARMS.

We are under bonds to the Government for guns at the rate of $14.00 apiece when similar guns can be bought outright for $2.50 apiece and better ones for our use can be purchased for considerably less. It might be well for the College to own arms and accouterments.

UNIFORMS.

When the olive-drab uniform was adopted we were assured that it would not cost more than $12.00. The first uniforms purchased by our cadets did not cost more than this, but they have gradually increased in price until they now cost over $17.00 and the officers' uniforms greatly in excess of this. This is a serious tax on our students and if continued will prevent many from entering the

College. Besides, no less than five different shades of olive-drab have been furnisned which causes our cadets to present a motley appearance.

I ask that a Committee of the Board be appointed to inquire into this subject and see if the evils mentioned cannot be remedied. At Berkeley and many other schools the authorities require a deposit and become responsible for the uniform. They can thus arrange with the manufacturers to procure uniforms at wholesale rates and of the same material. Our policy has been to encourage competition among local dealers, but it has proved a failure.

RIFLE RANGE.

There is a growing interest in rifle practice not only in the army but among the National Guards and volunteer associations. There is room for the censure of the War Department for our neglect in this matter, but it is impossible to secure a suitable range near Corvallis. People object to our using their land for this purpose. I hope we can be allowed to prepare a safe range on our own farm.

DEGREES CONFERRED.

At our Commencement of June 13, in accordance with vote of the Faculty, the degree of Master of Science was conferred on Frank Edwards of our class of '95; William Hale Wicks of '04; Mahesh Charan Sinha, a graduate of Allahabad University, India.

The President of the Board presented diplomas to the following graduates showing that they are entitled to the degree of Bachelor of Science.

HOUSEHOLD SCIENCE.

Entrees ..... Ethel Berman
The Second National Period of American Literature ..... Alice Leora Edwards
Evolution of Breadmaking, with Practical Experiments in the Household Science Department ..... Julia Fuller, Maude Crenshaw Graves
Quick Doughs ..... Mertie Edith Harrington, Margaret Kathryn McCormick
Poultry Raising, a Profitable Branch of Farming ..... Rose Ingram
Negotiable Instruments Law ..... Mary Alice Hill
Art in Landscape Gardening ..... Belle Kate Mattley
Preparation of Meats ..... Minette Ethel Phillips
The Western Writers of the Second National Period of American Literature ..... Sarah Stella Parsons
Propagation and Culture of the Viola ..... Maggie Maude Hays

AGRICULTURE.

Physical Properties of Oregon Soils ..... Arthur George Bristow Bouquet
Digestion Experiments with Ground Vetch Seed and Cafroco Oil Cake Meal ..... Grover Cleveland Cate, Fred Clark Ewing, Wallace Atwood Thomson
Vetch ..... Robert Combs Jackson
The Fat Content of Gravity Separated Cream ..... Ralph Edward Smith, Walter Asa Winniford

MECHANICAL ENGINEERING.

Some Data Concerning the Strength of Oregon Fir....Arthur Edward Belknap, Philip Gearhart
Purificatian of Public Water Supply....Joel Emily, Walter Eakin Wade

ELECTRICAL ENGINEERING.

Theory and design of a Four Cycle Gas Engine....Alfred Leroy Bradley
The Theory and Construction of a Watt-Meter....Archibald Eugene Burns
The Arc Lamp....Earl Vincent Hawley
Photometry of Incandescent Lamps....Walter Ralph Horton, William Amile Schoel

PHARMACY.

Dieting aud its Effect upon Urine....Fred Adams
A Sanitary Analysis of Some Potable Waters of the Willamette Valley....John Carl Knapp
The Detection of Arsenic in Wall Paper....Archie Clifford Van Cleve, Guy Leonard Weaver

MINING ENGINEERING.

Comparative Analysis of Oregon Coals....Miles Bebee Belden
A Study of Furnace Slags....Arthur Amos Garrett, Howard Clayton Getz
The Cyanide Process as Applied to the Extraction of Gold from the Tailings of the Star Mine....Cyrus Ross McCormick, Fred Miller Roth
A Geological Report with a Qualitative and Quantitative Analysis of the Ores of the Ogle Creek Mining District....Joseph Lucine Ringo

LITERARY COMMERCE.

The Panama Canal....Harry Benjamin Auld
Lichens, A Study....Annie Laura Hill
Negotiable Instruments Law....Elmer Philander Rawson
Negotiable Instruments Law....Agnes von der Hellen
Art in Landscape Gardening....Bessie Hart Wilson

I would ask that the Board approve this action that a proper record thereof may be made on the minutes.

The following, taken from my report to the Department of the Interior, may give some valuable information:—

OREGON AGRICULTURAL COLLEGE.

CORVALLIS, OREGON, June 30, 1906.

Report of the President of said institution to the Secretary of the Interior and the Secretary of Agriculture, as required by act of Congress of August 30, 1890, in aid of Colleges of Agriculture and Mechanic Arts.

I. Condition and Progress of the Institution for the year ended June 30, 1906, especially—

(1) Changes in courses or methods of instruction if of sufficient importance to warrant mention, and (2) purpose, structural character, and cost of new buildings or addition to buildings.

(1). A four-year course in Forestry leading to the degree of B. S. has been added to the other eight courses.

(2). No new buildings.

II. Value of Additions to Equipment during the year ended June 30, 1906.

(a) Permanent endowment	$
(b) Buildings	
(c) Library	696.69
(d) Apparatus	355.67
(e) Machinery	446.70
(f) Live stock	441.90
(g) Miscellaneous	6,000.00
Total	$ 7,940.96

III. Receipts for and during the year ended June 30, 1906.

Balance on hand, July 1, 1905	$ 5,207 47
1. State aid. (a) Income from endowment granted by State	$
(b) Appropriation for current expenses	

	(c) Appropriation for buildings or for other special purposes	25,000.00
2. Federal aid.	(a) Income from land grant, act of July 2, 1862	12,293.05
	(c) Additional endowment, act of August 30, 1890	25,000.00
4. Fees and all other sources.	(b) Incidental fees	1,271.26
	(c) Miscellaneous receipts, farm, etc.	4,459.13
5. Total		$73,230.91
6. Federal appropriation for experiment station, act of March 2, 1887		15,000.00

IV. Property, year ended June 30, 1906.

Value of all buildings, $160,000; of apparatus, $5,000; of machinery, $27,000; Total number of acres in farm and grounds, 209.63; acres under cultivation, 110; acres used for experiments, 50; value of farm and grounds, $37,000; number of acres of land allotted to State under act of July 2, 1862, 90,000. acres still unsold, 4,200; value of unsold land, $5,000. Amount of land-grant fund of July 2, 1862, $193,778. Number of bound volumes in library, June 30, 1906, 4,500.

V. Professors and Instructors during the year ended June 30, 1906.

	MALE.	FEMALE.
1. College of Agriculture and Mechanic Arts:		
(a) Preparatory classes or schools		
(b) Collegiate or special classes	30	6
(c) Total, counting none twece	30	6
2. Number in all other departments (avoiding duplication)		
3. Number of staff of experiment station	13	

V. Students during the year ended June 30, 1906.

	MALE.	FEMALE.
1. College of Agriculture and Mechanic Arts:		
(a) Preparatory classes or schools	88	22
(b) Collegiate classes	384	108
(c) Post-graduate courses	10	8
(d) Short or special courses	41	74
Total, counting none twice	523	212
2. Number in all other departments (excluding duplication)		

3. Number of college students in regular four year courses of study in agriculture, 66; mechanical engineering, 138; electrical engineering, 21; mining engineering, 41; household economy, 65.
4. Number of students in short or special courses in agriculture, 28.
5. Number of students in course of study in veterinary medicine, in pharmacy, 70.
6. Number of students in military drill, 523.
7. How many students graduated from undergraduate college courses during the year ended June 30, 1906: Men, 26; women, 16.
8. Average age of students graduated from undergraduate college courses during year ended June 30, 1906:
9. What degrees and how many of each kind were conferred during year ended June 30, 1906:
   On men, B S., 26. M. S., 3.
   On women, B S , 16
19. What and how many honorary degrees were conferred during year ended June 30, 1906?
   One, Ph. D.

(Date:) July 25, 1906.

Accompanying find report of the Director of the Station.

Respectfully submitted,

THOS. M. GATCH,

President of the Oregon Agricultural College and Experiment Station.

REPORT OF THE DIRECTOR.

President Thomas M. Gatch:

DEAR SIR:—I have the honor to submit herewith the annual report of the Experiment Station for the year ending July 1, 1906.

The work of the Station is steadily increasing and its scope of usefulness constantly broadening. Each department during the past year has shown a material increase in its correspondence and general research work.

The rapidly changing conditions in agriculture and the development of many new industries have brought to the various departments of the Station much routine work. Much of this work is of such a character as to demand a great deal of time and careful thought. This is especially apparent in the department of chemistry. In order to adequately meet the demands on this department it will be absolutely necessary to provide for additional assistants.

Demands upon the time of the entomologist are also constantly growing. This department is rapidly becoming of great economic value to the agricultural and horticultural interests of the state. Good progress has been made in evolving methods for the control of fruit pests, and at present the department is engaged in valuable cooperative experimental work with farmers in Multnomah and Clackamas counties for the control of potato blight.

The endeavors of the department of bacteriology are recognized by farmers and horticulturists as being of great value to their respective interests. Much important routine work is accomplished by this department in the investigation of bacterial diseases of domestic animals and poultry and bacteriological analyses of water and food products. The major work of the department at present is the continuation of the experimental work with canning fruit and vegetables under comparatively low temperature and the retting of flax by means of specific bacterial action.

It is gratifying to contemplate that the immense horticultural interests of the state are to receive due recognition from the Station. Since so little has been done in the horticultural department of the Station for a number of years, the time is exceedingly opportune to launch immediately upon a vigorous campaign of investigation and cooperative experimental work. The state possesses almost illimitable opportunities for horticultural development, thus presenting to the Experiment Station an exceptionally broad field for practical and scientific research work. In view of the fact that our state is geologically divided into several divisions, varying materially in the character of soil and climate, would suggest that the most feasible plan to expedite the development of our horticultural interests would be through cooperative work with growers. This method of procedure would be especially beneficial in an effort to test the adaptability of varieties for high altitudes such as are found in the agricultural sections of Harney, Crook, Lake and Klamath counties. With these conditions and many other important commercial prob-

lems confronting the work it would seem that the horticulturist could profitably devote considerable time to field work and the routine work of the station may be delegated to a competent assistant. Therefore, I respectfully recommend that the position of assistant horticulturist be created.

There are two important branches of agriculture unrepresented at this Station: poultry and apiculture.

The production of poultry and eggs is rapidly assuming an important economic factor in the agricultural interests of the state. There is a great demand for information on poultry, especially so at farmers' institutes. The field for experimental and demonstration work with poultry is undoubtedly large and worthy of the attention of the station. A well conducted poultry department of the Station can be made of great value to the productive interest of the state.

The economical production of honey is not the only consideration in apiculture. Successful pollenization of fruits rests largely with the supply and activity of bees. There is also a possible large and important field for experimental work with bees for the fertilization of red clover. It is thought that there are races of bees which possess a sufficiently long proboscis to enable them to fertilize clover. A bee of this character would be invaluable to the farmer engaged in the production of red clover seed.

In view of the economic value of poultry and bees to the agricultural interests of the state, I would respectfully suggest that a department of poultry and apiculture be established and a competent person be given charge of this work.

General Agriculture.—The same general lines of work have been continued during the past year. This includes systems of crop rotation; production of soiling crops; observations in cultural methods; variety tests with cereals, forage plants and plant selection.

Alfalfa.—The Station has demonstrated that alfalfa can be successfully grown in western Oregon. There are, however, several minor problems relative to this crop that yet remain to be worked out. The most important of these are: Manner of seeding; soil inoculation and soil acidity. For the purpose of making observations along these lines three acres were seeded to alfalfa in the spring of 1905. One acre was sown with seed treated with nitro culture secured from the National Department of Agriculture. One-half acre was treated with air-slaked lime at the rate of 2000 pounds per

acre. One-half of this plot was sown with treated seed and the other was treated with inoculated soil. One-half acre was sown without inoculation and the remaining acre was treated with inoculated soil at the rate of 200 pounds per acre. The first cutting from these plats was so generally contaminated with weeds that no account of the yield was kept. Subsequent cuttings, however, will be carefully recorded.

For the purpose of encouraging the more general growing of alfalfa in western Oregon, the Station cooperated with the Southern Pacific Railroad Company in furnishing farmers who desired to grow alfalfa, inoculated soil free of cost. In this ocoperative work the Station supplied 160,652 pounds of inoculated soil to 248 farmers.

ANIMAL HUSBANDRY.—Soiling of the dairy herd has been continued and results indicate that this method is more economical than pasturing on high priced land.

A comparative feeding test of 89 days was made with a matured Jersey and a Shorthorn cow. The Jersey consumed 534 pounds of ground barley, 3100 pounds of corn silage and 898 pounds of mixed hay. Gain in live weight 220 pounds. The Shorthorn cow consumed 534 pounds of ground barley, 4345 pounds of corn silage and 1301 pounds of mixed hay. Gain in live weight 225 pounds. Thus it will be seen that the Jersey cow made the better gain of the two for food consumed.

Feeding experiment with swine were undertaken to demonstrate the relative value of ground wheat, ground barley and ground vetch. Twelve shotes were divided into three lot. Lot 1 consumed 1498 pounds of ground wheat in 60 days and gained in live weight 281 pounds. Wheat consumed for one pound gain in live weight 5.3 pounds. Lot 2 consumed 1498 pounds ground barley, gained 318 pounds. Barley consumed for one pound gain in live weight 4.7 pounds. Lot 3 consumed 751 pounds of ground vetch, gained 78 pounds. Vetch consumed for one pound gained 9.6 pounds. It is quite apparent from this experiment that vetch as a single article of diet is unsatisfactory. The hogs did not relish it. Doubtless better results would have been obtained if wheat or barley had been added to the vetch ration. This experiment, however, demonstrates rather markedly the value of barley as a fattening food for swine.

Another experiment with swine feeding was undertaken to determine the value of a supplementary feed of skim milk with grain, also to make comparative tests with swine fattened in close pens

with plank floors as against hogs given an opportunity to exercise in open lots.

Eighteen shotes were equally divided into three lots. Lot 1 confined in close pen consumed in 61 days 2776 pounds ground wheat, gained 655 pounds. Wheat consumed for one pound gain in live weight, 4.23 pounds. Lot 2 had privilege of open yard, consumed 2597 pounds ground wheat, gained 590 pounds. Wheat consumed for one pound gain, 4.40 pounds. Lot 3 confined in close pen, consumed 2460 pounds of ground wheat and 5586 pounds of skim milk, gained 945 pounds. Grain and milk consumed for one pound gain, 2.70 pounds of wheat and 5.91 pounds of skim milk.

It will be noted that there is but a slight difference in the results between the Lots 1 and 2 but the supplementary milk in Lot 3 was very beneficial, demonstrating that when wheat was worth 1 cent per pound skim milk, in this instance, was worth 27 cents per cwt.

FARMERS' INSTITUTES.—Under state aid we have been enabled to conduct more institutes than usual. However, the Station Staff should be relieved of the necessity of attending many institutes as it seriously interferes with research work. We have, however, during the past year secured the services of practical farmers and horticulturists with very good results. The major portion of the institute work should be done by specially selected institute workers other than members of the Station Staff. It would also seem advisable to employ a competent stenographer who can report the proceedings of the institutes so that the addresses and discussions can be compiled, edited and printed for general distribution among farmers.

There were 44 institutes held during the past year, representing 16 counties. Total number of sessions 109. Aggregate attendance 16,350. Total expense of institutes $1,174.73.

Two original bulletins and the second edition of two bulletins were issued during the past year. The former, No. 87, "Canning Fruit and Vegetables and Preserving Fruit Juices," and No. 88, "San Jose Scale." The latter, No. 75, "Insecticides and Fungicides" and No. 76, "Leguminous Forage Plants."

Receipts from sales of farm commodities, live stock and dairy products, $1,424.80.

Respectfully submitted,

JAMES WITHYCOMBE.