

# AGRICULTURE

**A**GRICULTURE in Oregon is confronted by a number of problems, chief of which is diversity of production to restore fertility of the soil West of the Cascades and to maintain it East of the mountains. Continuous planting of the staple crop, wheat, in the Western section has so drained the soil that the average yield has fallen to the lowest level in the history of the state. For a while in the growing season last year the indications were that Oregon would break its record with a crop failure. Eastern Oregon has not yet begun to feel the evil results of wheat, as it has not been so severely taxed by the one-crop idea of farming. Western Oregon was growing wheat when Eastern Oregon was down on the maps as a desert. Conditions as to fertility are pretty much the same in Eastern Oregon now as they were West of the Mountains in the latter part of the '60s and early in the '70s. Today the Eastern Oregon farmer, particularly in the choice areas of the Umatilla Valley, can harvest 40 and 50 bushels to the acre without any more effort than the planting of the seed and rotation with the summer-fallow. Thirty years ago the producer of the Willamette could do so without any more effort than to take a lay-off now and then and let a volunteer crop come up and fill his granaries.

A number of antiquated notions will have to be got out of the heads of the producing classes before the necessary reforms can take firm root. Diversified farming means work every year and it is not a gradual headway in the Willamette Valley among people who have long been accustomed to earn a living with the smallest effort. The whole object of work necessary to harvest a wheat crop does not occupy the farmer to exceed three months in the year. The first task in the Spring is to haul in the manure that has been left in the field all winter, and clean them of rust. After that, plowing and seeding, an eye to the fences in the growing season, harvest—that is all. If the farmer does any extra work it is generally in the line of a trip to the nearest town to buy bacon, and fresh and salt beef, articles of food which he can produce on his own farm if he so wills. But the limit of exclusive wheat production has been reached West of the Mountains and something must be done to relieve the soil. Dairying has been introduced as the remedy and is making gratifying progress.

In Eastern Oregon the chief of the old notions, tenacious in some localities, is that the country is fit only for stockraising on a large scale. Irrigation in the Yakima country having demonstrated what can be done for a semi-arid region, Eastern Oregon, too, looks forward to the day when it will be a garden. Already the agriculturist is crowding the stockman in regions where the land is more valuable for production than grazing. In Crook County the tendency is away from the large stock ranch and towards the small farm. In the John Day Valley the end of the big range is in sight. Railroad communication will settle the case there in favor of the tiller of the soil. Stock companies still own entire valleys in Grant County for pasture, and control enormous areas in Malheur and Harney Counties. The settler already has his eye on such of this territory as is productive or can be made so by irrigation, and will have his day before long. Barbed-wire fences will not keep him out. In Eastern Oregon the climate is more rigorous than in the western section and it requires more work to earn a living. Consequently, the large farm does not find much favor. Old-timers show a greater inclination to divide their holdings than old-timers in the Willamette Valley, and newcomers as a rule ask for small places. The old settler's faith in his ability to make the soil respond to his wishes is remarkable. When sugar-beet culture was first begun in the Grand Ronde Valley some farmers readily accepted contracts to plant 600 acres, more than they could take care of with all the help it was possible for them to engage in a growing season. Recent arrivals are going into the business on the basis of 5, 10 and 20 acres.

**Methods Must Be Remedied.**  
Economists emphasize the fact that agricultural methods in Oregon must be remedied. The one-crop system of the Willamette Valley has steadily reduced the humus contents of the soil, and as a result the land is harder and more expensive to work. The soil has lost its old-time mellowness, becomes soggy and compact in wet weather and cloddy in dry

weather. At a meeting of dairymen at Whiteson, last July, Dr. James Withycombe, vice-director of the Oregon Agricultural College, said that there is no excuse for this condition of affairs. With an intelligent system of mixed farming and proper rotation of crops, there is no reason why agricultural pursuits should not prove as successful and remunerative here as in any part of the world. The farmer must make better use of his brain and depend less on his brawn. "Stop the leaks on the farm," said Dr. Withycombe. "Abolish the senseless system of the bare summer fallow. The large area of summer-fallow land, with a few half-starved sheep roaming over it is a travesty upon 15th century agriculture. This system adds nothing to the soil, but, instead, hastens the destruction of the most valuable element of plant food. Instead of the bare fallow, grow rape and leguminous crops. These will add humus to the soil, thereby increasing its fertility and improving its physical character. This system will enable the farmer to carry much more stock and prepare the soil for larger yields of grain."

The nutritive properties of clover and other leguminous crops both to soil and stock, are well known, but as rape is a new plant in the West, it is not so well understood. Probably the first crop of rape ever grown in the Pacific Coast was gathered by John B. Stump, of Monmouth, last July. He got 10 bushels of seed to the acre, worth on the average \$3.50 per bushel. A 30-acre field was planted in June, 1899. On it Mr. Stump pastured 100 sheep and many goats, and hogs until the Spring of 1900. At Guelph, Canada, in 1890, 54 acres of rape were sown after a crop of rye, a portion of which had been made into silage early in June, and the residue cut in the green state with a binder and cured for winter fodder. In the Autumn, 537 sheep and lambs were fattened upon the rape. 15 head of steers fed upon it for 23 days, and several acres were still left uncut, when winter came. Rape possesses remarkable fattening properties. When sheep and lambs are turned upon it, they soon weigh like hogs. Rape has another quality which ought to recommend it to Oregon farmers. In view of the great growth of blue butternuts and tumble-weeds that diminish the grain yields. As a cleaning crop it has but few equals when it is grown in drills, owing to the season of the year at which it must be sown to obtain good yields and to the cultivation which it then requires. When rape is the only crop grown, the ground may be managed as a bare fallow from the preceding Autumn until the time of sowing the rape. Nearly all kinds of weeds can be sorely harassed in this way, but more especially those which ripen their seeds early. The cultivation which

average crop grown in drills should furnish not less than 10 tons per acre, and when the conditions are all favorable, it is quite possible to produce at least 20 tons of green fodder per acre. Aside from wheat, general agricultural conditions in Oregon are favorable. The situation of the wheat agriculturist would not be so disheartening if he would only do something for himself. Horticulture and horticraft are almost completely disassociated from general farming. They are recognized as special industries and followed as such. In both the tendency is for quality for production that will pass the closest inspection and command the highest market price. Dairying, too, will in time become an industry by itself. Conditions favor intelligent direction in all the branches of agriculture in this state. The wheat farmer can harvest 25 bushels to the acre, instead of hunting for them on two or three acres, if he will diversify. There is abundant property in store for the dairyman on the basis of the cow giving 6000 pounds of milk a year. The horticulturist can save 50 per cent of his fruit if he will spray and otherwise care for his orchard. Millard O. Lowndale, of Lafayette, lost but one-half of 1 per cent of his apples last year in a crop of 30,000 boxes. Others can do just as well if they give their trees the attention which Mr. Lowndale gives his. The hog grower can get the best market price if he will produce good hogs, and such is his aim nowadays.

**Cost of Wheat Production.**  
In all parts of the state there is an ardent discussion of the cost of raising an acre of wheat, and of the cost per bushel. Farmers in a section of Wasco County, from which a stiff price is charged for a short haul to the railroad, make money when wheat is at 50 cents, whereas, Willamette Valley farmers complain that there is nothing in wheat at that price. Cost of production, selected at random from different parts of the state, is contained below.  
(In one sense, Crook County's long isolation has been a blessing: It has taught farmers to depend upon themselves for many articles which could not be imported except at considerable cost. On this account, diversified farming is quite general. The lack of transportation and the prevalence of stockraising on a large scale have restricted farming operations and the wheat grown has been principally for home consumption. The average lands of the county have yielded in the past six years from 21 to 42 bushels of wheat to the acre. These crops were raised without irrigation, on lands that were summer-fallowed. Where Summer-fallowing is not practiced the crop falls as low as 15 bushels to the acre. The average yield for six years is about 20 bushels to the acre. On this basis the cost of raising a bushel of wheat is 42 cents.

table prepared by Cyrus H. Walker, of Albany, on the basis of an acre, gives a fair estimate along this line. It has its foundation in actual experience, and, according to Mr. Walker, shows the least possible outlay of labor and expense:

Plowing	.....	\$1.25
Harrowing twice	.....	1.00
Seed, well cleaned and vitriolated	.....	1.50
Sowing, average between broadcast and drilling	.....	.20
Cutting with self-binder	.....	.20
Twine	.....	.25
Shooking	.....	.15
<b>Total</b>	<b>.....</b>	<b>\$5.55</b>

Rolling ..... 20  
Twine ..... 12  
Cutting and shooking ..... 1.25  
Threshing ..... 1.08  
Delivering at station ..... 24  
Sacks ..... 54  
Interest, 5 per cent on land, at 120 per acre ..... 2.40  
**Total** ..... **\$2.46**

The cost per bushel in this section is nearly 47 cents.  
Diversified farming is the rule in Baker County. No producer depends upon wheat

that accrues when land is Summer-fallowed. Umatilla County's soil ranges from the almost worthless sand and sagebrush of the Columbia and Umatilla River lowlands, gradually increasing in fertility until the great growing belt of the county is reached. This extends about 35 miles northeast and southwest, is about 30 miles wide, beginning at the base of the Blue Mountains and following their contour. While Umatilla County

Kafir corn, popcorn and broomcorn have been tried in a small way without success, as they do not mature sufficiently to keep in that climate. Clover production has been successful. The average cost of raising a bushel of wheat in this section, estimating 12 bushels to the acre, is:

Plowing	.....	\$1.00
Harrowing twice	.....	.80
Seed	.....	.80
Sowing	.....	.20
Cutting	.....	.20
Twine	.....	.25
Shooking	.....	.15
<b>Total</b>	<b>.....</b>	<b>\$3.20</b>

The average yield per acre is 12 bushels; average cost per bushel, \$3 1-3 cents.

been known to be favorable to beet-sugar culture, but several years of experimenting were required to convince capital and get the first factory in operation. Between 1892 and 1894, the State Agricultural College furnished seed to a number of persons interested in the industry who sent beets to the experimental station for analysis. The average of the results of 23 analyses made from 1892 to 1896, showed 15.95 per cent of sugar and a purity of 93.8 per cent. In 1897, the ex-



CUTTING GRAIN IN EASTERN OREGON FIELDS WHERE THE YIELD RUNS 40 BUSHELS TO THE ACRE.

—Photo by W. A. Raymond, Moro, Or.



METHOD OF TRANSPORTATION IN THE ISOLATED SECTIONS OF EASTERN OREGON—EIGHT-HORSE TEAM FREIGHTING TO THE RAILROAD.

—Photo by George M. Weister, Portland.

follows while the rape is growing is fatal to weeds of a later habit of growth. When rape follows a crop of rye cut green, it is also helpful in destroying weeds. The rye tends to smother the weeds, and is cut before they mature their seeds. The plowing and cultivation which come later still further tend to complete the work of destruction. Growing rape in drills after a grain crop has been removed is also serviceable in destroying weeds, though not quite to the same extent as when it is grown by one or the other of the methods mentioned above. The rape also recommends itself to dairymen. An

In Linn County, in the neighborhood of Talent, the cost of raising 100 acres of wheat, taking 15 bushels per acre as the average, is as follows:

Plowing, at \$1.25 per acre	.....	\$125.00
Harrowing twice, at 25c per acre	.....	37.50
Seed, 100 bushels, at 40c	.....	40.00
Binding, 50c per acre	.....	50.00
Shooking, 15c per acre	.....	15.00
Twine, at 12c per pound	.....	15.75
Threshing, 5c per bushel	.....	75.00
Sacks, 50, at 4c	.....	30.00
Hauling to market, 3c per bushel	.....	39.00
Storage, 4c per bushel	.....	60.00
<b>Total</b>	<b>.....</b>	<b>\$321.25</b>

This is an average per acre of \$3 21/2 per

one beginning at a point six miles west of Pendleton and the other six miles east of Pendleton, both running in a northeasterly direction parallel to each other and terminating 30 miles from the starting point in a normal way the yield per acre of the territory within the lines approximates 30 bushels. In the territory to the right, or next to the mountains, the average is 49 bushels, while in the region to the left, the farthest from the mountains, the yield drops to 15 and 20 bushels per acre. While the cost of heading and threshing varies in other parts of the county, the figures given for those items in the following estimate per acre for the county are uniform for the section mapped out:

Plowing	.....	\$1.00
Cultivating	.....	.25
Seed	.....	.80
Sowing	.....	.20
Heading	.....	1.25
Threshing	.....	1.00
Sacks and twine	.....	1.00
Hauling	.....	.20
Insurance	.....	.20
<b>Total</b>	<b>.....</b>	<b>\$7.90</b>

The cost per bushel, taking 30 bushels as the average yield, including poison and vitrioling, reaches nearly 23 1/2 cents.

**Profit in 50-Cent Wheat.**  
Summer fallowing has become general in Wasco County in the past five or six years. Occasionally there is a farmer who would rather have his 35 bushels spread over three or four acres than to have it on one acre, but he inevitably pays for his lax methods. His system is not considered in the following itemized statement of the cost of production of a bushel of wheat in the Dufur section. Each service can be done for the figure named and in some instances for less, so that the cost of machinery may be properly considered as included:

Plowing	.....	\$1.25
Cultivating	.....	.75
Seed and seeding	.....	.75
Heading	.....	.75
Threshing	.....	1.75
<b>Total</b>	<b>.....</b>	<b>\$5.25</b>

Farmers of the Dufur country hold cultivating to be as important as plowing. It is done with specially made machinery, and in the Summer weeds are not permitted to sap the moisture needed by grain planted in the early Fall. The average yield per acre on land treated as above is 35 bushels, but allowing for loss from hot July winds, 30 bushels would be a fair compromise. This makes the cost per bushel 17 1/2 cents. To this must be added 3 1/2 cents for sacks and 7 cents for hauling 15 miles to market; still the total cost per bushel stays under 30 cents. Wheat farming pays at Dufur when the market is at 50 cents. Nearly every farmer raises some barley, which, when sown on Summer-fallow ground in the Spring, averages about 50 bushels to the acre. The majority of farmers raise as many hogs as they can wall care for and several head of cattle for the market.

In the Ballston section of Polk County farmers are beginning to understand the value of diversified farming. Field corn,

one beginning at a point six miles west of Pendleton and the other six miles east of Pendleton, both running in a northeasterly direction parallel to each other and terminating 30 miles from the starting point in a normal way the yield per acre of the territory within the lines approximates 30 bushels. In the territory to the right, or next to the mountains, the average is 49 bushels, while in the region to the left, the farthest from the mountains, the yield drops to 15 and 20 bushels per acre. While the cost of heading and threshing varies in other parts of the county, the figures given for those items in the following estimate per acre for the county are uniform for the section mapped out:

Plowing	.....	\$1.25
Harrowing	.....	1.00
Seed	.....	1.50
Sowing	.....	.20
Cutting with self-binder	.....	.20
Twine	.....	.25
Shooking	.....	.15
<b>Total</b>	<b>.....</b>	<b>\$5.55</b>

Rolling ..... 20  
Twine ..... 12  
Cutting and shooking ..... 1.25  
Threshing ..... 1.08  
Delivering at station ..... 24  
Sacks ..... 54  
Interest, 5 per cent on land, at 120 per acre ..... 2.40  
**Total** ..... **\$2.46**

The cost of raising an acre of wheat at Mayville, Gilliam County, is:

Seed	.....	\$1.20
Plowing	.....	1.00
Harrowing	.....	.80
Seedling	.....	.20
Heading, including board of men	.....	.75
Threshing	.....	.75
Sacks	.....	.20
Hauling to railroad at Arlington	.....	1.44
<b>Total</b>	<b>.....</b>	<b>\$7.37</b>

At 12 bushels to the acre, the average per bushel is 44 cents. At the same cost per acre the Mayville farmer can harvest from 30 to 45 bushels of barley.

**Sugar-Beet Culture.**  
Oregon soil and climate have long

all have hogs to sell in the Fall, some make butter, others raise cattle and sheep, and all have poultry. Wheat, barley and oats are grown. If wheat is high, it is sold and barley is fed to hogs. If wheat is low, it is converted into pork. Baker County farmers have a good home market for all they raise and as a rule are well-to-do. The cost of raising an acre of wheat is:

Plowing	.....	\$1.50
Harrowing	.....	.80
Seed	.....	.80
Sowing	.....	.20
Cutting	.....	.20
Twine	.....	.25
Sacks	.....	.54
Interest	.....	1.00
<b>Total</b>	<b>.....</b>	<b>\$7.30</b>

In Sherman County farmers recognize the advantage of diversity, but still stick to exclusive wheat production. Cost per acre in the vicinity of Grass Valley is:

Plowing	.....	\$1.25
Harrowing	.....	.80
Seed and seeding	.....	.75
Harvesting	.....	1.10
Machinery (MFC)	.....	.20
Sacks and twine	.....	.20
Hauling to station	.....	.20
Taxes	.....	.20
Interest	.....	1.00
<b>Total</b>	<b>.....</b>	<b>\$6.40</b>

The average yield per acre is 12 bushels; average cost per bushel, \$3 1-3 cents.

The success of the La Grande factory has caused several sections of Oregon to put forth efforts to get factories. Early last Summer Newberg raised money to pay for a 60-acre site on the Willamette River, and located 5000 acres of beets to get an \$800,000 factory. Several towns in the Southern and Southeastern parts of the state are trying to interest capital in beet-sugar manufacture.

**Opening Up Eastern Oregon.**  
A number of irrigation enterprises are projected in Eastern Oregon. Powder, Burnt, John Day, Des Chutes and other rivers have an abundance of water and

periments were continued. Everything was not so favorable as it might be, the ground had been prepared in the Spring, and the seedlings were coming withstanding, the following excellent suits were obtained:

County	Weight	Per Ct.	Per
Washington	425	15.7	Pur
Clackamas	496	15.7	Pur
Trilux	625	15.7	Pur
Jackson	603	15.6	Pur
<b>Average</b>	<b>508</b>	<b>15.5</b>	<b>Pur</b>

The La Grande factory was built in 1892. Considering the haste with which the enterprise was started and the inexperience of farmers in growing beets, the first year was quite satisfactory. Many of the farmers thought that beets could grow like wheat, in tracts of hundreds of acres. Instead of contracting them to 10 or 20, or possibly 40 acres, they contracted to grow 100, 200 and in some cases as high as 600 acres of beets. The yield of sugar per ton was large, the average being 15.7 per cent, with 94.6 per cent purity. These results impressed Herbert Myrick favorably and in his book on "American Sugar Industry," he says: "An average of within a fraction 15 per cent sugar in the beet and 95 per cent is absolutely unprecedented in the beet sugar industry of the world. If such results can be obtained during a first season with unusually unfavorable climate and all other conditions against a good crop, certainly the industry ought to be a success in future years, as its agricultural details become better and better mastered."

The season for the growth of beets may be divided into three periods: germination, plant formation and sugar storing. The following comparative statement shows the temperature averages of Germany and the principal sections of Oregon in these periods:

	Germany	Southern Oregon	Willamette Valley	Washington
First	49.150	49.150	49.150	49.150
Second	51.305	51.305	51.305	51.305
Third	54.374	54.374	54.374	54.374

The best soils for quality, as well as quantity of production are those that consist of mild, moist loam, about 20 inches deep, the loam or sand three to six feet, and under this, sand. Such soils are easy to cultivate, have a high degree of absorption, can combine nourishment and give a plant physically a good start. They are called natural sugar beet soils. So far as the chemical constituents of the soil are concerned, phosphoric acid seems to bear the closest relation to the amount of sugar. If this be wanting, sugar will not be provided, while lack of lime could be replaced by potash, soda, or magnesia. Oregon soils are abundantly supplied with phosphoric acid. They surpass those of France in lime and equal them in potash. Below are contrasted analyses of some of the French sugar beet soils with those of the natural divisions of Oregon and of California:

**ANALYSIS OF FINE EARTH.**

	France	Oregon	California	Southern	
Insoluble matter	81.90	82.50	68.29	65.15	67.88
Soluble silica	23.00	23.00	11.12	8.02	8.74
Soda (Na2O)	1.06	1.14	1.12	1.12	1.12
Potash (K2O)	1.06	1.14	1.12	1.12	1.12
Lime (CaO)	1.06	1.14	1.12	1.12	1.12
Magnesia (MgO)	1.06	1.14	1.12	1.12	1.12
Manganese (Mn2O3)	1.06	1.14	1.12	1.12	1.12
Iron (Fe2O3)	1.06	1.14	1.12	1.12	1.12
Alumina (Al2O3)	1.06	1.14	1.12	1.12	1.12
Sulphuric acid (SO3)	1.06	1.14	1.12	1.12	1.12
Phosphoric acid (P2O5)	1.06	1.14	1.12	1.12	1.12
Carbonic acid (CO2)	1.06	1.14	1.12	1.12	1.12
Water and organic matter	1.06	1.14	1.12	1.12	1.12
Other matter	1.06	1.14	1.12	1.12	1.12