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UNIVERSITY OF IDAHO
AGRICULTURAL EXPERIMENT STATION

Work and Progress of the Agricultural
Experiment Station For the Year
Ended December 31, 1925

BULLETIN NO. 142

JANUARY, 1926

Published by the University of Idaho, Moscow, Idaho.

UNIVERSITY OF IDAHO AGRICULTURAL EXPERIMENT STATION

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*In cooperation with U. S. Department of Agriculture.

REPORT OF THE DIRECTOR

This report of the Idaho Agricultural Experiment Station deals with the progress of investigations conducted during the calendar year of 1925. The financial statement covers the fiscal year July 1, 1924-June 30, 1925.

A comprehensive report was published in January, 1925. Since it has seemed desirable to publish a shorter review on alternate years, this report will briefly summarize Agricultural Experiment Station activities of greatest general interest. Next year's report will, in accord with this policy, be more extensive.

Increased effectiveness of investigation has resulted during the last two years from continuity of service. No project leader has resigned during that time. This year the coming of new Federal funds for the support of investigational work under the terms of the Purnell Act has brought hope of much greater achievement to the staff of the Idaho station. These funds will permit initiation of new lines of investigation that for many years have been requested by the farmers for the state. It will enable certain projects that have been seriously handicapped for want of equipment and technical help to be strengthened and hastened to an early conclusion. The addition of a sum of \$20,000 per annum, to be increased each year by further additions of \$10,000, means that the Idaho station will be of much greater service than ever before to the farmers of Idaho.

The first two lines of investigation initiated with the support of Purnell funds deal with agricultural economics and home economics. One project in agricultural economics has been approved by the Office of Experiment Stations. It is entitled, "A Study of the Primary Markets for Leading Idaho Products." Considerable progress already has been made in this investigation, as is indicated later in the pages of this report. Four other projects, dealing respectively with trends of production in Idaho, and changes that have taken place in the production of beef cattle, sheep and wool, and dairy cattle, have been submitted. One full time worker G. T. Sulerud, together with a portion of the time of Dean H. C. Dale have been assigned to the agricultural economics projects. The first home economics project deals with the distribution of time by home makers. The study is already in progress.

The funds supplied by the Purnell act have permitted assignment of one full time entomologist to a study of the sugar beet leaf hopper. The Idaho Station, in initiating this research, is fortunate in being able to cooperate with the Bureau of Entomology, the Utah Agricultural Experiment Station and the Utah-Idaho Sugar Company. R. W. Haegele,

assistant entomologist of the Idaho station, assigned to this particular problem, is located at Twin Falls. R. W. Carter, representing the U. S. Bureau of Entomology, has been designated as the leader of the project in a memorandum of understanding signed by the Bureau with the experiment stations of Utah and Idaho. Considerable work already has been done in a survey of the habitat of the leaf hopper. A laboratory with excellent greenhouse facilities is maintained at Twin Falls for the use of Carter and Haegele, and any others who may be assigned to this project. The feeding tests with steers and lambs conducted at the Caldwell Substation and recently with lambs fed at Aberdeen, have been carried on without the assignment of any considerable portion of one man's time to supervision of work and compilation of results. A full time assistant in feeding investigations, to have charge of feeding studies with beef cattle, dairy cattle and sheep, conducted at Caldwell and Aberdeen, has been selected in the person of R. F. Johnson.

Other new projects initiated with the Purnell fund follow:

A study of bean diseases.

Investigations in alkali land reclamation in cooperation with the Bureau of Public Roads, United States Department of Agriculture.

Investigations of the results secured through the use of dairy bulls produced by dams of known production.

The last named project is in cooperation with the United States Bureau of dairying. The leader of the project, H. A. Mathiesen, maintains his headquarters at Boise and visits certain selected bull associations to collect data that form the foundation of this study.

The irrigated substation at Aberdeen was leased in 1911 for a period of 15 years. The early expiration of this lease made it necessary to purchase the farm. This purchase has been approved by the State Board of Education with payments extending over ten years, as is the practice in the purchase of irrigated land in the Aberdeen section. The consummation of this purchase places the Idaho station in permanent ownership of 76.15 acres of land located midway between the Upper Snake and Lower Snake River basins, and well equipped for experiments in cereal and forage crops production, application of water to soils, plant diseases and other problems of vital concern to farmers of the irrigated districts. The Aberdeen Substation already has released information of very great value to irrigation farming.

For several years the central station at Moscow has been handicapped by lack of ample land to handle the livestock herds and to properly take care of the experimental work in farm crops and horticulture. The

availability of funds provided by the Purnell Act emphasized more strongly the necessity of seeking additional land. A study of the situation convinced the administrators of the Station that saving would be effected by the purchase of land. The poultry department was crowded and using land year after year that retained infestations of parasites. There has not been enough land for pasture for the herds of beef cattle and sheep. Furthermore, a large part of the hay consumed by the livestock herds has been purchased and hauled to the University farm. The station has been able to secure, and the Board of Education has approved the purchase of, a tract of land of 247.3 acres, separated from the present holdings only by a highway and railroad right-of-ways. This gives the central station a solid body, except for the highway and railroad right-of-ways, of 600 acres of land, all tillable. The new farm will provide more pasture and hay land, will give additional acreage for increasing of promising varieties for distribution to farmers, will provide adequate land for handling the poultry flock and in other ways will serve the experimental program of the Agricultural Experiment Station.

A significant event for the Station this summer was the removal of the departments of agricultural chemistry and bacteriology to the new Science Hall, a modern fire proof structure completed during the past summer at a total cost of \$400,000. In this new building laboratories especially designed for these two departments have been set aside for experimental work. This move has made more room in other buildings and has relieved somewhat the cramped situation in other departments of the Station.

Through the liberal donations of the Boise-Payette Lumber Company, the Idaho Power Company, the Union Pacific Railroad Company, the Chamber of Commerce of Parma, and other agencies a laboratory building was erected for the use of the entomologist whose headquarters are maintained at Parma. This building which has a completed value of \$2500, contains laboratories, store room, dark room, glass enclosed structure for rearing plants and insects, and other conveniences that will facilitate the research of the entomologist.

During the past year a building suitable for a seed house has been purchased and moved to the High Altitude Substation at Felt and a new seed house has been erected at the Sandpoint Substation. The increasing importance of certain varieties developed by these substations made it necessary to have increased storage facilities.

In order to have the Caldwell Substation more adequately serve the southwestern section of Idaho, the farm plan has been rearranged. A new milk barn of a type designed to meet the needs of this particular

section is being erected now. A machinery shed designed with certain conveniences that should recommend it to the farmer will be erected in the near future and other improvements will be made to make the Caldwell Substation buildings for sheltering the stock and taking care of the experimental work, very attractive.

For many years the policy of the station has been to so orient its work as to serve the entire state of Idaho. The location of regional branch stations and the handling of certain projects such as entomology and plant pathology at locations specially adapted for these investigations are evidence of this policy. The central laboratory, greenhouses and the administrative offices are maintained at Moscow.

MAILING LIST

Residents of Idaho	13,470
Residents of other states	3,965
Foreign	175
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Total.....	17,610

PUBLICATIONS DURING 1925

Bulletin, Title and Author

No.

- 135—Work and Progress of the Agricultural Experiment Station for the Year Ended December 31, 1924, E. J. Iddings.
- 136—Farming Practices for the Cut-Over Lands of Northern Idaho. G. R. McDole and J. H. Christ.
- 137—The Fruit Tree Leaf Roller, Its Control in Southern Idaho by use of oil emulsion sprays, Claude Wakeland.
- 138—Seasonal variation as it affects the activities and control of the alfalfa weevil in Idaho. Claude Wakeland.
- 139—Artificial Brooding. R. T. Parkhurst.
- 140—Vegetable Seed Production in Idaho. C. C. Vincent and L. E. Longley.

Circulars, Title and Author

- 37—Publications available for free distribution, E. J. Iddings.

Research Bulletin, Title and Author

- 4—Seed control of rhizoctonia in Idaho. J. M. Raeder, C. W. Hungerford and Naomi Chapman.

Research Papers

- Alkali Studies I. Tolerance of wheat for alkali in Idaho soils. Ray E. Neidig and H. P. Magnuson.
Soil Science, Vol. XVIII, No. 6.

- Alkali Studies II. Tolerance of alfalfa, corn and sweet clover for alkali in Idaho soil.
Ray E. Neidig and H. P. Magnuson.
Soil Science, Vol. XIX. Feb. 1925. No. 2.
- Alkali Studies III. Tolerance of barley for alkali in Idaho soil.
Ray E. Neidig and H. P. Magnuson.
Soil Science. Vol. XX. Nov. 1925, No. 5.
- Alkali Studies IV. Tolerance of oats for alkali salts in Idaho soil.
Ray E. Neidig and H. P. Magnuson.
Accepted in Soil Science.
- Mineral Composition of Sunflowers grown for silage.
Ray E. Neidig and H. P. Magnuson.
Accepted and being published in Journal of Agricultural Research.
- The effect of alkali salts on bacteriological activities in soil:
I—Ammonification.
II—Nitrification.
III—Ammonification, nitrification and crop yield.
William M. Gibbs, H. W. Batchelor and H. P. Magnuson.
Soil Science, Vol. XIX, No. 5.
- Witches' broom of potatoes in the northwest.
Chas. W. Hungerford and B. F. Dana.
Phytopathology, Vol. XIV.
- The influence of field peas rations on the quality of pork.
Julius Nordby and R. S. Snyder.
Accepted and waiting publication in Journal of Agricultural Research.
- Certain Factors in Relation to Production and Egg Weight in White Leghorns, R. T. Parkhurst.
Poultry Science (Submitted for Publication).

ACTIVE PROJECTS

The list of active Experiment Station projects follows. All investigations carried on at the substation farms are in cooperation with the various departments of the Home Station:

Agricultural Chemistry

The iodine content of Idaho grown foods in relation to the prevalence of goiter.

Slick spot investigations, and peat investigations.

(In cooperation with Agronomy)

Feeding experiments: (a) The comparative value of various silages for milk production, (b) Winter rations for young stock in Idaho, (c) Feeds for wintering dairy heifers under practical farm conditions in Idaho.

(In cooperation with Dairy Husbandry)

Studies in animal nutrition: (a) The effect of various feeds upon gains made and quality of pork produced, (b) The physiological effect of feeding rations restricted to Canadian field peas on growth and reproduction in swine.

(In cooperation with Animal Husbandry)

Leaf roller control studies.

Chlorosis studies.
(In cooperation with Horticulture).

*Alkali Investigations:

1. Tolerance of crops for alkali.

*In cooperation with U. S. Department of Agriculture.

2. Chemical aids to reclamation of alkali soil by drainage.
3. Drainage surveys.
4. Alkali survey.
5. Effect of alkali salts on bacteriological activities of soils. (In cooperation with Bacteriology).

The protein content and yield of wheat, nitrogen content of the soil when cropped continuously to wheat and when cropped under a definite rotation system.

Cause of unproductiveness of recently cleared coniferous timber soils, relation of toxicity thereto and corrective measures.

Rotation and fertility investigations at Moscow and Sandpoint. (In cooperation with Agronomy and Sandpoint Substation)
Chemical studies of soil survey samples. (In cooperation with Agronomy).

Agricultural Economics

*Primary markets for Idaho potatoes, cheese, eggs, beef, and mutton, and the extent of competition in these markets represented by the production of other states.

*An economic study of irrigated farming in selected areas of southern Idaho.

A study of the changes that have taken place in the production of beef cattle in Idaho, and the reasons for these changes.

A study of the changes that have taken place in the production of sheep and wool in Idaho, and the reasons for these changes.

A study of the changes that have taken place in dairying in Idaho and the reasons for these changes.

Agricultural Engineering

*Reclamation after drainage as one of the factors underlying the economic use of water in irrigation. (In cooperation with Agricultural Chemistry and Agronomy).

The duty of water as one of the factors underlying the economic use of water in irrigation. (In cooperation with Aberdeen Substation).

Relation of dust to motor operation.

The relation of electricity to agriculture.

Agronomy

Small grain improvement: (a) wheat, (b) oats, (c) barley, (d) rye, emmer, flax and miscellaneous grains. (In cooperation with the substations)

Forage investigations: (a) grasses and legumes for hay and seed, (b) cultural tests with alfalfa, (c) introduction and testing of miscellaneous forage crops, (d) seed production. (c) Alfalfa improvement (1) Breeding, (2) Hard Seed study, (3) Identification studies with Grains.

Field and garden pea investigations: (a) classification studies, (b) cultural experiments, (c) breeding and improvement.

*Corn breeding and improvement: (a) cultural experiments, (b) breeding and improvement.

Weed eradication investigations.

- *Silage crop investigations: (a) cultural tests of corn for silage production, (b) cultural experiments with sunflowers, (c) improvement of sunflower silage production by selection and breeding. (In cooperation with Agricultural Chemistry and Sandpoint Substation.)

Tests with commercial fertilizers.

Soil amendments: Use of sulphur, lime, gypsum on leguminous crops. (In cooperation with Agricultural Chemistry).

Rotation and fertility investigation.

Peat soils of Idaho. (In cooperation with Agricultural Chemistry.)

*Soil survey: (a) a detailed survey of a designated area each season as funds permit.

*Irrigated soil investigations: (a) correction of alkali and "slick spots." (In cooperation with Caldwell Substation and Agricultural Chemistry.)

Timber soil investigations: (a) plots located at Sandpoint Substation. (In cooperation with Sandpoint Substation and Agricultural Chemistry.)

Reclamation of overflow lands. (In cooperation with Agricultural Chemistry).

Animal Husbandry

Steer feeding investigations at Caldwell.

Lamb feeding investigations at Caldwell and Aberdeen.

Studies in the growth of wool.

Growing rations (winter) for ewe lambs.

The influence of Canadian field pea rations on quality of pork produced.

Physiological effect of feeding rations restricted to Canadian field peas on growth and reproduction in swine.

The effect of Canadian field pea rations on the skeleton development in swine.

Hogging-off field crops.

Fictein supplements with barley and wheat for growing and finishing swine.

Cost of keeping brood sows, developing and finishing the market hog, and breeding gilts.

Bacteriology

Effects of wood and forest products on bacteriological activities in soil: (a) ammonification and nitrification, (b) nitrogen fixation.

The isolation and study of nitrifying bacteria.

Surface tension and bacterial growth.

Legume culture preparation.

*In cooperation with U. S. Department of Agriculture.

Dairy Husbandry

*Inbreeding and line breeding compared with outcrossing as regards their effect upon dairy cattle, their milk and butterfat production, fecundity and general characteristics.

A study of the normal growth of dairy cattle.

Weight of dairy cattle as influenced by pregnancy, age, and methods of handling.

A study of the best methods of feeding calves while receiving milk.

The best winter ration for young dairy stock in Idaho. (In cooperation with Agricultural Chemistry.)

The comparative value of various silages for milk production. (In cooperation with Agricultural Chemistry.)

*A study of the effects of the use of dairy sires selected from dams of known production, upon the production of offspring.

Dairy farm management: (a) to encourage the introduction of dairying as a type of farming for this area of the state, (b) to determine the crops to be grown for a dairy herd, (c) to determine the proper number of animals to be maintained on an 80-acre unit of land and their management.

Official testing for advanced registry and register of merit in Idaho.

The value of feeding grain to dairy cows during dry-rest period.

Entomology

*Investigation of the sugar beet leaf hopper. Alfalfa weevil; study of climatic conditions affecting control; further experiments in control; breeding and liberation of parasites.

Eleodes beetles: The life cycle studies for *E. Hispilebris*; experiments in spring poisoning of adults; taxonomy of eleodes beetles of the state.

Codlin moth: Life cycle studies at Parma. Snowy tree crickets: Studies of biology and control on prune trees in the Boise Valley.

Fruit tree leaf roller: Control experiments under Idaho conditions.

Wire worms: Locality survey at Parma; studies in bionomics and control; taxonomy of wire worms of the state.

Grasshoppers: Experiments with sprays for protection of alfalfa and crops.

Spreaders: Test of value of calcium caseinate under southwestern Idaho conditions.

Cutworms: Taxonomy study of cutworms of Idaho.

Potato diseases: A study of insect vectors of potato diseases. (In cooperation with Plant Pathology.)

The peach tree borer as a pest of prune trees; Life cycle studies and control experiments.

Forestry

Experimental tree planting.
Relative durability of Idaho woods.

Studies of farm woodlands.
Agricultural possibilities of logged-off lands.
Grazing studies.

Home Economics

*A study of the use of time by farm women.

Horticulture

Potato production experiments.

Experiments in seed production.

Experiments in the control of western yellow tomato blight by breeding and selection. (In cooperation with Plant Pathology.)

Testing the value of various spreaders for sprays.

Varietal study and cultural tests in producing head lettuce.

Experiments with various sprays for the control of the leaf roller. (In cooperation with Entomology and Agricultural Chemistry.)

Pruning investigations.

Orchard fertilization tests. (In cooperation with Agronomy.)

The testing of new spray materials.

Cherry pollination studies.

Apple breeding.

Variety testing of fruit trees, small fruits and vegetables.

The testing of new spray materials.

*Plant Pathology

Comparison of various treating agents for grain smut control.

Potato seed treatment investigations.

Study of western tomato blight. (In cooperation with Horticulture.)

Study of stripe rust of grains and grasses. (In cooperation with the Office of Cereal Investigations, United States Department of Agriculture.)

Investigations of the eelworm of clover and alfalfa. (In cooperation with the Office of Cotton and Truck crops disease investigations, United States Department of Agriculture.)

Mosaic and leaf roll of potatoes.

Soil moisture and soil temperature in relation to bunt infection.

Bean disease investigations.

Poultry Husbandry

The influence of seeds of high vitamin content upon the production and hatching quality of eggs and upon the health of the layers.

The inheritance of weight, shape, colored texture of shell of eggs in the Single Comb White Leghorns.

*In cooperation with U. S. Department of Agriculture.

The value of certain vegetable protein feeds supplementing sour skimmilk in a ration for laying hens.

The correlation of factors of production and egg characteristics in the Single Comb White Leghorn.

The comparative value of certain feeds as supplements to peameal for laying hens.

The relation of certain constituents of sour skimmilk to egg production.

The comparative cost of producing baby chicks with different types of incubators.

The influence of humidity on the hatchability of eggs.

**Aberdeen Substation*

Small-grain investigations: (a) varietal experiments with wheat, oats, barley, (b) cereal breeding and selection in nursery.

Investigations in field and garden peas and beans: (a) varietal experiments, (b) value of the various pea varieties as nurse crops for alfalfa, (c) seed-bean investigations.

Silage crop investigations: (a) varietal experiments with corn for silage production (b) breeding and selection of corn for eastern Idaho.

Potato investigations: (a) varietal experiments, (b) tuber-unit potato improvement.

Study of trees with respect to environment.

Land feeding investigations.

Duty of water for selected crops.

Seed production: (a) sugar beets; selection and improvement of sugar beets for high sugar content by propagation of mother beets showing highest percentage of sugar, (b) production studies with carrot and parsnip seed growing, (c) alfalfas and clovers.

To determine adaptability of various ornamental trees to higher elevations of eastern Idaho for the improvement of the homestead.

Soil fertility investigations: (a) to determine effect of sulphur on yield of alfalfa, (b) Crop rotations designed to maintain soil fertility and crop yields.

Pure seed distribution: (a) increase and distribution of pure seed of various crops which have been improved.

Caldwell Substation

Dairy farm management: (a) to encourage the introduction of dairying as a type of farming for this area of the state, (b) to determine the best combination of crops to be grown for a dairy herd, (c) to determine the proper number of animals to be maintained on an 80-acre unit of land and their proper management.

Farm management: (a) to place the remainder of the farm in condition to produce crops for feed or sale, (b) to determine the cost of certain crops from the standpoint of man and horse labor expended.

Feeding investigations: (a) steer feeding investigations, (b) lamb feeding investigations, (c) dairy cattle feeding investigations.

Corn investigations: (a) to determine the yielding capacity of introduced varieties as compared with those locally grown for the production of silage, (b) later, a system of corn breeding will be established to produce an improved variety for this section of the state.

Soil investigations: (a) to determine the needs of soils of this area, (b) A study of methods to eliminate "slick spots."

High Altitude Substation

Small grain investigations: (a) variety tests with wheat, oats, barley and miscellaneous grains under high altitude conditions, (b) rate date and depth of seeding winter wheat on dry land, (c) variety test of cereals for the production of hay, (d) rate of planting oats.

Fallow and cultural tests with wheat.

Forage and miscellaneous crop investigations: (a) to determine the best varieties of grasses and legumes for the production of forage and the most successful cultural practice, (b) the introduction and testing of such crops as flax, buckwheat, sunflowers, corn, etc., for the production of grain or forage, (c) effect of sweet clover upon crop yields.

Horticultural investigations: (a) the introduction and testing of apples, pears, and plums, and some small fruits to determine their winter hardiness and adaptability to high altitudes, (b) the planting of ornamental trees and shrubs for the improvement of the homestead.

Rotation experiments, primarily to discover the value of sweet clover in soil improvement.

Rotation Experiments with peas and wheat.

Field and garden pea investigations: (a) to determine the varieties best adapted to dry lands.

Sandpoint Substation

Small grain and field pea investigations: (a) varietal experiments with winter wheat and barley, spring wheat, barley, oats and field peas, (b) rate and date of planting winter wheat and barley and spring wheat, (c) oat varieties for peat soils, (d) rate and date of planting field peas.

Forage crop investigations: (a) alfalfa and red clover and production (b) legume variety test, (c) cultural experiments with alfalfa, (d) vetch variety tests, (e) grass variety test for hay and seed, (f) annual grains and legumes for hay (g) legume combinations, (h) nurse crop trials.

Silage crop investigations: (a) rate and date of planting sunflowers, (b) variety test of corn, (c) comparison of silage crops.

Root crop investigations: (a) tuber-unit potato breeding, (b) comparison of different selections of potatoes, (c) variety test of potatoes, (d) rate and date of planting potatoes, (e) comparison of eye and stem end upon yield of potatoes, (f) comparison of various root crops for forage and seed.

Sheep management: (a) cost of production.

Soil investigations: (a) use of legumes in building up soil fertility, (b) the value of lime, gypsum and phosphate as fertilizers, (c) rotation experiment, (d) effect of cultipacking upon yield of grains, (e) effect of continued cropping upon the yield of spring wheat, (f) effect of sweet clover upon nitrogen accumulation and crop yields, (g) fertility problem on peat as relating to grain production.

PROGRESS OF INVESTIGATIONAL WORK

As has been the practice in former years, a brief summary of the work of the various departments and of the substation farms is presented. The summaries represent the major projects, and deal briefly with the more important achievements of the year.

Agricultural Chemistry

The past year has witnessed considerable progress in alkali tolerance studies. Three articles which contain data on the tolerance of alfalfa, corn, sweet clover, barley, and oats have been issued in Soil Science. The present studies include beans, a crop now grown quite extensively in Idaho and bringing large returns to the farmer.

Cooperative work with the bacteriology department during the past year has resulted in publication of three articles in Soil Science which show the effect of added alkali salts on the bacteriological activities in soil.

Considerable success was obtained in field work carried on jointly with the United States Department of Agriculture on salted out land at Banida. This tract has shown marked improvement in the one year since the installation of the drains. Enormous amounts of salts are being removed from this soil by installation of proper drainage and marked improvement is noted in the crops produced.

A tentative arrangement is now under discussion with the U. S. Department of Agriculture Bureau of Public Roads to undertake a more comprehensive study of the reclamation of alkali soil. This project is of great importance since approximately one thousand acres of alkali land are found in the Boise and neighboring valleys. Additional sections of Idaho have been visited during the past summer and samples of soil taken for alkali determinations. The regions visited were in the vicinity of Malad, St. Anthony, and Ashton.

Strawberries have been grown during the past years on soils that showed strong chlorotic plants in the field during the summer of 1924. Chlorosis has not been secured on these same soils when the plants were grown under greenhouse conditions. Recently spinach was tried and there appears to be evidence of some development of chlorosis. In trips thruout Idaho the past summer chlorosis was not as evident as the year preceding.

Little progress has been made during the past year on the slick spot soils of the state. Crops in the Caldwell area suffered from shortage of water the year preceding, which necessitated a temporary change in the cropping system. Corn was planted on the experimental area this year because of its sensitiveness to slick spot conditions.

A progress report covering the first ten years of the rotation experiments will be issued this year as a research bulletin. The work is entitled "The Relation of Yield and Protein Content of Wheat to the Nitrogen Content of the Soil Under Ten Years of Different Systems of Cropping."

The past year's work in cooperation with animal husbandry has been centered on a study of the effect of Canadian field peas when fed alone and when fed in mixed rations containing grain on the physical condition of brood sows during their gestation period and also on the skeleton of the offspring.

Chemical work on the isolated resinous material from timber soils has proven that this material is a mixture of resin acid bodies. Attempts have been made to study the effect of this material on the nitrifying bacteria of the soil. Definite conclusions are not yet drawn.

Agricultural Economics

With the support of Purnell funds the Experiment Station is enabled to resume its studies in agricultural economics. Prior to the new undertakings, the investigations along this line consisted principally of farm organization studies made in Twin Falls and Latah Counties from 1919 to 1922.

Agricultural economics in this state offers almost a virgin field of study. It was thought advisable as a first step to assemble the available farm, crop, and livestock statistics for the various agricultural areas of the state to form a basis for further study. These data have now been assembled for the most part, altho they are not as complete as might be desired. They are sufficient, nevertheless, to indicate what has been produced in the past, where it has been produced, and what changes have taken place with regard to the kinds of crops grown, the livestock raised, the improved land developments, etc.

Under Purnell Project No. 1, a study of the primary markets for Idaho potatoes has been partially completed. A formula has been devised by which potato crop estimates, as issued by the U. S. Department of Agriculture may be corrected and correlated with the Idaho price. It is not claimed that an infallible formula for price forecasting has been discovered, but within certain reasonable limits there has been determined the price probabilities based upon the U. S. Department of Agriculture estimates of production.

Agricultural Engineering

Considerable time was spent by the irrigationist in an effort to coordinate the irrigation research of this Station with that of the other western Stations. This work culminated in a meeting of the western irrigation research workers at Berkeley in September. At this conference an outline covering all irrigation research at present being carried on and proposed by the western stations was formulated. The projects of this Station have been re-written to conform to this outline.

The project on the Reclamation of Alkali Lands has been carried on in cooperation with the department of agricultural chemistry and the division of agricultural engineering of the United States Department of Agriculture. It is too early yet to have obtained results from this season's work. In cooperation with the Aberdeen substation, an experiment on the proper time for the irrigation of sugar beets was conducted during this season. It will take a number of years to secure definite results.

Preliminary work is being done on the study of the efficiency of air cleaners for internal combustion engines. Considerable time has been spent on the work of the Idaho committee on the Relation of Electricity to Agriculture. A report on this work is in preparation.

Plans for new buildings on the home farm of the Experiment Station and on the Caldwell Substation have been drawn and specifications prepared. Plans have been drawn for a breeder house and for an open type range colony house and text material written for publication to be used in the agricultural extension program.

Agronomy

Climatic conditions in 1925 were very favorable for most crops except peas. Moisture and temperature conditions were favorable for all crops until midsummer. This ideal condition was followed by hot, dry weather, which came during the blooming period of peas and reduced the yield considerably. Considering the 1924 pea yield as normal, those secured at the Station in 1925 were 65 per cent normal.

This is the first season since the work with alfalfa seed production was started that profitable yields have been secured. One fifth of an acre of Grimm alfalfa produced at the rate of 6.6 bushels to the acre. A similar sized area clipped when the alfalfa was a foot in height produced only a fifth as much.

Triplet, Mosida, Jenkin, as in previous years, were among the high yielding winter wheat varieties. Redit and White Odessa were the outstanding smut resistant varieties. Eleven year average yields of spring wheat show that Jenkin, Bluestem, Little Club and Baart all produce

satisfactory yields. Two of the newer varieties, Red Bobs and Federation, have outyielded these standard varieties for the years grown.

Trebi barley, yielding nearly 100 bushels to the acre, was the outstanding spring barley variety tested. Colsess, a new beardless variety, showed much promise and has been increased for distribution to farmers. Idamine, for several years the leading oat variety, was outyielded as in 1924, by Markton, a new smut resistant variety. Markton has been increased for distribution. Other oat varieties that proved to be high yielding strains under Palouse conditions are Banner and Abundance. Swedish Select and Markton were the outstanding varieties at Winchester.

Yields of flax varieties averaged from 8 to 12 bushels to the acre. Such yields are unsatisfactory when compared to those secured from a competing crop, spring wheat. Spring wheats yielded from 40 to 51 bushels under similar cropping and climatic conditions.

Continuation of the work on the eradication of bindweed has shown that carbon bisulphide is an effective measure if applied at the proper time and rate.

As in previous seasons, gypsum has produced profitable increases when applied to legumes. Work at the Winchester demonstration plots gave very satisfactory returns from gypsum but no definite increase from phosphorus. Additional tests with peat soils show the need of the application of phosphorus and potash if maximum yields are to be secured.

Animal Husbandry

Lamb feeding investigations were conducted at the Aberdeen Substation to determine the value of alfalfa screenings and beet pulp. The screenings made a very good showing, 193 pounds of screenings replacing 249.9 pounds of alfalfa hay and 144.5 pounds of barley. No definite results are yet available on the pulp tests.

The steer feeding investigations were continued at the Caldwell Substation with two year old steers, to (1) determine the value of alfalfa meal, cut alfalfa and long alfalfa hay when fed with a limited corn allowance; (2) to compare corn and barley; and (3) to determine the value of silage. The alfalfa meal showed a marked superiority over long and cut alfalfa while the cut alfalfa showed little advantage over long alfalfa. Corn was superior to barley. Corn silage made a better showing than it has in the past, 1087 pounds replacing 661 pounds of alfalfa and 356 pounds of corn when fed with corn and alfalfa hay. These steers were unusually nervous and made small and expensive gains. Still they sold well and made excellent carcasses, dressing 59.9 per cent to 60.3 per cent and returning good prices for the feed.

In a study of the influence of Canadian field peas on the vigor and

birth weight of pigs, 63 pigs were farrowed from sows receiving peas alone, and 85 were farrowed from sows receiving check lot rations including barley, oats, corn and alfalfa hay. The average weight of the 63 pigs farrowed by sows receiving peas was 2.073 pounds. The average weight of the 85 pigs farrowed by the sows in the check lots was 2.498 pounds. The sows on peas farrowed 1 very strong, 37 strong, 15 fair, 5 weak and 5 dead pigs. The sows in the check lots farrowed 31 very strong, 36 strong, 13 fair and 5 weak pigs.

In a study of the influence of field pea rations on the skeleton in swine 32 shotes averaging 67 pounds were divided into four lots of eight each and fed for 175 days as follows: Lot I—cracked peas; Lot II—cracked peas and minerals (steamed bone meal 30, limestone 30, common salt 20); Lot III—cracked peas 1, rolled barley 2.5; Lot IV—cracked peas 1, rolled barley 2.5 and minerals. The feed requirements for each 100 pounds of gain were respectively as follows: 445, 402, 478 and 430. The bending load required to break the right femur averaged per lot as follows:

Lot I—555; Lot II—634; Lot III—569; and Lot IV—643 pounds.

Fifteen shotes averaging 112 pounds in 58 days made an average daily gain of 1.12 pounds and returned 474.5 pounds of pork per acre in hogging-off two acres of Blue Prussian Canadian field peas in the fall of 1923.

Bacteriology

The research activities of the department of bacteriology through the past year have been centered on completion of the work to determine the effect of alkali salts on bacteriological activities in soil, and a continuation of the study of North Idaho soils. The former work was completed and published as three technical papers in "Soil Science". The latter problem involves the isolation and study of the nitrifying bacteria, the effect of surface tension on bacterial growth and a detailed study of timbered soils in the northern part of the state. The nitrifying bacteria have been isolated by special methods and cultivated on artificial media. The surface tension phase was prepared and accepted for publication in the "Journal of Bacteriology". A detailed study of 106 samples of timbered soil from northern Idaho has been made, including hydrogen ion concentration, presence of azotobacter, ability of these soils to support azotobacter when inoculated, ammonification, nitrification, and effect of woods and tree products on nitrogen fixation by azotobacter.

During the year cultures for the inoculation of approximately 12,000 acres of legume crops have been distributed to farmers over the state.

Dairy Husbandry

During the year official testing of the Station dairy herd was continued. A total of 44 records were made including 18 seven-day records, seven thirty-day, six ten-month, and seven yearly records with Holsteins; and five yearly records and one ten-month record with Jerseys. The records include three of over 600 pounds of butterfat in a year. Some very good records are in progress. The average production of the entire herd for all milking days during the past year was 12,633.7 pounds of milk and 443.29 pounds of butterfat.

The department of dairy husbandry is charged with the supervision of all official testing in the state. During the year the following number of two-day tests were conducted: 29 Guernsey, 87 Holstein, and 39 Jersey, making a grand total of 155 two-day tests. In addition to these, there were 13 one and one-half day tests on Guernseys and 786 days were spent on official short time tests, making a total of 1193 testing days conducted by representatives of the Agricultural Experiment Station.

The project on breeding studies with dairy cattle, comparing line breeding with outcrossing and inbreeding with outcrossing, has been discontinued, due to losses in the herd and to unsatisfactory bulls. The breeding studies will be continued by substituting a project on the continuous use of proven sires.

A new project has been started in cooperation with the U. S. Bureau of Dairying to study the results obtained from cooperative bull associations in Idaho. This is the first work of this kind in the United States.

Studies on growth of dairy heifers and related work are being continued. A detailed report of this work was made last year.

Studies were continued on the best pasture crops for this region. The project on succulent crops for milk production was continued. Apple pomace was compared with corn silage. This work will be repeated.

A study was made last year of the effect of different temperatures on clarification of milk for market and cheese making. This was handled by a graduate student. There seemed to be no difference in amount of visible dirt removed, flavor and keeping quality of milk, and practically none in cream line. The milk clarified at low temperatures gave smaller increases in bacterial counts. Low temperatures are more convenient in dairy plants. Cheese made from clarified milk had an average score of 1.8 per cent higher than cheese made from the unclarified.

Entomology

The wire worm probably was the insect of greatest economic importance to the state in 1925. Potatoes, corn, wheat, lettuce, peas, beans, bulbs and numerous other field and garden crops suffered severely. Favorable

conditions of temperature and moisture doubtless were responsible for the severity of this injury.

The insect of most economic importance to a single crop was the codlin moth, while the seed corn maggot as a pest of beans was second in importance.

The unusually low temperatures of December, 1924, resulted in an extremely high mortality of many insects. Extensive examinations indicated that the winter mortality of alfalfa weevil was 95 per cent, fruit tree leaf roller eggs 87.2 per cent, snowy tree cricket eggs 99.1 per cent. Practically all codlin moth larvae wintering about the snow line were killed, and a microscopical examination of 40,000 San Jose scale taken from widely separated orchards of southern Idaho showed that only 0.51 per cent of those wintering above the snow line survived while of those below the snow line 42.89 per cent survived. In some sections the kill was so complete that it was recommended that the dormant spray for scale be omitted, thus saving the growers thousands of dollars.

Parasitism of alfalfa weevil by *Bathyplectis curculionis* was determined to be as much as 50 per cent in certain fields. Experiments in the use of Calcium fluosilicate, indicated that it was of no value in the control of the weevil.

Results of tests carried on this year with oil emulsion sprays against eggs of the fruit tree leaf roller indicate that the more highly refined oils are decidedly more effective. Life history studies of the codlin moth were begun this year to be continued for three years. Preliminary experiments were conducted in preparing oil emulsion sprays in laboratory and in collecting data on stability, completeness of emulsification, relative proportions of oil and emulsifying agents, etc.

Another outbreak of Colorado potato beetles was handled by the entomologist in the same manner as the one of 1924. Examinations where the former outbreak occurred failed to show the presence of any beetles. The two outbreaks are separated by a distance of 30 miles.

A spray composed of $\frac{1}{2}$ per cent of engine oil and nicotine sulphate (40 per cent) at the rate of $\frac{3}{16}$ pint per 100 gallons of water proved to be nearly 100 per cent effective against the thistle aphid on plum trees.

In the cooperative investigations of the beet leaf hopper, mentioned in the early pages of this report, a survey was made of the southeastern part of the state to determine the distribution and relative abundance of the leaf hopper and its host plants. In addition, work was begun in selecting beet types to be used in breeding work in an endeavor to secure a strain of beets relatively resistant to the disease carried by these insects.

Forestry

A new development in distribution of planting stock this past year was the consummation of a cooperative agreement between the School of Forestry and the United States Department of Agriculture, under the Clark-McNary Act, looking to the expansion of the work of growing and distributing forest planting material for the purpose of establishing windbreaks, shelterbelts and woodlots.

Experiments in preservative treatment of fence posts have been continued. Sample posts in pairs from the principal trees of Idaho set out five years ago by the Rutledge Timber company have been received by the forest products laboratory, and studies are now under way to determine the relative durability of the different species. In the case of each tree species one post was treated and the other untreated when set.

As in the case of western yellow pine reported upon last year, there are in North Idaho, many areas of young western white pine. These white pine stands are either the residual stands on old logging grounds or have come up following forest fires. Studies to determine their rate of growth and future yields are under way. Since more or less of this timber is found in connection with farms, the findings will have a direct bearing upon woodlot management.

Along Wood River near Hailey is a considerable number of woodlots supporting pure stands of cottonwood. The past summer a reconnoissance study was made of these woodlots to determine their rate of growth and yields and to demonstrate to the owners the best methods of harvesting to keep them in timber growth. The study also is intended to help the owners in marketing the products. The report on this study is now being compiled.

Horticulture

During 1925 work on the apple breeding project was mainly along lines outlined in previous reports. The tree and fruit character of more than 200 seedlings have been studied. Detailed notes have been taken from time to time on various fruit characters, such as date of ripening, keeping qualities, size and shape, skin color and flesh texture.

Extensive tests again were made with oil sprays in the Lewiston and Post Falls districts for control of leaf roller. The results obtained were fairly satisfactory. Observations indicate, however, that considerable burning of leaves may result if the mixtures are not properly prepared.

Varying amounts of commercial fertilizers were again applied to the experimental orchards at Dalton Gardens and Moscow. Owing to excessive cold weather in the fall of 1924, fruit buds were so badly damaged that no fruit was harvested from the Jonathan trees at Dalton Gardens

and the pear and prune orchards at Moscow. The apple orchard located near the foot hills of Moscow Mountain produced a fair crop of apples. Growth measurements were recorded, as well as trunk diameter of the trees.

Experiments covering a period of three years prove that off-type seed potatoes coming from a field which has been thoroly rogued during the growing season make good seed stock, providing this condition is due to unfavorable soil and climatic factors.

Large vigorous cabbage plants of the Danish Ballhead variety, out-yielded small plants of the same variety approximately 3,000 lbs. per acre. Several varieties of popcorn were grown in experimental plots with gratifying results. Promising varieties are Baby Golden, Australian Hulless, Flint and Red Rice.

Over a period of several years, several varieties of head lettuce, including Tom Thumb, Mignonette, and May King, have consistently matured earlier than the New York Head. These varieties, altho small in size, are recommended for growing in the home garden. The Big Boston, Salamander and Unrivalled, have shown up well as mid-season varieties.

Plant Pathology

The results of five years of experimental work with the virus diseases of potatoes have shown that it is possible, by adequate isolation of the seed plot and by careful roguing, to keep a given lot of seed practically free from these diseases. It has been shown that environmental conditions are very important not only upon the effect of some of these diseases upon the potato plant but also upon the rapidity with which they are disseminated. Altho climatic conditions may have a very definite influence upon the symptoms which present themselves in connection with each of these diseases, other environmental conditions also are very important. Rapidity of dissemination of russett dwarf, mosaic and leaf roll has been shown to be dependent upon (a) the infected aphid population, (b) the proximity of infected potatoes and (c) the presence or absence of wild species of *Solanum* susceptible to these diseases.

The results of extensive experiments with various methods of seed treatment for the control of *Rhizoctonia* of potatoes have shown that the efficiency of various methods of seed treatment is greatly increased by presprinkling the tubers with water and keeping them moist for 48 hours before treatment is applied. As a result of these tests the department of plant pathology is now recommending the use of the hot formaldehyde method following the presprinkle. The treatment recommended consists in dipping the tubers for four minutes in a solution of

formalin—one pint to fifteen gallons of water—at a temperature of 125 degrees F.

A preliminary study of the dry root rot disease of beans, caused by an unidentified species of *Fusarium*, has shown that there is a very great difference in varietal susceptibility to this disease. The Robust bean which is practically immune to mosaic is very susceptible to the dry rot disease. Observations have shown that the Red Mexican variety is practically immune to this disease, while the Great Northern and a number of other varieties are quite resistant under normal conditions.

Two years tests with the Robust bean on farms in northern Idaho have shown that it is not only practically immune to mosaic but also has each year outyielded the Little Navy variety, which is very susceptible.

Strains of tomatoes resistant to the Western Yellow Tomato Blight, again proved their superiority to commercial varieties. Definite progress also has been made with other plant pathology projects.

Poultry Husbandry

Sour skimmilk was found to be best for the production of a large number as well as large size of eggs over a period of five years, beginning November 1, 1920.

Unlimited sour skimmilk was used profitably, alone and with peameal, beanmeal, meatmeal and fishscrap supplements to the basal mash. The results justify the conclusion that when unlimited sour skimmilk is given, vegetable and animal protein supplements should be added to the mash only when they cheapen or do not materially increase the cost of the ration.

The sour skimmilk pen gave 46 per cent average production for the five years. Forty-five and two-tenths per cent of all the eggs produced in this pen weighed 24 to 28 ounces per dozen; 37.1 per cent weighed 22 to 24 ounces and only 17.7 per cent weighed below 22 ounces. The average production per pullet per year was 164.3 eggs, profit over feed cost, \$2.25, feed cost \$2.11 and feed cost 15.6c per dozen eggs. The feed consumption per pullet averaged 41.1 pounds of grain, 19.4 pounds of mash, and 164.6 pounds of sour skimmilk.

Cod liver oil proved slightly more valuable as a feed of high vitamine content than lawn clippings. Both pens gave higher production, higher hatchability, and less mortality than the pens getting no green food, or dry yeast and no green food.

No constituent or combination of constituents of sour skimmilk gave as satisfactory results as sour skimmilk itself.

Seventeen Single Comb White Leghorns laid more than 250 eggs in

365 days during 1924-1925. One pullet laid 298 eggs, the highest record in the history of the department.

Thirteen thousand eight hundred eighty-five eggs were observed during the year 1924-1925 for egg characteristics. A marked improvement is noticeable in egg weight, color, texture and shape over previous years.

Some progress has been made in the study of the relation of humidity to the hatchability of eggs, in getting the comparative cost of producing baby chicks, with different types of incubators and in rate of growth in Single Comb White Leghorns.

Aberdeen Substation

The past year was one of the best ever experienced by the Aberdeen Station. The purchase of the experimental farm at Aberdeen, recorded elsewhere in this report, makes this Substation a permanent part of the agricultural experimental program of the state. Long time experiments can be planned with assurance that they will be carried out. Improvements are planned that will facilitate the gathering of scientific information.

Excellent growing conditions were experienced during the past season. Cereals made high yields. Root crops, with the exception of beets, did well. Flax was damaged by the extremely rapid growth of weeds due to the numerous summer rains. Corn made a fair crop and matured well. Alfalfa seed production was the highest ever experienced at the Substation.

New experiments were started this year in irrigation of sugar beets. This will be continued with sugar beets and potatoes the coming season. The rotation plots were started with the object of finding the best legume to use in a rotation from a standpoint of soil fertility and economic value.

Sheep were fed on the Aberdeen Substation for the first time. This work yields data of interest to the farmers of the region and furnishes manure to keep up the fertility of the soil. Four hundred twenty-two lambs were put on feed during the fall of 1924 and returned a substantial profit and valuable experimental results. The work is being continued this year with 500 lambs.

Some promising selection of oats were made during the past year. Twenty-five thousand plants were smutted with loose smut of oats. Some of these represented a Markton X Victory cross, Markton being a smut resistant strain of oats and Victory a high yielding variety well-adapted to irrigated conditions. This work has not been carried far enough to definitely indicate a new strain of oats for distribution.

The smut work also was carried on with barley. Twelve thousand barley plants were smutted. These plants were grown in the nursery and were studied for resistance to loose smut.

Four hundred new varieties of barley were planted from the collection made by Dr. Harlan on his European trip. In addition, 350 varieties of wheat and 200 varieties of oats were grown in the nursery for genetic studies and varietal testing.

One hundred seventy-five certified potato seed growers sent in fifteen pound samples of certified seed potatoes for strain tests. These strains were all planted on as near uniform land as possible to determine their freedom from disease and yielding ability. Unusual interest was shown in this test by the farmers growing certified seed. This work is in cooperation with the potato seed certification service, conducted by the horticulturist of the Extension Service.

Caldwell Substation

The shortage of water during the 1924 season lowered the vitality of alfalfa plants to such an extent in the region of the Substation farm that a large percentage of the stands in many fields was destroyed by the extremely cold weather of the following winter. Approximately 120 acres of alfalfa on the Substation were so badly damaged that it seemed desirable to seed this area to other crops. Four emergency feed crops were planted: peas and wheat, corn, soy beans, and Sudan grass. With the exception of the corn, all of the crops were drilled in, following spring tooth harrowing and dragging. The corn land was irrigated, plowed and harrowed before the corn was planted. The amount of labor required to prepare the land for corn limits the acreage that could be planted on the ordinary farm as an emergency crop following the loss of alfalfa. The other crops seeded for feed production yielded well on soil that necessarily was prepared in a rather hurried manner.

The corn was planted on May 29 and matured an excellent yield of good silage. The peas and wheat made a good yield per acre, but were prematurely ripened by the hot weather of midsummer. Soy beans showed promise of future usefulness as a feed crop. The Sudan grass produced a coarse quality of hay and was probably the least valuable of the other forage crops grown.

The field set aside for slick spot investigations was planted to corn in 1925. No marked difference was found between the treated and untreated plots.

The steer feeding investigations carried on during the winter of 1924-1925 are reported under animal husbandry.

High Altitude Substation

The season of 1925 was favorable for most crops at the High Altitude Substation. The rainfall from December 1, 1924 to December 1, 1925 was 20.06 inches, approximately seven inches above normal. Plenty of

moisture fell during the growing season and it was an exceptionally good year for spring wheat which in 1925 made a higher average yield than the winter wheats. Heretofore the winter varieties have yielded better than the spring varieties.

New work was taken up this year as follows:

1. Cultural work with sweet clover.
2. Rotation experiments including the 5 and 6 year rotation with sweet clover as the leguminous crop and wheat as the cash crop.
3. Rotation experiments with peas and wheat.
4. Rotation experiments with sweet clover and potatoes.

In cultural tests sweet clover was seeded with peas, barley, oats and wheat, as nurse crops. Peas apparently make the best nurse crop but sweet clover seeded alone gave much better results than when seeded with a nurse crop. Because of the importance of the seed potato industry in the high altitude country, rotation experiments with sweet clover and potatoes were started this year.

In exchange of seed potatoes with the Aberdeen Substation, the home grown seed gave the highest yield for all three varieties tested. The average yield in bushels per acre of the Felt seed above the Aberdeen seed for the three varieties was 34.6 bushels. More work will be done in selecting and breeding better yielding strains of potatoes.

The Kharkov and Kanred varieties of winter wheat retain the lead with an average yield of 37.4 bushels per acre. The C. I. 3055 variety, grown for the first time this year, yielded as well as any in the test altho planted a month later than the other varieties excepting Sherman. The late varieties of spring wheat matured this year and outyielded the earlier maturing varieties. The Dicklow, Jenkin and Bluestem are among the late maturing varieties. Trebi barley still retains the lead in yield with Baker and Beldi yielding well up with the Trebi. Seed of the Trebi variety is in active demand. It has made an average yield of 42.8 bushels per acre in the six years it has been grown on the dry farm.

Alfalfa is one of the best hay crops for the dry farm area.

The data on the cultural test with wheat up to this time show that the good fallow increases the yield on the fallow plots 3.9 bushels per acre over the yield on the plots having no cultivation for May 15 plowing. The increase in yield of the good fallow plots over the plots having no cultivation for June 15 plowing was 3.1 bushels per acre, while on the July 15 plowed plots the increase was 1.9 bushels.

Sandpoint Substation

Weather conditions were very favorable for all spring grains and hay. Precipitation dropped below normal for the months of July, August,

September and October. The potato crop was reduced by an early frost, but other fall crops which were frost-resistant made good yields.

Rosen rye came thru the winter with the least winter injury and yielded 29.46 bushels per acre. A three year average for the different dates of seeding wheat shows that the early August seeding produced 28.7 bushels per acre, the second seeding in September 22.9 bushels and the third seeding in October 14.5 bushels.

The highest yielding spring wheat was Jenkin, 44.89 bushels per acre: Federation second, 38.71; Palouse Bluestem third, 38.69. The Banner variety of oats led all others with 83.09 bushels per acre; Victory next, 81.53; Abundance third, 78.43. Trebi was the leader in the barley varieties producing 51.47 bushels per acre; White Smyrna 47.82; Hooded 45.38. Flax yielded 8.84 bushels, spring rye 24.55 bushels and spring emmer 26.80 bushels.

The highest yielding field peas were the White Canada, 23.81 bushels per acre; McAdoo, 23.32; Bluebell, 22.52. The highest, 23.81 bushels, was obtained from a planting of field peas made April 2nd. A planting made April 20th yielded 18.68 bushels and a third planting made May 16th yielded 11.32 bushels.

Hairy vetch was the only variety out of nine that withstood the winter. This variety yielded 3630 pounds of hay in two cuttings. It produced 14.17 bushels of seed on a similar planting. The highest yield of hay from a spring planted variety was 3465 pounds. The largest amount of seed from a spring variety was 18.40 bushels.

The total yield for a period of three years from a mixed seeding of legumes shows that a mixture of alfalfa, biennial white sweet clover, and Hubam yielded 11,134 pounds, alfalfa and biennial white sweet clover 11,048 pounds, and alfalfa alone 8,151 pounds. The average yield of alfalfa over the entire farm was slightly better than 3 tons per acre.

The highest yield of sunflowers, 11.55 tons, was produced on an April 30th planting. The May 24th planting yielded 9.46 tons and the June 13 planting 7.54 tons. Data for four years show that the early planting averaged 10.05 tons, the next planting 9.75 tons and the late planting 8.37 tons. Over a period of four years, the average yield for sunflowers was 12.07 tons and for corn 3.92 tons.

The Bliss Triumph variety of potatoes was the highest yielding this year. Late maturing varieties did not do as well as usual owing to unfavorable weather conditions. Selections are being made from various varieties of potatoes which show considerable promise of higher yielding ability.

Original applications of gypsum continue to show as heavy increases

in yield. The total yield of alfalfa on the check plots was 4040 pounds, phosphate treatment 4800 pounds, gypsum treatment 10,260 and lime treatment 7,260 pounds.

Eight acres of land were cleared this spring, making the entire frontage of the farm free from stumps. A field day, held June 1st, was attended by 150 persons.

FINANCIAL STATEMENT

University of Idaho Agricultural Experiment Station in account with
Federal Appropriations

DR.	HATCH	ADAMS
To Balance from Appropriations for 1924-1925	None	None
Receipts from the treasurer of the United States for the Year ending June 30, 1925	\$15,000.00	\$15,000.00
CR.	ABSTRACT	
By Salaries	1 \$12,395.38	\$11,718.37
By Labor	2 1,718.82	988.91
By Stationery and Office Supplies	3	
By Scientific Supplies Consumable	4 114.64	746.56
By Feeding Stuffs	5 112.02	114.70
By Sundry Supplies	6 151.09	54.36
By Fertilizers	7	122.25
By Communication Service	8	
By Travel Expense	9 328.19	1,050.98
By Transportation of Things	10 7.25	47.65
By Publications	11 41.35	
By Heat Light and Power	12 82.76	72.81
By Furniture and Fixtures	13	
By Library	14	
By Scientific Equipment	15	82.41
By Livestock	16	
By Tools, Machinery and Appliances	17 5.50	1.00
By Buildings and Land	18 30.00	
By Contingent Expense	19 13.00	
TOTAL	\$15,000.00	\$15,000.00

LOCAL STATION FUND Fund Statement

Balance Jan. 1, 1925	\$1,100.68	
Receipts Jan. 1, 1925-Dec. 31, 1925	3,094.94	
Disbursements January 1, 1925-December 31, 1925	\$2,263.94	\$4,195.62
Balance December 31, 1925		\$1,931.68

RECEIPTS BY DEPARTMENTS

Interest on Deposits		\$ 240.55
Horticulture Dept.—Sale of Orchard Products	\$ 578.53	
Horticulture Dept.—Sale of Garden Products	127.06	705.59
Poultry Dept.—Sale of Poultry	105.96	
Poultry Dept.—Sale of Poultry Products	1,863.80	1,969.76
Agronomy Dept.—Sale of Garden Products		157.54
Agricultural Chemistry Dept.—Sale of Chemicals		8.00
Plant Pathology Dept.		13.50
		3,094.94

DISBURSEMENTS BY DEPARTMENTS

Items	Adm.	Ag. Chem.	Agron.	Bact.	Hort.	Plant Path.	Poultry	Total
Help	\$ 15.00	\$ 22.60	\$ 12.00	\$ 40.25	\$435.18	\$ 128.20	\$468.25	\$1,121.48
Travel Expense	79.61		267.27		293.66	122.10	5.45	768.09
Printing & Advertising	90.00							90.00
Stationery & Office Supplies	5.65							5.65
Laboratory Supplies		142.54	27.00	9.00	46.17			224.71
Feeding Stuffs								
Repair to Equip.	13.00		1.00	2.00	14.56	23.45		54.01
Total	\$203.26	\$165.14	\$307.27	\$ 51.25	\$789.57	\$ 273.75	\$473.70	\$2,263.94

EXPENDITURES BY DEPARTMENTS

From State Appropriations
January 1, to December 31, 1925

Items	Adm.	Ag. Chem.	Agron.	Bact.	Entomology	Hort.	Plant Path.	Poultry	Soil	Total
Salaries		\$ 20.70	\$520.00	\$ 75.30	\$4,189.99		\$ 78.56	\$310.00	\$ 528.21	\$ 5,548.20
Help			98.58	75.30	75.63	105.17	285.50			739.44
Travel	161.04				394.08	43.26	55.61		50.16	704.15
Telephone										
Telegraph	10.05				32.82					42.87
Postage	55.20				31.86					87.06
Freight and Express	12.98	3.21		57.65	30.00		37.45			141.29
Light and Power					14.25					14.25
Printing and Advertising	1,427.66		8.05			3.10	23.90	2.60		1,465.31
Laboratory Supplies		20.67	148.00	293.56	197.77	138.65	203.75	149.03	3.10	1,154.53
Office Supplies			10.00		31.88					41.88
Repair to Equipment	9.40		3.75		104.81	11.60		76.62		206.18
Equipment					36.25				502.00	538.25
Total.....	\$1,676.33	\$44.58	\$788.38	\$426.51	\$5,139.34	\$301.78	\$399.27	\$823.75	\$1,083.47	\$10,683.41

EXPENDITURES

January 1, 1925 to December 31, 1925

	Aberdeen	Caldwell	High Altitude	Sandpoint	Total
Salaries	\$2,400.00	\$2,040.00	\$1,500.00	\$2,000.00	\$ 7,940.00
Labor	2,613.81	4,304.31	1,143.25	2,099.70	10,161.07
Expense and Supplies	1,933.96	5,328.15	983.66	2,369.10	10,614.87
Equipment	1,500.00	138.00	763.80	556.50	2,958.30
Total.....	\$8,447.77	\$11,810.46	\$4,390.71	\$7,025.30	\$31,674.24