

00786  
C.3  
DOCUMENT COLLECTION  
OREGON COLLECTION  
FOURTEENTH BIENNIAL REPORT

OF THE

**DISCARD**  
OREGON

STATE AGRICULTURAL COLLEGE

TO THE

Legislative Assembly.

FOURTEENTH REGULAR SESSION--1887.



SALEM, OREGON:  
W. H. BYARS, STATE PRINTER.  
1886.

FOURTEENTH BIENNIAL REPORT

OF THE

OREGON

STATE AGRICULTURAL COLLEGE

TO THE

Legislative Assembly.

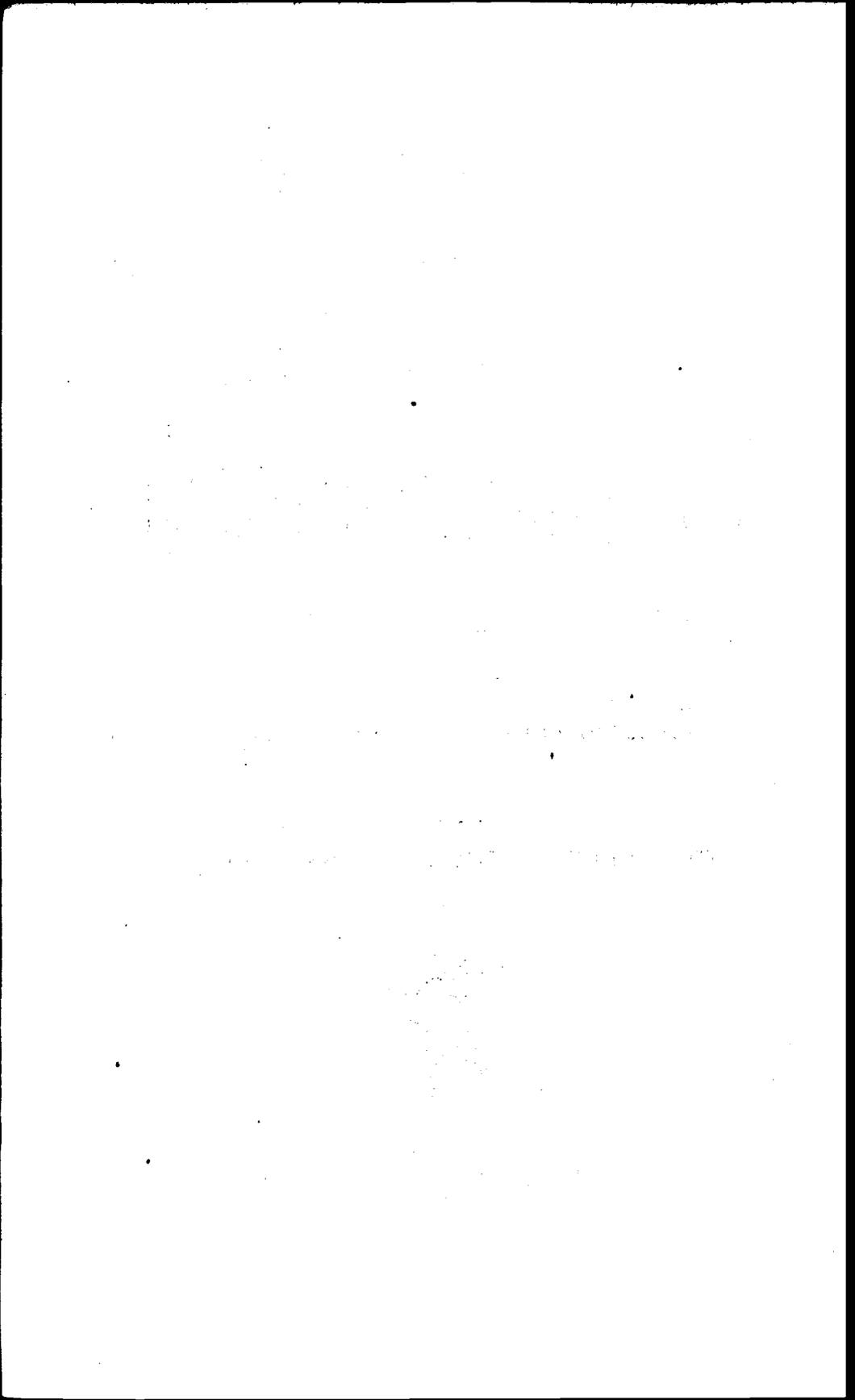
---

FOURTEENTH REGULAR SESSION--1887.

---



SALEM, OREGON:  
W. H. BYARS, STATE PRINTER.  
1886.



# BIENNIAL REPORT.

---

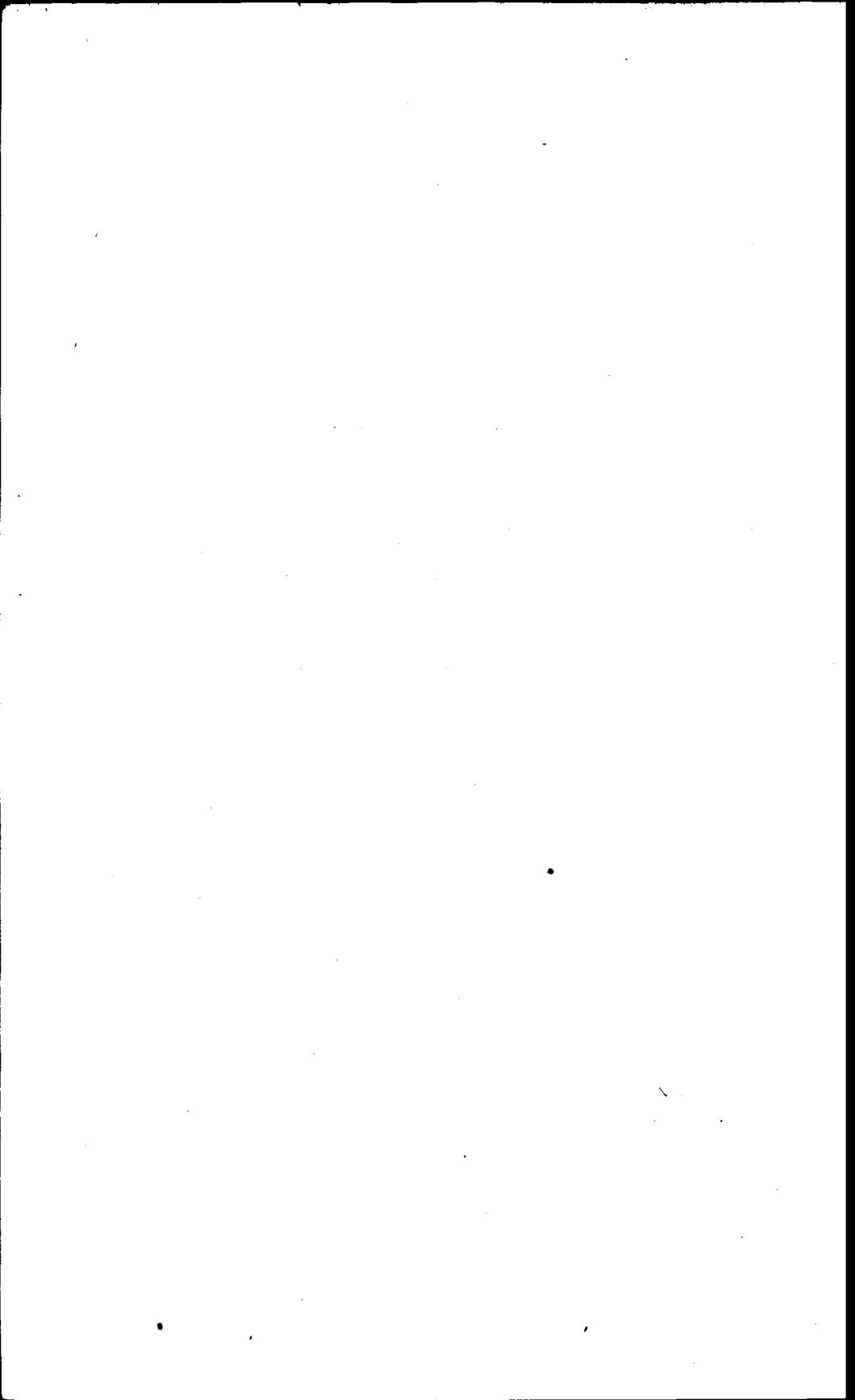
CORVALLIS, Oregon, Dec. 20, 1886.

*To His Excellency, Gov. Z. F. Moody :*

SIR—I have the honor respectfully to submit the Fourteenth Biennial Report of the Oregon State Agricultural College.

Very Respectfully,

B. L. ARNOLD,  
President.



# REPORT.

---

*To His Excellency Gov. Z. F. Moody :*

SIR—I deem it desirable to bring before the Legislative Assembly the various laws of the United States, and of Oregon, that relate to the establishment and organization of the Agricultural College. And I wish, especially, to call attention to one or two points in the law of Congress. Section 5, Article 4, requires that the State accepting the grant shall cause a printed report of its Agricultural College to be transmitted to each and every Agricultural College in the United States. This has not been done in case of Oregon, although I have frequently called attention to the law. The officers of our State say that they are not authorized to issue [more] than three hundred perhaps. I think, however, that the State in accepting the grant of Congress virtually enacted a law authorizing our officers to issue as many reports as may be needful to fulfill the law. Other Colleges have well-nigh ceased to send us their reports, and they have frequently called our attention to the Congressional law. And, besides this, some of the Agricultural Colleges outside of the United States send us their reports, from which we frequently gain valuable information. We ought, I think, to return our report.

## TACTICS.

The law of Congress requires us to teach tactics. To do this requires a man trained in a military school, and, as we are in need of an additional Professor, I suggest that the Legislature provide for this. An addition of some twelve hundred dollars to our present appropriation would enable us to employ a military man who could teach some other branches of knowledge and at the same time teach tactics.

## EXPERIMENT STATIONS.

I call attention to the subject of experiment stations in the report. This is a most important matter and demands the most serious attention of the Legislature. Experience proves that experiments to

be valuable must be made with attention to many exact conditions, and these require large expense; the Faculty of Tuition cannot economically devote their time to experimenting, either the teaching or the experimenting will be slighted. Hence many of the States have established at their Agricultural Colleges what are called experiment stations after the fashion of Germany, and there is a bill in Congress, called the Hatch bill, whose object is to endow these stations. Allow me most respectfully to ask the Legislature to memorialize Congress on this bill.

#### COLLEGE RULES.

The rule 4, relating to intoxicating liquors and games, I regard as unjust; it punishes the student and lets the saloon-keeper go free; in other words it furnishes a youth for entering a trap which a vile man has set for him, and it permits the trapper to go unpunished. This is unjust.

#### TECHNICAL EDUCATION.

I wish to call attention to the advancement of technical education. There has been much done recently to promote technical education in Europe and elsewhere, and, if we are to keep pace with civilization, we must look well to this matter. Our young people must prepare themselves for strong competition from abroad. Lower civilization must give place to higher. This is true of States, as well of individuals—the weaker must yield to the stronger in the progress of society. Mr. J. S. Russell, an English writer of force, says: "When education has given to each man a knowledge of all the branches of his work, and there remains no difference of rank, excepting superior skill and intelligence, then each man's individual work will be weighed in the balance, and the true share of his merit will be appraised in the scale of wages. Equality will be then, as now, impossible, but the scale of each man's life may be one of steady, continual, meritorious rise." Again, he says, "The farmer (in addition to a fundamental education) should be educated in sciences, elementary engineering, mechanics and agriculture. \* \* The machinist must master all the known powers of material nature. Architects, engineers, teachers and all classes of workers require technical education." Again, Mr. Stetson, in his work on technical education, says: "The person who has general charge of any business should understand the business both theoretically and practically. His knowledge of principles should be such as to enable him to instruct any subordinate requiring instruction, to de-

termine at once the comparative value of different processes of work, or to invent new ones when emergencies require it. In a word, he should be able to reach just conclusions at once by a knowledge of principles, and not slowly by trial and error. He should be workman enough to know when work is well done, that he may not be cheated by those under him, and that he may be able to render justice to all by daily discriminating between the skilled and unskilled laborer. He should understand his business, as a whole, and the relation of each part to the whole. Neither skilled workmen nor tariffs can compensate for stupidity on the part of the superintendent. Only the very few exceptional geniuses, like Stephenson, become thus qualified to take charge of enterprises, great or small, without special school instruction."

2. "The workman should not only be dexterous in manipulation; he should certainly know so much of the theory of his business as will enable him readily to comprehend all instructions, verbal or graphic, given for his guidance. The more extended and thorough his knowledge of principles the better. Such a workman requires very little supervision; he executes with rapidity; he wastes the least possible; he adapts himself readily to new methods; he devises novel and better ways for doing even the simplest things; he is the first to be promoted, he is the last to be discharged; he always commands the best wages, and yet his labor is the cheapest in the market. On the other hand, the workman who works only by 'rule of thumb,' though he may be dexterous, lacks logic, lacks invention, lacks adaptability; indeed, only is a better kind of machinery.

3. "The workman should be better instructed because of the machinery used, since it is the rude or dexterous workman, rather than the really skilled workman, who is supplanted by machinery. Skilled labor requires thinking, but a machine never thinks, never judges, never discriminates. Objects which have a simple and regular form, and require high finish or not, may be made with advantage by machinery, if the objects are produced in large numbers. Most kinds of work which demand little besides strength for their execution can usually be best done by machinery, too. Though the employment of machinery does, indeed, enable rude laborers to do many things now which formerly could be done only by dexterous workmen, yet, after making allowance for all the bearings of the question, it is clear that the use of machinery has decidedly increased the relative demand for skilled labor, as compared with unskilled labor, and there is abundant room for an additional increase if it is true, as declared by the most eminent authority, that the power now expended can be readily made to yield three or

four times its present results, ultimately ten or twenty times when masters and workmen can be had with sufficient intelligence and skill for the direction and manipulation of the tools and machinery that would be invented.

4. "All those persons whose business it is to produce new combinations of matter—such as the farmer, miner, dyer, bleacher, founder, maker of machinery, and numerous others—should have a knowledge of chemistry. Without such knowledge, which is an essential element of skilled labor in these departments of industry, neither rude nor dexterous labor can produce satisfactory results.

5. "The utmost effort should be made to produce articles of beautiful design, whether in form or color, or both. The difference between good design and poor design is the difference between success and failure in the market of the world. When the beauty of the object depends, as it usually does, upon its own form, or upon the form of the applied decoration, the workman should be one who has been thoroughly instructed in artistic drawing and designing. Not only should the originator of the design have been thus instructed, but also the reproducer of the design in wood, metal, earth, or other substance.

6. "For the most successful prosecution of any great enterprise in land or naval architecture, in the construction of railroads, canals, machinery, there should not only be an abundance of thorough and expert draughtsmen, but each workman should be draughtsman enough to make a drawing of any object he is required to construct. Of two competing establishments, the one having such workmen, the other not, the former would not only win, but would distance the latter every time." I have quoted thus at length because these high authorities show in these strong words both the object and value of technical education at the same time, and they *well* show both. We are doing all we can to organize the mechanical department at the Agricultural College; but little can be done till the Legislature shall supply shops for the application of mechanical principles; we need models, and models can be furnished at moderate cost.

#### MANUAL LABOR.

How much manual labor should be required of students is still an unsettled question. There is little or no time in the winter fit for labor out of doors. When the Legislature provides shops for mechanical work, the study of mechanical processes and structures will require all the manual labor needful for their thorough com-

prehension, and that will be considerable. I believe that manual labor should be a matter rather of encouragement than of force.

#### VETERINARY MEDICINE.

I believe that the Legislature should establish at the Agricultural College a chair of Veterinary Medicine at once. When we reflect that the loss of even a thousand cattle by disease would be the loss of from \$20,000 to \$25,000, a small sum might, we think, be risked in the attempt to give the farming community all the aid from knowledge that the world of science can produce. A large part of the wealth of our state consists in live stock, and our youth who attend the Agricultural College should have the benefit of all the known principles of veterinary surgery and therapeutics.

Thanking you and our State officers for the courteous treatment received at their hands, in the name of the Board of Trustees and Faculty of the College, I subscribe myself most respectfully, yours truly,

B. L. ARNOLD.

---

#### AN ACT

*To Accept the Proposition of the Congress of the United States Granting Lands to the State of Oregon for Agricultural Colleges.*

WHEREAS, The Congress of the United States did pass an act, in effect following, to-wit: An act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts:

SECTION 1. *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That there be granted to the several States, for the purposes hereinafter mentioned, an amount of public land, to be apportioned to each State, in quantity equal to 30,000 acres for each Senator and Representative in Congress, to which the States are respectively entitled by the apportionment under the census of 1860; *Provided,* That no mineral lands shall be selected or purchased under the provisions of this act.

SEC. 2. *And be it further enacted,* That the land aforesaid, after being surveyed; shall be apportioned to several States in sections, or sub-divisions of sections not less than one-quarter of a section, and whenever there are public lands in a State subject to sale at private entry, at one dollar and twenty-five cents per acre, the quantity to which said State shall be entitled shall be selected from such lands

within the limits of such State, and the Secretary of the Interior is hereby directed to issue to each of the States in which there is not the quantity of public lands subject to sale at private entry, at one dollar and twenty-five cents per acre, to which said State may be entitled under the provisions of this act, land scrip to the amount in acres for the deficiency of its distributive share; said scrip to be sold by said State, and the proceeds thereof applied to the uses and purposes described in this act, and for no other use or purpose whatsoever; *Provided*, That in no case shall any State to which land scrip may thus be issued be allowed to locate the same within the limits of any other State, or of any Territory of the United States; but their assignees may thus locate said land scrip upon any of the unappropriated lands of the United States subject to sale at private entry, at one dollar and twenty-five cents per acre; and, *Provided further*, That not more than one million acres shall be located by such assignees in any one of the States; and, *Provided further*, That no such locations shall be made before one year from the passage of this act.

SEC. 3. *And be it further enacted*, That all expenses of management and superintendence and taxes from date of selections of said lands previous to their sale, and all expenses incurred in the management and disbursement of the moneys which may be received therefrom, shall be paid by the States to which they may belong out of the treasury of said States, so that the entire proceeds of the sale of said lands shall be applied without any diminution whatever to the purposes hereinafter mentioned.

SEC. 4. *And be it further enacted*, That all moneys derived from the sale of lands aforesaid, by the States to which the lands are apportioned, and from the sale of land scrip hereinbefore provided for, shall be invested in stocks of the United States, or of the States, or some other safe stocks, yielding not less than five per centum upon the par value of said stocks; and that the money so invested shall constitute a perpetual fund, the capital of which shall remain forever undiminished (except so far as may be provided in Section 5 of this act), and the interest of which shall be inviolably appropriated by each State which may take and claim the benefit of this act to the endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislature of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.

SEC. 5. *And be it further enacted*, That the grant of land and land scrip hereby authorized, shall be made on the following conditions, to which as well as to the provisions hereinbefore continued, the previous assest of the several States shall be signified by legislative acts :

1. If any portion of the fund invested, as provided by the foregoing section, or any portion of the interest thereon, shall, by any action or contingency, be diminished or lost, it shall be replaced by the State to which it belongs, so that the capital of the fund shall remain forever undiminished ; and the annual interest shall be regularly applied without diminution to the purposes mentioned in the fourth section of this act, except that sum, not exceeding 10 per centum upon the amount received by any State under the provision of this act, may be expended for the purchase of lands for sites or experimental farms, whenever authorized by the respective Legislatures of said States.

2. No portion of said fund, nor the interest thereon, shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings.

3. Any State which may take and claim the benefit of the provisions of this act shall provide, within five years at least, not less than one college, as described in the fourth section of this act, or the grant to such State shall cease; and said State shall be bound to pay the United States the amount received of lands previously sold, and the title to purchase under the State shall be valid.

4. An annual report shall be made regarding the progress of each college, recording any improvements and experiments made, with their cost and results, and such other matters, including State industrial and economical statistics, as may be supposed useful, one copy of which shall be transmitted by mail free by each to all the other colleges which may be endowed under the provisions of this act, and also one copy to the Secretary of the Interior.

5. Where lands shall be selected from those which have been raised to double the minimum price in consequence of railroad grants, they shall be computed to the States at the maximum price, and the number of acres proportionately diminished.

6. No State, while in a condition of rebellion or insurrection against the government of the United States, shall be entitled to the benefit of this act.

7. No State shall be entitled to the benefit of this act unless it

shall express its acceptance thereof by its Legislature, within two years from the date of its approval by the President.

SEC. 6. *And be it further enacted*, That land scrip issued under the provisions of this act shall not be subject to location until after the first day of January, 1863.

SEC. 7. *And be it further enacted*, That the land officers shall receive the same fees for locating land scrip issued under the provisions of this act as is now allowed for the location of military bounty land warrants under existing laws; *Provided*, That maximum compensation shall not be thereby increased.

SEC. 8. *And be it further enacted*, That the Governor of the several States to which scrip shall be issued under this act shall be required to report annually to Congress all sales made of such scrip until the whole shall be disposed of, the amount received for the same, and what appropriation has been made of the proceeds.

Therefore:

SECTION 1. *Be it enacted by the Legislative Assembly of Oregon*, That each and all of the propositions in said act of Congress offered to the State of Oregon are hereby irrevocably adopted, with all the conditions and obligations therein contained.

Sec. 2. WHEREAS, The time for acceptance of said proposition will expire before the next regular session of the Legislature of Oregon, there being no law accepting the same; and,

WHEREAS, It is expedient to make provision for locating said lands as soon as possible, therefore this act shall take effect and be in force from and after its passage.

JOEL PALMER,  
Speaker House Representatives,  
WILSON BOWLBY,  
President of the Senate.

Approved October 9, 1862.

ADDISON C. GIBBS,  
Governor of Oregon:

STATE OF OREGON,  
OFFICE OF THE SECRETARY OF STATE, }  
SALEM, November 24, 1886.

I, R. P. Earhart, do hereby certify that I am the Secretary of State of the State of Oregon, and custodian of the Great Seal thereof; that the foregoing transcript of the an act to accept the proposition of Congress of the United States granting lands to the State of Oregon for Agricultural Colleges, has been by me compared with the original copy of the said act now on file in this office, and that

it is a true and correct transcript thereof, and the whole of said original act.

In testimony whereof, I have hereunto set my hand and affixed hereto the Great Seal of the State of Oregon. Done at the Capitol at Salem, Oregon, this 24th day of November, A. D. 1886.

[SEAL.]

R. P. EARHART,  
Secretary of State.

---

## OFFICERS DETAILED FOR COLLEGES.

(United States Revised Statutes, 1878.)

SECTION 1225. The President may, upon the application of any established college or university within the United States, having capacity to educate, at the same time, not less than one hundred and fifty students, detail an officer of the army to act as president, superintendent or professor thereof; but the number of officers so detailed shall not exceed thirty at any time, and they shall be apportioned throughout the United States, as nearly as may be practicable, according to population. Officers so detailed shall be governed by general rules prescribed from time to time by the President. The Secretary of War is authorized to issue, at his discretion and under proper regulations to be prescribed by him, out of any small arms or pieces of field artillery belonging to the Government, and which can be spared for that purpose, such number of the same as may appear to be required for military instruction and practice by the students of any college or university under the provision of this section; and the Secretary shall require a bond in each case, in double the value of the property, for the care and safe keeping thereof, and for the return of the same when required.

---

## ENGINEERS IN NAVY DETAILED FOR COLLEGES.

(Sup. Revised U. S. Statutes, Vol. I., Chap. 105.)

That, for the purpose of promoting a knowledge of steam-engineering and iron-ship building among the young men of the United States, the President may, upon the application of an established scientific school or college within the United States, detail an officer from the Engineer Corps of the Navy as Professor in such school or college: *Provided*, That the number of officers so detailed shall not

at any time exceed twenty-five, and such details shall be governed by rules to be prescribed from time to time by the President: *And provided further*, That such details may be withheld or withdrawn, whenever, in the judgment of the President, the interests of the public service shall so require.

---

## STANBARD WEIGHTS AND MEASURES FOR AGRICULTURAL COLLEGES.

(United States Statutes, Vol. 21, Res. 26.)

That the Secretary of the Treasury be, and is hereby, directed to cause a complete set of all the weights and measures adopted as standards, to be delivered to the Governor of each State in the Union, for the use of Agricultural Colleges in the States, respectively, which have received a grant of lands from the United States, and also one set of the same for the use of the Smithsonian Institutions; *Provided*, That the cost of each set shall not exceed two hundred dollars, and a sum sufficient to carry out the provisions of this resolution, is hereby appropriated out of any money in the Treasury not otherwise appropriated.

The following are the acts of the Oregon Legislative Assembly regarding the Agricultural College.

General Laws of the State of Oregon for 1868, page 40.

---

### AN ACT

*To Secure the Location of the Lands Donated by Congress to the State for an Agricultural College, and to Establish such College.*

SECTION 1. *Be it enacted by the Legislative Assembly of the State of Oregon*, That J. F. Miller, J. H. Douthit and J. C. Avery are hereby constituted a Board of Commissioners with power—

(1.) To locate all the lands to which this State is entitled by act of Congress for the purpose of establishing an Agricultural College; and as soon as such locations are made, to report the same to the Secretary of State; to take into consideration the further organization and perfecting of a plan for the permanent establishment of said College, in accordance with the requirements of the act of

Congress making such donation, and report the same to the Governor by the first day of August, 1870.\*

SEC. 2. That, until other provision can be made, the Corvallis College is hereby designated and adopted as the Agricultural College, in which all students sent under the provisions of this act shall be instructed in all the arts, sciences and other studies, in accordance with the requirements of the act of Congress making such donation.

SEC. 3. Each Senator is hereby authorized and empowered to select one student, not less than sixteen years of age, who shall be received by the Faculty of said College and instructed by them in the manner provided in this act, for the space of two years, unless such student shall be discharged for misconduct; *Provided, however,* That this act shall not be binding until the Trustees of said College shall adopt a resolution and file a certified copy thereof with the Secretary of State, assenting to, and agreeing on their part, to faithfully carry out the provisions of this act.

Approved October 27, 1868.

The following is so much of the law of 1870 as will make the legislative history of the Agricultural College plain:

See Acts of 1870, page 17.

---

## AN ACT

*To permanently locate the Agricultural College of Oregon.*

SECTION 1. *Be it enacted by the Legislative Assembly of the State of Oregon,* That 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 Agriculture and the Mechanic Arts, and the acts amendatory thereof.

SEC. 2. The following persons, to-wit, J. C. Avery, L. F. Grover and N. H. Cranor, are hereby constituted a Board of Commissioners to propose a plan for the instruction and education of the students in said Agricultural College, and to prepare rules, regulations and by-laws for the government of the same, all of which shall be submitted to the Legislative Assembly at its next regular session for its adoption or rejection, and, in the meantime the said College shall be

---

\*This report could not be found.

governed by and under the provisions of the act of the Legislative Assembly approved the 27th day of October, 1868, in relation to said College.

SEC. 3. That the Board of Trustees of Corvallis College shall, by resolution, accept the provisions of this act, and agree to be bound by the same within thirty days after its passage, and cause a copy of said resolution to be filed with the Secretary of State, and upon their failure to do so they shall be deemed to have rejected its provisions.

Approved October 21, 1870.

## ACCEPTANCE OF TRUSTEES OF CORVALLIS COLLEGE.

---

“A special meeting of the Board of Trustees of Corvallis College was held in the College building in the city of Corvallis, Benton county, Oregon, October 29, 1870, at which the following preambles and resolutions were unanimously adopted.” [I leave out the preambles; the following are the resolutions:]

*Resolved*, By the Board of Trustees of Corvallis College, that said Board does accept the provisions of said act of the Legislative Assembly aforesaid, and they do agree to be bound by the same.

*Resolved*, That the Secretary of the Board is hereby directed forthwith to forward to the Secretary of the State of Oregon a copy of the foregoing preambles and resolutions.

R. S. STRAHAN,  
President.

Attest:

B. R. BIDDLE, Secretary.

Filed in the office of Secretary of State November 2, 1870.

REPORT  
OF THE BOARD OF COMMISSIONERS ON REGULATIONS  
AND COURSE OF STUDY FOR THE AGRICUL-  
TURAL COLLEGE OF OREGON.

*To the Honorable, the Legislative Assembly of the State of Oregon:*

We, the undersigned Commissioners, appointed by the act of the Legislative Assembly of the State of Oregon, approved October 21, 1870, entitled, An Act to permanently locate the Agricultural College of Oregon, pursuant to the requirements of said Act, beg leave to make the following report, prescribing rules, regulations and by-laws for the government of said institution.

J. C. AVERY.  
L. F. GROVER.  
N. H. CRANOR.

## COURSE OF STUDY.

*Prescribed by the State.*

---

## PREPARATORY CLASSES.

*Mathematics*—Arithmetic, Algebra.

*English*—Reading, Spelling, Geography, English Grammar, Penmanship, Composition, Elocution, History of United States.

*Natural Science*—Natural History, Philosophy, Physiology.

*Languages*—Latin Grammar, Latin Reader, Greek Grammar, Greek Reader, French Grammar and Reader, German.

*Military Exercises*—Tactics, Drill.

*Agricultural*—Practical instruction on Farm.

## FRESHMAN CLASS.

*Mathematics*—Algebra, Geometry.

*English*—Rhetoric, Composition, History, Book-keeping.

*Natural Science*—Inorganic and Organic Chemistry, Qualitative Analysis, Structure and Physiology of Plants, Water, Atmosphere and Soil in their relations to Vegetable Production, Meteorology, Zoology, Botany, Physical Geography.

*Languages*—Ancient Geography, Roman Antiquities, Virgil, Cicero, Greek Antiquities, Greek Testament, Homer, French, German.

*Agriculture*—Theory and Practice of Agriculture, Principles of Tillage, Drainage, Landscape Gardening.

*Military*—Tactics, Drill.

*Excursions*—Botanical, Zoological.

## SOPHOMORE CLASS.

*Mathematical*—Trigonometry (plane and spherical), Navigation, Mensuration, Surveying, Field Surveying, Drawing Maps of Farms, etc.

*English*—Rhetoric, Logic, Composition, Elocution, Book-keeping, Universal History.

*Natural Science*—Analysis of Minerals, Ores, Soils, Manures, Ashes of Plants, Mineral Waters, etc., etc.; Practice in Mineralogy, Etymology, Geology, Botany.

*Languages*—Roman and Greek Antiquities, Sallust, Horace, Odes and Ephodes, Greek Testament, Homer, French, German.

*Agriculture*—Theory and Practice of Agriculture, Horticulture, Farm Implements and Drainage, Stock Breeding.

*Excursions*—Geological, Botanical.

## JUNIOR CLASS.

*Moral Philosophy*—Evidences of Natural and Revealed Religion, Moral Philosophy, Political Economy.

*Mathematics*—Analytical Geometry, Differential and Integral Calculus, Practical Surveying and Engineering.

*English*—Mental Philosophy, English Literature.

*Natural Science*—Qualitative and Quantitative Analysis, Mineralogy, Chemistry, Geology, Organic Analysis.

*Languages*—Livy, Horace's Satires, Epistles, etc.; Odyssey, De Corona, Latin and Greek Composition, French, German.

*Agriculture*—Theory and Practice of Agriculture, Training and Culture of Fruit Trees, the Vine, Small Fruits, Culture of Flowers.

*Military*—Tactics, Drill.

## SENIOR CLASS.

*Moral Philosophy*—Evidences of Natural and Revealed Religion (continued).

*Mathematical*—Mechanics, Astronomy, Civil Engineering.

*Natural Science*—Chemistry (completed); Quantitative Analysis.

---

*Languages*—Juvenal, Cicero, Tacitus, Alcestis, Thucydides, Demosthenes.

*Agriculture*—Theory and Practice of Agriculture, Laying Out of Lawns, Ornamenting Grounds, etc.

*Military*—Tactics, Drill.

## COLLEGE RULES.

*Prescribed by the State.*

---

RULE 1. No student can enter a class with any professor until he shall have been admitted to the College and enrolled by the *President*.

RULE 2. All students must attend the opening religious services of each day.

RULE 3. All students will be required to observe "study" hours, and not be found loitering in the streets, in shops, or at places of amusement during these hours.

RULE 4. No student shall play at cards or billiards, or *at any time visit places of gambling or drinking*, or buy, keep, or use in his room or elsewhere any intoxicating liquors.

RULE 5. No one can remain a member of the Institution who is idle or vicious, or whose influence is detrimental to the discipline or reputation of the College.

RULE 6. No student will be allowed to smoke on or near the College grounds.

RULE 7. All students will be required to abstain from all profane and obscene language, and all noisy or disorderly conduct about the College buildings.

RULE 8. Students must attend promptly to their duties and studies assigned them, and in no case suspend a study or change a recitation without permission.

RULE 9. A record of the scholarship and deportment of each student will be kept, and this will at all times be open to the inspection of parents and guardians.

RULE 10. It is expected and enjoined that students, on Sunday, attend the church of their choice, or that of their *parents* or guardians.

## CONCEPTION OF A PRACTICAL EDUCATION, BASED ON SCIENCE.

A practical education based on science supposes three things—viz:

1. A certain amount of instruction in science;
2. A certain amount of instruction in technological studies;
3. A certain amount of instruction in the practical application of principles.

For example, when a man farms, he applies principles to practice, and Agricultural education teaches him how to apply these principles well. Now in this case scientific education enables him to understand the principles well; technical education teaches him to apply them well; and practical education applies them. Hence, if one school must teach all this, and in addition studies in a Mechanical Department, a very large corps of teachers must be had and costly outfit must be used. Such school must have at least three faculties—

1. A Scientific and Literary Faculty;
2. A Faculty for Technical Studies;
3. A Faculty for Teaching the Operations.

The law organizing the Oregon Agricultural College contemplates an institution upon the broad basis above alluded to. An attentive consideration of the following course of study will make this evident.

### TECHNICAL STUDIES OF RATIONAL AGRICULTURE.

I suppose the following to be a good course of technical studies in Scientific Agriculture:

Rational Agriculture should teach—

- I. The nature, quantity and sources of plant food.
- II. The methods which have been established by scientific experience for changing this food into plants.
- III. The best uses of these plants, that is to say, how the plants can be used to produce the greatest amount of human happiness.

Hence there are three distinct classes of subjects in a complete course of Scientific Agriculture.

I. The first class treats of the nature, quantity, and sources of plant-food.

The science concerned in this are—

1. Chemistry.
2. Mineralogy.
3. Geology.

These studies are distributed into three classes—

1. Junior Class.—The study of this class is General Chemistry (Inorganic.)

2. Intermediate Class.—General Chemistry (Organic) Mineralogy and Agricultural Chemistry.

3. Senior Class.—Analytical Chemistry, Agricultural Chemistry and Geology.

II. The second class of studies treat—

1. Of the methods of changing plant-food into plants.

Here belong—

1. The methods of rendering potential plant-food actual, or of preparing the food for the plant (such methods are rest, fallow, rotation, green crops, mechanical improvements, etc.)

2. Drainage.

3. Botany.

4. Entomology.

5. Meteorology.

6. Forestry.

These studies are divided into three classes—

1. Junior Class.—Soils, and methods for rendering potential plant-food actual, Botany.

2. Intermediate Class.—Same subject continued, grass, and fruit culture.

3. Senior Class.—Drainage, Meteorology, Entomology, Forestry.

III. The third class treats of the use of plants and considers the best methods for such uses.

Here belongs—

1. Harvesting and preservation of crops.

2. Stock-breeding (including physiology and zoology.)

3. Farm engineering (including drawing and construction of farm buildings)

4. Landscape gardening.

5. Political economy.

These studies are divided in three classes—

1. Junior Class—Methods of harvesting and preserving crops, Farm Engineering, Physiology.

2. Intermediate Class—Drawing, Zoology, Stockbreeding.

3. Senior Class—Drawing, Stockbreeding, Landscape Gardening, Political Economy.

Preparation needed for entering these courses of study—Algebra, and Geometry, and such studies as prepare for Algebra and Geometry.

---

STATEMENT OF WORK DONE BY EACH TEACHER OF  
THE SCHOOL.

1. B. L. Arnold.

During the past two years I have taught Chemistry, Physics, Mechanics' Logic, Mental Science, Ethics, Physiology.

Remark.—It is plain that we need more division of labor; it is impossible for one man to teach so many things with success, without overtaxing his body and mind. It is greatly hoped that we should soon receive relief from the Legislature. Time for study should be allowed to every teacher and the teacher be required to study during that time. It is not possible, that persons unacquainted with educational matters, should know how needful it is that the teacher be a diligent student, hence he should have first, the time, secondly, the means for thorough study and investigation; it is better for teacher, pupil, parent and State.

The teachers in the Agriculture College are all so crowded with the work of teaching as to have but little time for study. We hope the Legislature will take this into consideration and give us funds enough to enlarge our faculty.

B. L. ARNOLD.

## REPORT.

---

*President B. L. Arnold:*

SIR—Following is the report of my work for the past two years:

The subjects which I have taught during the period of time above mentioned are Latin, Greek, German, French, English and Freehand Drawing.

### FREEHAND DRAWING.

The study of Freehand Drawing was here introduced two years ago, and is of great practical use to the farmer as well as to the mechanic. The most important and leading object in learning to draw is the acquirement of a clear comprehension of the nature and efficiency of the expression of simple lines, together with that of capacity for their execution. It has been said that "He who cannot draw a straight line, the simplest, easiest, and most comprehensive, has certainly much to learn, and should begin with it. He that can has already made no inconsiderable advancement."

Recognizing the practical utility of this study, the Board of Trustees of this institution very generously appropriated a sum of money for the purchase of drawing-models.

The class, at present numbering thirty-eight, manifest a great interest, and are doing good work in drawing landscapes, water scenes, figures, animals and birds. The eye being thus quickened to just perception of form, the hand trained to executive readiness, the pupils will soon be ready for sketching exercises, which we shall introduce during the coming spring.

All the exercises of the students are carefully preserved, and, as far as possible, without blot or evidence of slight or carelessness. They may not only be of individual interest to recur to with satisfaction at some future period of advanced progress, but serve to excite and encourage emulation, by exhibiting proofs of the ease and certainty of the way of its attainment.

## ENGLISH.

*Text Books*—Swinton's Literature, Whitney's Grammar and others. Some twenty compositions on agricultural and other topics are read and corrected every week. Reading of English Classics.

## GREEK AND LATIN.

*Text Books*—W. W. Goodwin's Grammar and S. W. White's Exercise Book for Greek, and Gildersleeve's Grammar, Exercise Book and Reader for Latin. Composition work, and Reading of Greek and Latin Classics, as prescribed by the State.

## GERMAN.

As in all other languages, so is the course here divided into four classes:

*Freshman*—Study of W. H. Whitney's Grammar and Reader. Easy translations from German into English, and English into German.

*Sophomore and Junior*—Grammar as above. Reading of good German authors; translations; easy German compositions.

*Junior*—Reading and translations; best German authors; compositions; letter writing; conversation.

## FRENCH.

The study of this language is pursued in very much the same manner as that of German.

*Text Books*—Tasquelle's French course; translations; compositions; reading of good French authors.

Very respectfully,

F. BERCHTOLD.

December 15, 1886.

## REPORT

*Of the Professor of Agriculture and Chemistry.*

---

*To the President:*

I herewith submit the following biennial report of the department of Agriculture and Chemistry:

### AGRICULTURAL CHEMISTRY.

I have given instruction to the Senior Class in Agricultural Chemistry, using Tanner's Science of Agriculture and Johnson's How Crops Feed, as text-books.

During the year the following topics were fully discussed: The Origin and Formation of Soils, Chemical Composition of Plants, Source and Relative Abundance of the Elements of Plant Growth, Physical and Chemical Properties of the Soil, etc.

The student is thus brought to see the great importance of an intimate acquaintance with the chemical elements of soil and atmosphere, and to know which of these are essential to plant growth. How to influence the subserviency of these elements to his purposes by the mechanical operations, such as drainage, fallowing, rotation of crops, etc., are fully discussed.

During the session of 1885-86 the class in Agriculture studied Animal Feeding, using Stewart as a text-book. The object of introducing this study was to give a connected course of study from the preparation of the soil to the marketing of the crop, in the form of grain, or beef, mutton, wool, etc. The following are some of the topics discussed:

Chemical composition and digestibility of various feedstuffs; nutritive ration; the most profitable combination of feedstuffs for the production of beef, pork, etc., as determined by American Experimental Stations; soiling; soiling crops; ensilage; ensilage crops;

care of manure; money value of feedstuffs; preparation of food; arrangement of barns, etc. The valuable experiments carried on at the experimental stations of Wisconsin, Michigan, Kansas and Missouri were carefully examined with the class. The student is thus brought to see that it is not enough to raise large crops, but that it is of equal importance to know how to use them so as to maintain the fertility of the land and yet put his crop in the market in the most valuable form.

#### PRACTICAL AGRICULTURE.

I delivered a course of lectures to the Freshman class on stock and stock breeding, in which are discussed the various breeds of cattle, sheep and swine, their history, peculiarities, adaptation to various sections of Oregon as determined by climate, soil, food and market.

#### BOTANY.

The class in Botany has used Wood's Botanist and Florist as a text book. The student is made familiar with the various parts of the plant, and their technical names, and the principles of classification, and then given plants to study. The class has manifested considerable interest in the study. Each student, on an average, has collected and identified sixty plants. Special attention is given to the identification of agricultural plants, such as the clovers and grasses. Each student provides himself with a microscope and does his own work without assistance from the teacher. The student thus comes to have confidence in his own work, and takes a greater interest in the study than he otherwise would.

#### POLITICAL ECONOMY.

In Political Economy I have used Chapin's Wailand's Political Economy as a text book.

The following are some of the topics discussed:

Production, Division of Labor, Capital, Co-operation of Labor and Capital; Distribution, Remuneration of Labor; Leading Considerations which Determine Rates of Wages, The Effects of Strikes, Usury Laws; Exchange, Money and Credit as Instruments of Exchange, Banks, Protective Laws, etc.

The last term was devoted to the study of "Laughlin's Mill's Political Economy," which time was devoted more especially to the study of current practical problems in industrial society in the light of economic principles.

## CHEMISTRY

In the department of chemistry I taught a class in inorganic and one in organic chemistry. I have used Roscoe's Elements of Chemistry as a text book, illustrated by appropriate experiments, as far as our limited supply of apparatus will permit. The student is made familiar with the history of chemistry, laws of chemical combination, chemical affinity, elementary substances, history, distribution, preparation, properties and uses; application of chemistry in the arts and manufactures. I have been able to do but little work in analytical chemistry.

The class spent one hour each day in the last term in the use of the blowpipe and the determination of minerals.

This should be followed by a course in volumetric and qualitative analysis; but having no room for carrying on this work, nothing has been done in this direction. It is to be hoped that this part of the work will be better provided for in the future.

## AGRICULTURAL EXPERIMENTS.

During the session of 1885-6 additions were made to the number of plots reported in 1885. Several varieties of grasses, clover, wheat and oats were added by the students. I think it very unfortunate that this department had to be discontinued for lack of funds. While the plots were small, 35x12 feet, yet they gave valuable indications of the value of the various grasses and clovers growing on them. The importance of the study of the grasses and forage crops can hardly be overestimated. Every agricultural country some time in its history must be brought to see the necessity of having good pastures. The Ontario Agricultural College, as well as some schools in the United States, have shown that the cheapest food for animals comes from pastures of mixed grasses and clovers. Many of our farmers are sowing their land to grass. What shall we sow? is often asked. Many are sowing grasses known to be inferior in quality because known to be good in quantity. An agricultural college ought to remove the doubts and uncertainties of agriculture as far as possible and create an atmosphere which shall permeate and influence the farmers beyond the bounds of the class room.

E. GRIMM,  
Prof. Agriculture and Chemistry.

## REPORT

*Of the Professor of Mathematics and Engineering.*

---

*To the President of the Faculty:*

I herewith submit my report for the School of Mathematics and Engineering:

I have taught the course of study as prescribed by the State and published on the first pages of this report. In the Freshman and Sophomore years Davies' text books are used, in the Junior Olney's General Geometry and Calculus, and in the Senior Olmstead's Astronomy and — Civil Engineering. To this school is also assigned the study of Geology. I have shared in instructing English Grammar.

## ENGINEERING.

Previous to this time Engineering has been taught only to the extent of surveying, supplemented by a few lectures by the Professor, and the course of study has not called for more than this. Pursuant to the resolution of Board of Trustees, that a mechanical department be organized, I have made a beginning in this line and will push its establishment as rapidly as times and means will allow. To establish this department on a practical working basis will require some time or a large amount of money. At present it is possible to teach only the theoretical part of this important subject, and thus fit the student for rapidly acquiring the practice hereafter. I therefore submit this prospectus, hoping that in the near future the State will furnish the means to carry it out.

The course of study will embrace—(1.) Mechanical Drawing; (2.) Surveying and Location; (3.) Mechanics of Engineering and Technical Engineering; (4.) Shop Work.

## MECHANICAL DRAWING.

This will include Projection Drawing, with its applications to designing and framing structures in wood, masonry and iron; Isometric and Oblique Projections; Shades and Shadows; Linear Perspective; and Elements of machines.

## SURVEYING AND LOCATION.

This will include surveying, plotting and calculating the area, leveling, with its applications to grading and locating ditches, dividing up land, and laying out and construction of roads.

## MECHANICS OF ENGINEERING AND TECHNICAL ENGINEERING.

The determination of strains and stress in framed structures; pressure in brick and stone work; the selection and arranging of materials to resist these forces; laying foundations of large buildings and of bridges, as well as designing the structures themselves.

## SHOP WORK.

This will be instruction and practice in working in both wood and metals; working to drawings, pattern making and framing, casting and forging, as well as regular machine-shop work. To give the student such a knowledge of the theory and practice of these useful arts as will enable him to compete successfully with those practicing them, will be the design in the work of this school.

To establish the shops necessary for this training will cost a large amount of money, but the appliances necessary for training in the remaining parts of Engineering need not cost above a few hundred dollars, and it is to be hoped that these will soon be supplied. A compass, transit, Y level, rod and chains will be needed for instruction in surveying and location and topography.

A few sets of carpenters tools will be needed when a room to work in can be provided. This will make a beginning toward shop-work and will furnish the means for making the models required in the drawing work.

Respectfully,

T. P. BRANCH,

Prof. of Mathematics and Engineering.

## EXPERIMENT STATIONS.

---

Experimenting is so expensive and laborious, and requires attention to so many exact conditions, when well done, that several of the States have established Experiment Stations to supplement the work of their Agricultural Colleges. Experiments, when improperly made, are worse than useless; for they involve a waste of money, time and labor to no purpose whatever. I quote from the language of Dr. Gilbert, who was for many years with Mr. Lawes during his celebrated experiments, and who is now Professor of Agriculture in Oxford, England.

"I have already quoted the opinion of Sir Humphrey Davy, that scientifically conducted field experiments should be undertaken by proprietors of land who, by their education, are fitted to form enlightened plans, and by their fortunes are able to carry them into execution; and when I tell you that the Rothamstead field experiments, independently of all the laboratory investigations connected with them, cost considerably more, and those which have been undertaken by the Duke of Bedford, at Woburn, for the last seven years, on behalf of the Royal Agricultural Society of England, and which are under the direction of Dr. Voelcker, not much less than 1,000 pounds (\$5,000.00) annually, you will not be surprised that such field experiments are not more general." "At the present time the Rothamstead staff consists of two, and sometimes three chemists, several general assistants in different departments, occasionally a botanical assistant, three, and sometimes four, computers and record-keepers; also, a laboratory man and several boys."

I wish to remark in passing that—

- (1.) These experiments of Mr. Lawes are carried on at private expense, hence we may expect economy.
- (2.) There is no teaching to be done by the experimental corps.
- (3.) That Mr. Lawes uses only small plats of land.
- (4.) That his whole expense for field experiments is from \$15,000 to \$20,000 a year.
- (5.) That there is a bill before Congress which gives to each Agricultural College for experiments \$15,000 a year.

(6.) The following letter, addressed by Agricultural Colleges to Representatives and Senators, shows some of the reasons why this bill should pass.

(7.) The Agricultural College of Oregon is weak in funds, and especially needs this appropriation.

(8.) It seems to me the duty of our Legislature to memorialize Congress for this purpose, viz: That the aforesaid bill should pass.

*To the Hon.* -----

The Congressional bill, known as the Hatch bill, To establish agricultural experiment stations, has been favorably reported by the Committee on Agriculture, and its passage recommended. It is now before Congress, and ready to be acted upon; and you are earnestly requested to give it that consideration which its importance entitles it to receive.

This bill proposes to provide such stimulus for agricultural improvement as the patent laws do for mechanics, manufacturers and artists, and the copyright laws for authors. This seems to be the only way in which such an end can be reached. Farmers cannot maintain a personal right to improvements in tillage, in crops, in stock-breeding, in overcoming the diseases of animals or plants, or in withstanding the attacks of insect enemies. However much of labor, or study, or money the farmer may expend for either of these, his neighbor can imitate his work and get as much profit from it as he himself can, and that without asking permission or expressing thanks. Some action of the sort proposed by this bill may fairly be asked, in order to put agriculture on a par with the other industrial arts.

Agricultural Experiment Stations carry on investigation in subjects of the greatest importance to agriculture, by the use of the accurate methods and processes of chemistry, botany, entomology, physiology, and kindred sciences. The analysis and management of manures, the production and adaptation of new varieties of seeds and crops, the destruction of injurious insects, the protection against contagious diseases of animals, have all been the subject of successful and satisfactory investigation in Experimental Stations. Wherever they have been established they have proved themselves of great benefit to farmers, and have received their hearty and unanimous support. There are a hundred or more of them in various countries of Europe, and in our country they have been established in Connecticut, North Carolina and New Jersey for several years, and are highly valued. More recently they have been established in New York, Ohio, Wisconsin, and some other States, and are doing good work.

When the interests involved are looked at, it will be seen that the outlay contemplated by this bill is exceedingly small, fifteen thousand dollars (\$15,000) a year for each State or five hundred and seventy thousand dollars (\$570,000) for all the States, while seven million five hundred thousand (7,500,000) men, which is forty-four (44) per cent. of our working population, are engaged in agriculture; ten thousand million dollars (\$10,000,000,000) are invested in farm lands, four hundred million dollars (\$400,000,000) in its implements and machinery, fifteen hundred million dollars (\$1,500,000,000) in its live stock, and its annual products are twenty-two hundred million dollars (\$2,200,000,000). Surely the farming community may ask this comparatively small provision for their interests.

The bulletins publishing the result of the work of the State Experiment Stations are printed as soon as the work is done, and sent without charge to farmers who desire them, and they are producing a great revolution in farm economy wherever their influence extends. The benefits of intelligence and skill in farming make themselves felt wherever they are applied. To produce these, no other means equal to that of Agricultural Experiment Stations have been devised, and no thrifty and progressive farming community can afford to do without them.

The establishment of these stations in connection with the Agricultural Colleges will be strengthening to both. The Colleges have done excellent work, and have given a large return to the country for the gifts by which they were established. The \$7,000,000 fund created by the gifts of the government has been supplemented by \$5,000,000 more from States and benevolent individuals. The Colleges have been established in all the States, and more than 4,000 students are profiting from the instructions of above 400 Professors.

These institutions mainly teach the branches of learning which relate to agriculture and the mechanic arts, while the Experiment Stations apply these branches of learning to the practical wants of the agriculturist.

The studies begun by the students in College are carried on by the practical farmer in the field, and the College Professors will be quickened in their duties by seeing the useful purposes to which their sciences are applied. It brings learning and work fairly in connection, and meets a pressing demand of the age.

The advantages to be secured by the passage of this bill are wide and far reaching, both for the farmers and for the whole country; and the interests which it is intended are so vital to the pros-

perity of the whole country as to be entitled to the fostering care of the general government.

Trusting that these suggestions will commend themselves to your favorable consideration, we ask for the bill your earnest support.

Yours very respectfully.

## STUDENTS FOR THE YEAR 1885-86.

J. C. Applewhite,  
J. P. Teller,  
W. B. Rohrer,  
H. T. Bell,  
H. Kittridge,  
T. Allen,  
G. E. Waggoner,  
John Campbell,  
H. C. Hinton,  
Chas. Atwood,  
H. J. Phillips,  
F. E. Brallier,  
Chas. D. Thompson,  
W. C. Taylor,  
O. W. Montgomery,  
W. S. Stock,  
S. S. Meads,  
Frank Williams,  
R. E. Cooper,  
Willard Cauthorn,  
Edgar Schott,  
John Buchanan,  
Chas. Taylor,  
J. R. Kerr,  
T. D. Waugh,  
E. T. Holgate,

Will Hall,  
B. S. Martin,  
G. H. Skeels,  
H. L. Holgate,  
L. Kearney,  
O. W. Waggoner,  
O. W. Robbins,  
J. H. Ricard,  
W. Dreskill,  
O. M. Rose,  
Chester Avery,  
J. H. Collins,  
B. F. Collins,  
J. W. Lewis,  
J. Wilkins,  
Oliver Atree,  
Osborne Davey,  
T. A. Horning,  
F. W. Rayburn,  
Blake Cauthorn,  
James Horning,  
R. G. Buchanan,  
Grant Mulkey,  
C. A. Davis,  
L. J. Kemp,  
J. G. Bennett.

STUDENTS FOR THE YEAR 1884-85.  


C. D. Thompson,  
J. E. Whitney,  
Geo. W. Slayton,  
Will Hall,  
O. L. Hall,  
Alterius Giesy,  
O. W. Robbins,  
James Lewis,  
J. H. Rickard,  
B. S. Martin,  
Frank Davis,  
J. C. Applewhite,  
M. B. Short,  
Fred A. Horning,  
J. J. Sturgill,  
Geo. E. Lilly,  
Clyde Beach,  
C. B. Gaines,  
R. S. Buchanan,  
H. L. Holgate,  
J. Fred Yates,  
Geo. E. Waggoner,  
George Nelson,  
A. S. Buchanan.

W. H. Heisler,  
Fred Rayburn,  
W. Rees,  
Edwin Cooke,  
J. P. Feller,  
Arch Horning,  
Herbert Kittridge,  
Ira Allen,  
W. H. Newton,  
E. U. Will,  
B. F. Collins,  
T. Elliott,  
R. E. Cooper,  
S. J. Vaughn,  
Chester W. Skeels,  
Alonzo Allen,  
G. F. Hoffman,  
R. Abbey,  
W. R. King,  
M. Martin,  
O. W. Waggoner,  
J. G. Bennett,  
Leslie Lilly,

FINANCIAL STATEMENT  
FOR THE SESSION OF 1884-85.

---

RECEIPTS.

Received from State Treasurer.....\$ 5,066 63

DISBURSEMENTS.

Paid teachers.....	\$ 7,800 00
Paid Secretary and Treasurer.....	100 00
Paid janitors.....	111 90
Paid for supplies.....	200 00
Paid for printing and advertising.....	105 05
Paid for incidental expenses.....	184 59
Paid for books.....	100 00
Total.....	<hr/> \$ 8,601 35

FINANCIAL STATEMENT  
FOR THE SESSION OF 1885-86.

RECEIPTS.

Received from State Treasurer-----\$10,050 32

DISBURSEMENTS.

Paid teachers-----	\$7,844 43
Paid Secretary and Treasurer-----	100 00
Paid janitors-----	120 50
Paid for printing and advertising-----	49 45
Paid for supplies-----	154 01
Paid for incidentals-----	201 98
Total-----	\$8,470 37