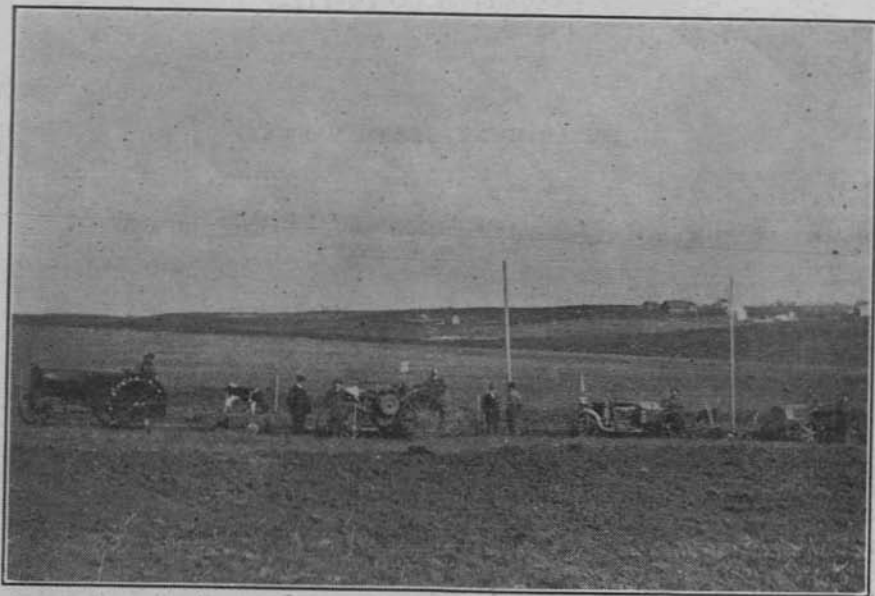


UNIVERSITY OF IDAHO  
AGRICULTURAL EXPERIMENT STATION  
Department of Agricultural Engineering

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# Power Farming in Idaho

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Plowing the Headland at the Vollmer Demonstration.

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BY  
JOHN C. WOOLEY

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# Power Farming in Idaho

## SOME RESULTS OBTAINED BY A RECENT SURVEY

*John C. Wooley*

The national tractor demonstrations have shown that while new and in the hands of experts the tractor will do the work it is designed to do. These demonstrations have been very valuable aids in the development of the tractor as a form of power and of the business of making tractors. At the present time, however, we are most interested in knowing what success the farmer-owner is having with his machine. In order to secure information regarding the success of the tractor on the farm questionnaires were sent to 520 tractor owners. Two hundred twenty-six answers were received. One hundred twenty-seven of the questionnaires were filled out completely and it was from these that the conclusions were drawn.

Several studies were made of these data and some of the results are given below:

### STUDY NUMBER 1

PURPOSE.—To determine the success with which tractors have been operated in Idaho during the past ten years.

Date of Purchase.	Has the Tractor Been a Paying Investment?	
	Yes	No
1908.....	1	2
1909.....	0	2
1910.....	0	0
1911.....	2	0
1912.....	2	2
1913.....	1	0
1914.....	9	4
1915.....	15	7
1916.....	14	10
1917.....	42	14

Of the 127 reports, 86 indicated the tractor as a profitable and 41 as an unprofitable investment. In other words, 69.3 per cent of all the tractors that have been used in the state have been

profitable. Considering alone the tractors purchased in 1917, we find that 75 per cent of them have been profitable to their owners. Some of the failures are due to poorly designed machines, but in many cases the trouble can be traced to a lack of knowledge regarding the care and proper method of operation of the machine, or to carelessness on the part of the operator.



TRACTOR AT WORK AT GRANGEVILLE DEMONSTRATING

The selection of the proper size and type of machine also has much to do with its success or failure.

### STUDY NUMBER 2

PURPOSE.—To find the relation of size of farm to the success of the tractor.

On less than 200 cultivated acres.....	70	per cent were successful
" 200 to 300       "       " .....	81.5	per cent were successful
" 300 to 400       "       " .....	50	per cent were successful
" 400 to 500       "       " .....	77	per cent were successful
" 500 to 600       "       " .....	75	per cent were successful
" 600 to 700       "       " .....	57	per cent were successful
" 700 to 800       "       " .....	63	per cent were successful
" over 1,000       "       " .....	78	per cent were successful

It is seen from this that the highest percentage of success

was secured on the small farm and the next best results were secured on the farms with over 1,000 acres in cultivation. On the smaller farm the owner was in all probability his own operator, which, no doubt, has something to do with this high percentage of success. On the larger ranch there is a tendency to overload the machine and this at once makes the tractor an unprofitable investment. On the largest ranches an expert operator is often hired and less loss of time and less expense is usually the result.

### STUDY NUMBER 3

PURPOSE.—To determine the relation of size of tractor to the profitableness of the investment.

Size	No. Reported Profitable	No. Reported Unprofitable
8-16 horse power.....	10	5
10-20 " ".....	16	3
12-25 " ".....	18	8
15-30 " ".....	14	7
20-45 " ".....	13	6
30-60 " ".....	7	4
40-75 " ".....	5	1

The higher percentages here are found in the 10 to 12 draw bar horse power class and in the 40-75 size. The smaller type has been, in most cases, used to supplement the horse power on the farm, while in many cases, the larger type has been used for all the work on the wheat ranch. Both have been found profitable investments.

### STUDY NUMBER 4

PURPOSE.—To find the size of tractor favored by owners of different size farms.

Cultivated Areas.	Favored Size.
Less than 100 acres.....	8-16 horse power
100-200 ".....	12-25 " "
200-300 ".....	10-20 " "
300-400 ".....	20-40 " "
400-500 ".....	12-25 " "
500-600 ".....	15-30 " "
600-700 ".....	25-50 " "
700 acres and over.....	40-75 " "

The size of tractor selected will depend upon other factors beside the size of farm. One of these factors is the requirement

for belt power. Another is the type of soil and still another is the type of farming. On the specialized wheat ranch, where the plowing, discing, seeding and harvesting can be done with the tractor, one of the larger sizes will be necessary for success. While on a ranch where diversified farming is followed, one or two smaller machines may be more successful.

### STUDY NUMBER 5

PURPOSE.—To determine the effect of dependability on success of the tractor.

Size of Tractor	Number Reporting	Profitable	Unprofitable
		Days Out of Repair When Needed	Days Out of Repair When Needed
Less than 10 D. B. H. P.....	26.	8.3	60.
10 to 16 D. B. H. P.....	42.	3.2	30.
Over 16 D. B. H. P.....	21.	7.	33.
Average .....	..	6.1	41.

NOTE:—D. B. H. P. is the abbreviation for Draw Bar Horse Power.

Dependability is one of the most important factors in the success or failure of the tractor as an investment. If the tractor can be depended on to work when the busy season comes, it proves to be, in most cases, a profitable investment. Where it fails in the busy season, it is certain to be a marked failure.

### STUDY NUMBER 6

PURPOSE.—To find the number of horses displaced by different size tractors and to determine the effect of this displacement on the success of the tractor.

Size of Tractor	—Horses Displaced—	
	By Profitable Machines	By Unprofitable Machines
Tractors less than 10 D. B. H. P.....	4	2
10 to 16 D. B. H. P.....	7	4
Over 16 D. B. H. P.....	14	6

In every case the tractors reported as having been profitable investments have displaced a larger number of horses than those that have not been reported as profitable. A tractor can be made more easily a financial success if it displaces some horses, but quite a few owners feel that they have made money by supple-



menting the horse power with the tractor. They have taken some of the hardest work off the horses and have had an abundance of power for the rush seasons.

### STUDY NUMBER 7

PURPOSE.—To determine the effect of the tractor on the labor situation.

Size of Tractor	Percent of Owners Reporting a Decrease in Hired Help.	
	Profitable Machines	Unprofitable
Less than 10 D. B. H. P.....	73%	12½%
10 to 16 D. B. H. P.....	83%	19 %
Over 16 D. B. H. P.....	90%	55 %

Eighty-two per cent of all tractor owners reported that the tractor enabled them to get along with less hired help. The men who have been able to displace some man labor with their machines are the ones who in a majority of cases have made the greatest financial success with these machines.



TRACTOR AT GRANGEVILLE DEMONSTRATING SQUARE TURN

### STUDY NUMBER 8

PURPOSE.—To find the different farm operations in which the tractor is being used in Idaho.

Ninety-seven per cent of the owners make the greatest use easily be made to pay its way.

of the tractor in plowing. A few operators use their machines in plowing as many as 120 days each season.

About one-third of the owners use their tractors in the preparation of the seed bed. A large number of the men who use their tractors in this work are among the successful operators. By use of the tractor this work can be done rapidly and without expensive equipment, and such use will help the tractor to pay its way.

Twenty per cent of the owners use their machines for harvesting and about forty per cent of the machines are used in threshing. Clearing of land, pumping, silo filling, feed grinding, grading, and hauling are other lines of work in which the tractor is being used successfully.

### STUDY NUMBER 9

**PURPOSE.**—To learn the troubles that tractor owners encountered.

Quite a large number of men have reported trouble with ignition and in almost every case this has been due to dust that has found its way into the magneto. A dust-proof cover should be carefully kept in place and by this means much of this trouble will be avoided.

Lubrication was one of the difficulties encountered last season. Some of the most successful operators are the ones who take the greatest care with their lubricating oil. Lubricating oil is destroyed by being burned, by being cut with kerosene that works past the piston rings, and by being worn out in the bearings and cylinders. One successful operator drains his crank case at the end of each day's run. He allows the oil to stand until morning and then pours off any washy material and filters the remainder. At the end of one week he uses new oil in the crank case. Tests have indicated that the oil should be changed after 30 hours of work where the engine is being operated under maximum load. Trouble with bearings, with rings, and with loss of power are very often the result of poor lubrication.

Gears and chains come in for a large share of the trouble in this state, due to the large amount of dust that prevails. It is well to inspect the gears and chains often and thus anticipate the need for new parts.



**STUDY NUMBER 10**

**PURPOSE.**—To determine the items in tractor cost to the owner.

One of the items that is quite important is that of deterioration. If a tractor gives service for only five years, then one-fifth of the original cost must be charged to deterioration each year and at this rate, this will be one of the big items. If the tractor will give service for ten to twelve years, as it should under proper usage, then this item will not be so great. Loss of time when power is most needed is an expensive item and must be avoided



POOR EQUIPMENT FOR TRACTOR PLOWING,  
USING HORSE PLOW WITH LOG CHAIN FOR HITCH

by care in operation and by effective service on the part of the dealer, in case of a breakdown during the busy season. Fuel and oil should probably be listed next, with repairs as one of the lesser items in cost. Fuel and oil costs for plowing should be kept below fifty cents per acre. The other items of cost are so variable that no accurate figures can be given.

## • Hints to Prospective Owners

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Know your tractor thoroly before you begin operating it. Study your instruction book and know the why and the how of each part of the machine.

Follow instructions of the manufacturer. He has experimented with cheap oils and with heavy loads and in your instruction book you are getting the benefit of his experience. The experimental work is expensive. Let the manufacturer do it.

Spend as much time morning, noon, and night on your tractor as you would on your horses. Keep your whole ignition system free from dirt and grease. Clean all working parts that are exposed to dust. Grease and dust together make a very effective grinding compound.

Do not overload the tractor as it will shorten its working days and bring you expense.

House the tractor between seasons. Proper shelter will be far cheaper in the long run.

### CONCLUSIONS

1. The tractor, when selected to suit the farm and intelligently and carefully operated, has been reported by owners in Idaho a profitable investment.

2. The farmer must be able to make all minor repairs himself and to get repairs and expert help quickly for larger installations.

3. Dependability is probably the largest factor in the success of the tractor.

4. The three plow size is favored by a majority of Idaho owners.

5. Proper care of lubrication will prolong the life of the machine.

6. The best quality of oil is the cheapest for the tractor.

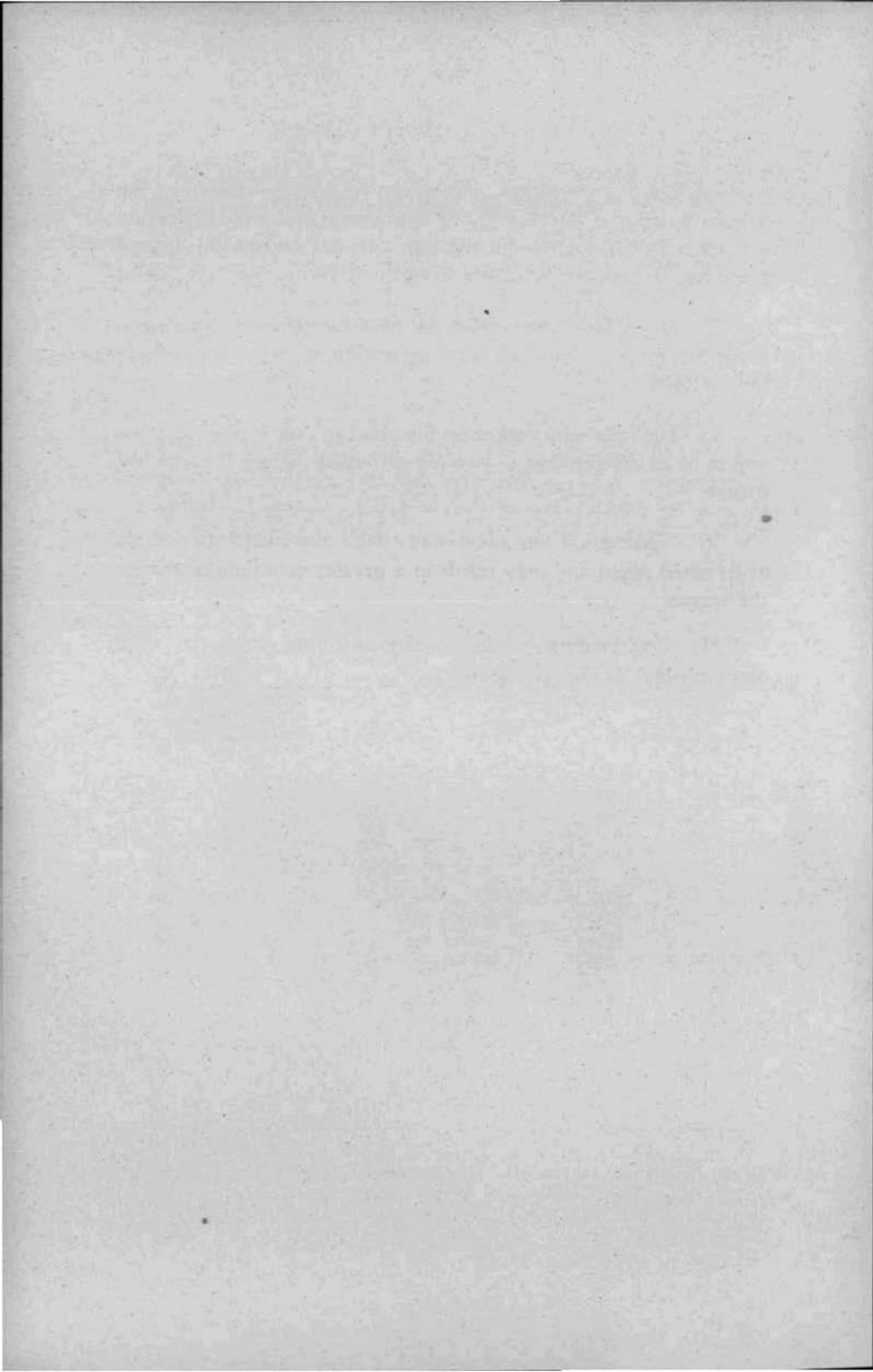
7. The tractor motor is required to pull its rated load the greater portion of the time. The automobile motor is very rarely subjected to full load for a ten hour day. Care for the tractor accordingly.

8. The tractor that displaces half its value in horses can easily be made to pay its way, according to reports of Idaho tractor owners.

9. The man who makes up his mind to care for his machine and to be as independent as possible of outside help is the satisfied owner.

10. Taking off one plow may enable the tractor to operate at its rated speed and may result in a greater accomplishment for the season.

11. Overloading brings trouble and cuts down the work accomplished during the season.



### REPORT ON THE 1918 SEASON

Will you kindly fill out this blank, detach it and mail to the Agricultural Engineering Department of the University of Idaho, Moscow, Idaho.

#### Your Cooperation Will be Appreciated.

Owner's Name..... Town.....

County..... Kind of Tractor.....

Size..... Date of Purchase.....

Size of Farm..... Cultivated Acres..... Topography.....

Did the Tractor pay its way this season?.....

How many more seasons do you expect your Tractor to give satisfactory Service? .....

How much did you spend for repairs this season?.....

How many days did you lose because the tractor was not in condition for operation? .....

Will you keep a careful record of the fuel and oil used for a period of at least five days and report on other side of this page?

Kind of work done.....

Kind of fuel used.....

Gallons per acre.....

Cost per acre.....

Oil used per acre.....

Cost per acre.....

Total fuel and oil cost per acre

What Troubles Have You Had This  
Year?

Different lines of work in which  
you have used the Tractor this  
year.

Kind of Work.	No. of Days.
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Has the Tractor saved you money in displacing horses?.....

How much?..... Would you buy the same make of

Tractor again?..... Same size?..... If not, what

size?..... What is your opinion of the future of power

farming in Idaho?.....

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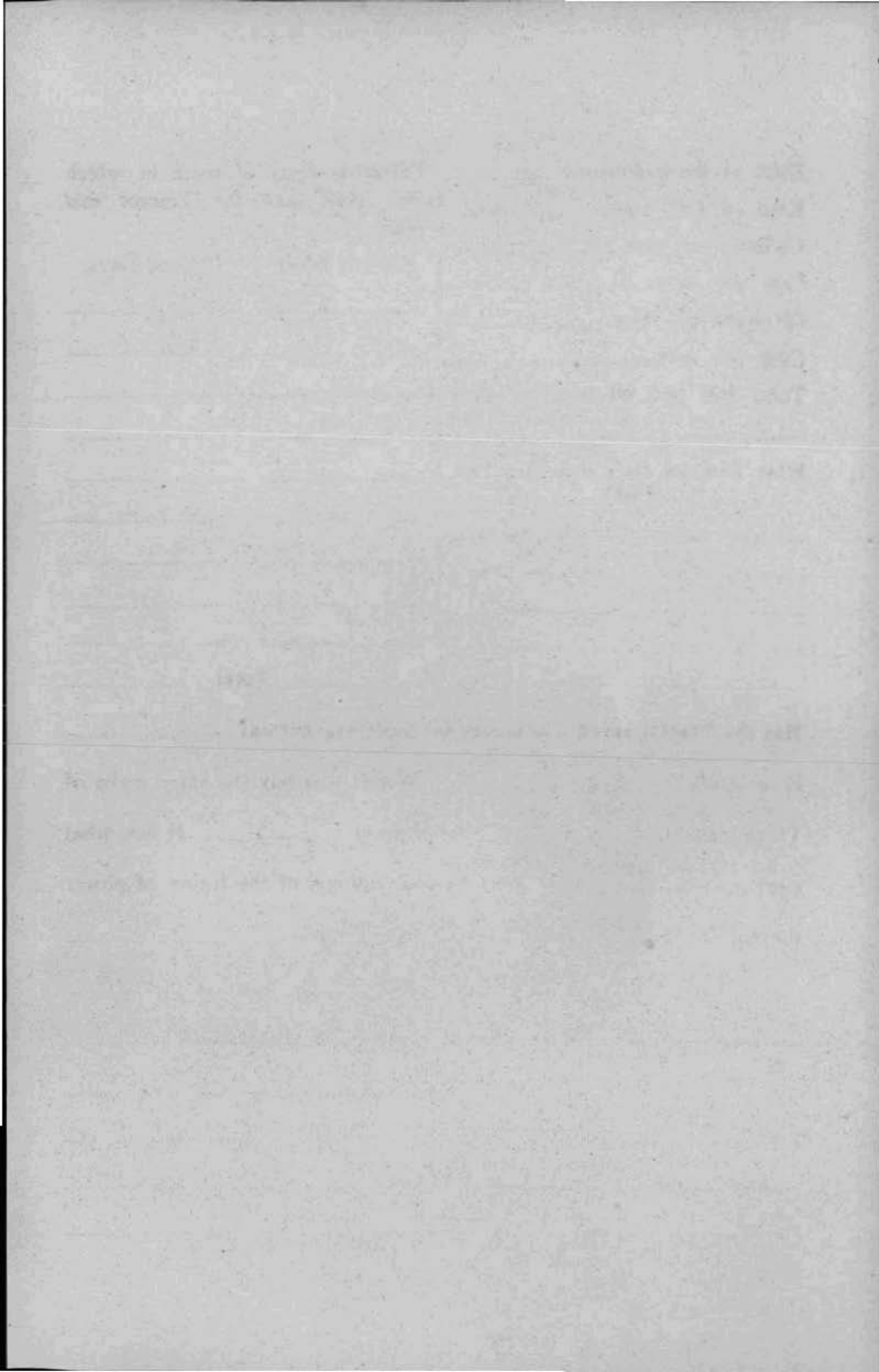
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The following publications may be obtained without cost, by addressing the Agricultural Experiment Station, Moscow, Idaho:

### Bulletins.

72. A Report on the Milling Properties of Idaho Wheat.
73. A Study of Idaho Butter with Suggestions for Improvement.
75. Composition of Irrigated and Non-Irrigated Fruits.
85. The Use of Lime-Sulfur as a Summer Spray for Apple Scab.
86. Some Poisonous Plants of Idaho.
87. Insect Pests of the Orchards and Gardens of Idaho, and Their Control.
88. The Milling Values of Dry-Farmed and Irrigated Wheat.
90. Creamery Records.
91. Methods of Clearing Logged-off Lands.
92. The Annual Report of the Experiment Station for the Year Ending June 30, 1916.
93. Experiments with Small Grains Under Irrigation.
94. Experiments with Legume Crops Under Irrigation.
95. The Management of Irrigated Grass Pastures.
96. The Management of Farm Flocks in Idaho.
97. Commercial Onion Culture in Idaho.
98. Winter Versus Summer Pruning of Apple Trees.
99. Experiments in the Irrigation of Apple Orchards.
100. The Production of Clover Seed Under Irrigation in Southern Idaho.
101. The Production of Alfalfa Seed in Southern Idaho.
102. Dairy Herd Management.
103. Performance Records of Some Eastern Wheats in Idaho.
104. Annual Report of the Experiment Station for the Year ending Dec. 31, 1917.
105. Trees: What, Where, When and How to Plant.
106. The Home Garden in Idaho.
107. Soils of Latah County.
108. Sprays for the Control of San Jose Scale.
109. The Protein Content of Wheat under Irrigation.
110. Drying and Serving Fruits and Vegetables in the Home.
111. Power Farming in Idaho.
- .... Directory of Idaho Pure-bred Breeders.
- Farmers' Bulletin 769. Growing Grain on Southern Idaho Dry Farms.
- Farmers' Bulletin 907. Bean Growing in Eastern Washington and Oregon and Northern Idaho.
- \*Ground Squirrel Control.
- \*Oats in Washington.
- \*The Home Drying of Fruits and Vegetables.

\*Purchased of Washington State Experiment Station for distribution in Idaho.

### Circulars.

2. Field Peas.
3. Feeding for Egg Production.
5. Tested Forest Trees for Planting in Idaho. This circular is a price list of trees for sale by the Department of Forestry at approximate cost.
6. The Spray Calendar.