GREAT FUTURE FOR DAIRYING

No State in the Union So Well Adapted to the Industry as Is Oregon—Abundance of Natural Grasses for Feeding.

THE idea has been suggested by a well-known agriculturist that the dairy industry is reaching a critical stage in Oregon. We have nearly if not quite, reached the point where the output of butter and cheese is equal to the demand for home consumption, and not having an export trade established as yet, a further increase in production will result in a lowering of the sale price. But, says this same individual, the depression will be but temporary. The inhabitants of Japan, China, the Philippine and Hawaiian Islands are going to want our butter as soon as they learn its qualities, and as soon as it can be delivered to them in a form to stand their climatic conditions. Besides, with our cheaper food stuffs and mild climate, when we produce in quantities sufficient to ship carload lots, we can compete with Iowa, Minnesota, Illinois and other states of the Middle West in the Eastern markets. So, all things considered, there need be no fears entertained regarding the future success of the dairy industry in Oregon.

Topography and climatic conditions naturally divide the state into two parts, separated by the Cascade Range of Mountains, which are commonly spoken of as "Eastern Oregon" and "Western Oregon." While the creameries and cheese factories in "Eastern Oregon" are as yet very few in number, this section of the state is believed to have great possibilities as a dairying region, particularly in the northern part. Indeed, parties familiar with dairying in Southern Minnesota are of the opinion that this section of Oregon will eventually rival equal portions of Southern Minnesota and Northern Iowa in the quality and quantity of its dairy productions. At the town of Milton, situated in the locality under consideration, is located what is probably the most up-to-date creamery in the state. A recognized dairy authority, after carefully inspecting this plant, pronounced it the best-equipped creamery he had ever seen. This establishment is conducted on the co-operative plan, this method of operation being decided upon after a careful investigation of creamery methods in the State of Minnesota by a committee of citizens of Milton and vicinity.

It is not probable that the southeastern portion of the state will ever become much of a dairy region, at least, not in the immediate future. With an annual rainfall of only 10 to 14 inches, irrigation must be resorted to for the successful growing of crops for feeding dairy cows, and it is yet an unsolved problem to what extent this section of the state can be brought under irrigating systems. It is believed by some of the residents of this region that large areas can be brought under the influence of irrigation by the reservoir system.

The western portion of the state is commonly spoken of as the "Willamette Valley," "Southern Oregon," and the "Coast Regions," the latter being very important in a consideration of the dairy industry. While the whole of Western Oregon has a greater rainfall and a milder climate than the eastern portion of the state, the topography of the western portion warrants the divisions just mentioned. The Coast Range, running practically parallel with the Pacific Ocean and the Cascade Mountains, makes a rather formidable barrier between the coast regions and the Willamette Valley, which greatly interferes with transportation between these two sections. A transverse range of low mountains, known as the Calipooias, makes a rather distinct division between the Willamette Valley and Southern Oregon. These two latter named regions, however, are connected by the Southern Pacific railroad. A person unfamiliar with the topography of a mountainous region would scarcely realize the amount of territory covered by the foothills of a mountain chain like the Coast Range. It is safe to say that a strip of country averaging 30 miles in width and extending clear across the state from north to south is occupied by this range of mountains and its foothills. On the western side of the Coast Range these hills are usually covered either with a dense growth of timber, generally fir, or with a luxuriant growth of fern. And it is reported that where the fern has been killed and cultivated grasses, such as the clovers, introduced, they have made their way clear to the summits of these hills, and the prediction has been made that in the future this region may be not unlike picturesque and practical Switzerland from a dairy standpoint. Numerous valleys of greater or less extent are found among these hills wherein may be grown the necessary Winter dairy feed, while the hills will furnish the Spring, Summer and Fall pasturage.

Bordering the shores of the Pacific Ocean is a belt of land with a more or less broken surface. In places it extends inland for 20 miles or more in a practically unbroken level stretch, while in other places the hills extend clear down to the water's edge. The principal level tracts are found in Clatsop, Tillamook and Coos Counties, while there are smaller tracts of the same character in all of the counties bordering on the Pacific. All of these sections are abundantly supplied with small streams of pure water, and the mild, moist climate keeps the grass green and growing during the entire year. However, growth is pretty slow during the Winter season, and the progressive dairyman provides some Winter feed in addition to the grass supply. Dairying is not a new industry in these Coast regions, yet there is a large amount of land in them yet to be cleared of timber and brush or reclaimed from the encroachment of the sea water. The matter of transportation has been a serious handicap to the Coast counties, but happily the service is rapidly improving. At present shipments of freight must be made mainly by ocean steamers, as railroads reach but two points, namely, Yaquina Bay and the Clatsop plains.

Of almost equal importance to the Coast country as a dairy region is the valley of the Lower Columbia. For more than 125 miles the Valley of the Columbia River on the Oregon side comprises a strip of level land of varying width, a portion of which next the river is subject to annual overflow from the June freshets. This overflow land is not adapted to general agriculture, but does furnish most excellent pasturage after the waters subside, while on the adjoining land, which does not overflow, can be grown all kinds of farm crops, in great abundance. Within this territory are found the largest dairy herds in the state, many of them numbering 100 or more cows. The product of these herds is largely shipped to Portland in the form of cream, where it is made into ice cream and butter.

The dairy industry is making rapid progress in the Willamette Valley, where it is carried on in much the same manner as in the dairy regions of the Middle West. The Willamette Valley is preeminently an agricultural region, and its farmers are coming to realize that the growing of crops suited to the feeding of cows is essential in the rotations required to keep up the fertility of their farms.

Many farmers who, 10 years ago, were buying butter for family use, or quite as often, doing without, are now milking five to 25 cows, sending their product to a near-by creamery and receiving in return a monthly check, which furnishes the means of supplying the table with an abundance of the necessaries and luxuries that delight the inner man and provides as well a little sum to be laid away against the coming of the proverbial "rainy day." The absence of Winter cold and intense Summer heat makes almost an ideal dairy climate. Add to this the comparative absence of flies and mosquitoes, an abundance of pure, cold water from running streams or shallow wells, a soil adapted to the growing of all crops suited to the economical production of milk, and you have the dairy conditions of the Willamette Valley.

Dairy Stock.

The dairy cows of Oregon are mainly what is commonly called "scrub stock." But there is a rapidly increasing number of dairy men who are making an effort to grade up their herds by the use of pure-bred bulls, some of them also keeping a few pure-bred cows of recognized dairy breeds. And there are several breeders in the state who make a business of raising, for the market, pure-bred dairy animals of both sexes. They spare neither time nor money in securing the best animals obtainable for renewing their breeding herds. Frequent trips are made to the leading pure-bred dairy herds of the Eastern and Middle West states, and animals brought back to Oregon which are the very best than can be secured. The demand upon these breeders for young animals is at all times in excess of the supply, and the prices realized are such as to seriously tempt the breeders to sell thier animals off closer than good judgment would indicate was best for the welfare of the breeding herd. Offers of $250 each for 2-year-old heifers have been refused by breeders in several instances during the past few months.

Grasses and Forage Crops.

Grass is the natural food of the dairy cow, as well as of nearly all other species of domestic animals. Experiment has proven that, with an abundance of nutritious grass, grain cannot be profitably fed to dairy cows. Hence the adaptability of a country to the dairy industry depends in a large measure on its grass production, both for pasturage and hay. The wide variation in rainfall, soil, temperature, and elevation found within the state would naturally indicate a great variety of species among the natural or wild grasses of the state. Eastern Oregon with its high elevation, and scanty rainfall has a widely different natural vegetation from the more moist and lower lands of the western paris of the state. In Eastern Oregon the grasses are principally of the varieties known as "bunch-grass." They are noted for their ability to withstand drouth and the peculiar quality of curing on the ground where they grow, thus furnishing a Winter feed without the necessity of cutting and curing. They are highly nutritious, probably due to their comparatively small water content. But owing to close pasturing with both sheep and cattle, these grasses are each year becoming less abundant, and it is a great problem with this range country to find some means of restoring the bunch-grass, or what is perhaps more feasible, finding some domesticated grass that will thrive in its stead. The most promising variety at the present is the muchly-advised brome grass (Bromus inermis). Except in the northern part and in some of the well-watered valleys, it is not probable that much attention will be given in Eastern Oregon to the raising of dairy cattle and the production of milk.

As would naturally be inferred the coast regions, with an abundance of moisture, produce a class of grasses of widely different character from the varieties found in the eastern part of the state. In general the coast grasses may be said to be less nutritious but much more luxuriant, and instead of growing in bunches or tussocks the tendency is to form an unbroken turf. While all domesticated grasses that thrive in a cool, moist climate may be successfully grown along the coast, the excellency of the native grasses have made it preferable in many portions of this region, to retain the natural pastures. The same condition is true to an even greater extent on the lowlands of the Columbia River, where the annual overflow would kill out many varieties of cultivated grasses.

Some Well-Known Species.

Timothy (Phleum Pratensis)—This grass, which is one of the best known in the long list of grasses, grows to perfection in that class of lands known as "beaver dam." In fact, wherever the soil is rich and black, with abundant moisture, timothy is a staple grass.

Cheat or chess (Bromus)—This grass furnishes annually a large portion of the hay of the Willamette Valley. If cut at just the proper season it produces a very fair quality of hay for horses, but it is doubtful if it has much value as a food-stuff for dairy cows. It is sown in much the same manner and with as much regularity in some sections as the wheat crop. It stands wet weather remarkably well, hence its popularity.

Orchard grass (Dactylis Glomerata)—This grass was brought to America from England at a very early date, and has found a very congenial home in the soils of Oregon. Samples six and seven feet long have been gathered this Fall on land that was not considered very good grass land. It roots deeply, hence withstands dry weather well. It starts early; in fact, scarcely stops growing after the Fall rains begin, thus furnishing good pasture early in the Spring and late in the Fall. For hay it must be cut early, otherwise it develops too much woody fiber. It is an excellent grass to sow with clover, as it matures about the same time. No other grass will be found of more general adaptability to the soil and climatic conditions of Western Oregon, for it thrives upon the red hill lands and grows abundantly in the valleys.

Velvet grass, Mesquite (Holcus Ianatus)—This is one of the most widely distributed grasses of the western portion of the state. On the rich lands of the Coast region it is regarded by many as a weed, owing to its rank growth, and the difficulty with which it is eradicated from places where its growth is undesirable. But on sandy soils, such as are found on the Clatsop plains, its friends are legion. The stems and leaves are covered with a fine, velvety growth, hence the name. It is rather disposed to grow in bunches, and if kept rather closely cropped makes very fair pasturage. When cut and cured it produces hay of quite inferior qualities.

Rye grass (Lolium)—Two representatives of this genus are to be found in abundance among the grasses of Western Oregon. The English rye grass (L. Perenne) is in the best favor, as it is a perennial. The Italian rye grass (L. Italicum) is classed as an annual, and if closely pastured or cut for hay soon requires re-seeding. Washington County farmers are long in their praises of rye grass. Both varieties make excellent pastures, and if cut early produce a very fair quality of hay. These grasses have proven very satisfactory for sowing in the "burns" of newly cleared land.

Blue grass (Poa)—This genus contains a considerable number of species which thrive in Oregon. The best known species is the one commonly called Kentucky blue grass, which does very well on soils rich in vegetable matter, such as the beaver dam lands and the Columbia River bottoms, but it does not thrive in the greater portion of the Willamette Valley. Another species known as flat-stalked meadow grass has proven a valuable grass for rich, moist land, but is practically worthless for the dry uplands. Some of the bunch grasses of the plains belong to this genus, so considering the several species it comprises a class of grasses of universal distribution throughout the state.

The fescues (Festuca)—These are pasture rather than hay grasses, owing to their ability to form a good turf, which is an important item in a climate like that of the western part of the state.

Meadow fescue (F. Partensis)—Is one of the largest species, and is rapidly growing in favor. It stands dry weather rather better than the other fescues owing to its tendency to root deeply. It is an excellent Winter pasture grass, and will make a fair yield of very excellent hay. Owing to its abundance of seed when allowed to ripen, it can be purchased more cheaply than most valuable grass seeds. Sheeps fescue (F. Ovina) comprises several varieties, which are widely distributed. The fine short stems make a beautiful turf, hence it is one of the most valuable grasses to use in a mixture for permanent pasture. Hard fescue (F. Duriscula) and red fescue (F. Rubra) are other species well adapted to the forming of pastures, for they withstand the tramping of stock better than most cultivated grasses. The "great bunch grass" (F. Scabrella), of Eastern Oregon, grows in bunches or tussocks, and is a very valuable grass for horses and cattle.

Red top (Agrostis)—This genus also has many representatives among the valuable pasture grasses of Western Oregon. Common red top (A. Vulgaris) forms a thick sod on the soft ground along the banks of streams. When cut for hay, if well cured, it is free from dust and of excellent quality. Another variety (A. Stolonifera) seems to be well adapted to "white land," on which most grasses do not thrive. It has a habit of spreading over the ground with its stems. This is a most excellent variety for the formation of permanent pastures on the prarie lands, which are after of the "white land" character.

It is not to be supposed that the grasses already mentioned comprise the entire list adapted to Oregon conditions, but they are those most in favor with stockmen. Other grasses that might be mentioned as possessing considerable merit are several species of wild rye, blue joint, blue stem, wild oat grass, tall oat grass, etc. Quite a considerable quantity of hay is annually produced by cutting and curing of wheat and oats for this purpose. Oat hay when properly made makes a very satisfactory hay for dairy cows.

Ensilage and Soiling Crops.

The legumes: All things considered this may be regarded as the most valuable class of plants for the Oregon dairyman. To it belong the clovers, alfalfa, the vetch, the peas, and numerous other plants. The plants just mentioned, with perhaps the exception of the pea, serve a five-fold purpose, viz., pasturage, hay, ensilage material, an abundant soiling crop, and the enriching of the soil by the assimilation of atmospheric nitrogen.

Red clover is particularly valuable in a rotation system of crops. Years ago it was a common belief that clover could not be grown in Oregon, but the results of the past few years have demonstrated that it can be successfully grown on nearly all of the lands west of the Cascade Mountains. When "poor white land" can be made to produce nearly four tons of red clover hay per acre there can be no questioning the adaptability of Western Oregon to the growing of clover. From a two-acre field which had received some barnyard manure, a yield of 12 tons of hay was secured from the two crops of a single season. Just at present there is a big profit in growing red clover for its seed. Last Spring the seed was selling at from 12½ to 15 cents per pound, and hard to get at that. A yield of four bushels of seed per acre has been reported in several instances this year, which at 12½ cents per pound would mean an income of $30 per acre. Veteran red clover growers report never having experienced a failure when the seed is sown at the rate of about eight pounds per acre on Fall wheat in the month of February. About the middle of March gypsum (land plaster) should be applied broadcast at the rate of 50 to 75 pounds per acre. The application of gypsum will nearly double the crop as a rule, hence it is a very profitable investment, as it can be secured for 50 to 60 cents per hundred weight, and in some cases the crop will be an utter failure without the gypsum.

The white or Dutch clover is in high favor among the coast dairymen for permanent pastures. For this purpose it is much better than the red variety, which is largely grown in the coast regions for hay. Alsike clover, though not so well known as the red and white varieties, is well adapted to the soil and climate of the western part of the state. Besides these domesticated clovers, there are a great many native varieties. Careful investigation will often show a dozen or more varieties in a single locality, and it has been estimated that there are between 25 and 30 of these native clovers within the state.

Alfalfa is very successfully grown where there is a loose, open soil and sufficient moisture. Its growth is quite restricted in the Willamette Valley, but in Southern Oregon and parts of Eastern Oregon it is the most valuable crop that can be grown for the dairy cow. It is particularly adapted to sections where irrigation is practiced, a yield of seven tons of hay per acre having been secured from the several cuttings of a single season's growth.

Vetches (or tares) are rapidly growing in favor. The Winter vetch (vicia sativa) is the variety most commonly grown. For best results it should be sown in the Fall. It thrives on a rather wider range of soils than red clover, and often serves to put some soils in a condition for the growing of clover. The vetch is a great soiling crop. Cows eat it with avidity, and it produces very heavily, 18 to 20 tons per acre being a not unusual yield. Owing to the abundant growth, considerable difficulty is experienced in curing it for hay, and there is a slight objection to it as a crop for ensilage. To hold it up during the period of growth grain (wheat or oats) is sown with it. The hollow stems of the grain carry too much air into the silo for the production of ensilage of the highest quality.

The value of the field pea from the dairy standpoint is principally for ensilage. Pea hay is not relished by the Oregon cow, nor does she take very kindly to pea meal.

Oregon's advantage as a dairy state rests in no small degree on the ability to produce in abundance these leguminous crops, rich in protein, which element of animal food is of prime importance in the production of milk.

Corn.

Corn is generally considered the king of crops for ensilage purposes. Owing to its solid stem, flat leaf, proper moisture content, and the ease with which it is handled, it is particularly adapted for silo filling. But in the greater portion of Western Oregon the nights are too cold for the proper growth of corn. Certain portions of the Columbia River Valley and the lower end of the Willamette Valley, however, produces very excellent corn for ensilage purposes. A Washington County dairyman reports an average height of stalk of 12 feet for his corn crop this year. In Southern Oregon corn is grown successfully even to the extent of maturing the ears. Its value as a green feed to supplant short pastures in the late Summer is fully recognized wherever the crop makes satisfactory growth.

This class of dairy feeds includes carrots, sugar beets, mangels, turnips, etc., all of which yield abundant crops. Yields of 20 to 30 tons per acre are quite the common thing. On the sandy soils of the coast regions these crops may be allowed to stand in the field until wanted for Winter feed, when they are hauled in by the wagon load. But this is hardly practicable on the valley lands, for they become too wet in Winter to permit of driving over. However, the roots may be put in most any sort of an old shed, for there is practically no danger from injury by freezing. Roots, however, are not a very popular food stuff. The back-breaking work required in cultivating and harvesting them does not agree with the average Oregonian's idea of the eternal fitness of things.

Dairy Methods.

The principles of feeding and care of cows for milk production must be observed in Oregon the same as in any other place if the maximum of profit is to be obtained. Not until recent years has this idea apparently been entertained. There was formerly a great scarcity of fresh dairy products in the Winter, with consequent high prices, and an oversupply in the Summer time, with correspondingly low prices. The greater portion of the butter procurable in the Winter was what had been packed during the Summer season of oversupply. Along the Coast butter was packed in kegs or small barrels, which were opened by sawing the barrel into two equal parts from which the butter could be removed easily and put into "rolls," for the roll or square, containing two pounds, or as much less as the greed of the maker and the forbearance of the buyer would permit being sold for two pounds, has long been the standard form in which butter is placed in the retail market on the Pacific Coast. The coast regions still produce comparatively little butter or cheese during the Winter season, for most of these dairyman depend on grass alone for their source of food for milk production. In the Willamette Valley, however, Winter dairying is gradually coming to the front and several of the creameries of Washington County report a better run during the Winter than during the Summer months.

In the matter of handling milk on the farm the Oregon dairyman is quite up with the times. True, a few have been caught with the "tin-can separator" fake, but most of them know what a good cream separator is like, as is evidenced by the sales of hand or farm separators of the leading makes. While these hand cream separators have been used for more than 10 years, it is only within the last year or two that they have come into common use. The agent for one of the leading makes of these separators reports the sale of 500 machines from January 1 to October 1 of the year just closed. Other agents have sold from 40 to 60 each, hence the sales of farm separators within the state during the year 1901 may very safely be placed at something over 400 machines. The introduction of the hand separator has brought about the establishment of butter factories for the handling of hand separator cream. Several such factories have been started within the past few years. Prior to that the Oregon creameries were all conducted on the "whole milk" plan. The use of the hand separator has developed a cream shipping business of considerable magnitude. Transportation companies on both waterways and railways make a very liberal rate on cream shipments. As a result large quantities of cream are shipped considerable distances to Portland and other points. At Portland there are located five factories, which receive this kind of cream, also a considerable amount from regular skim stations. Reports from four of these factories, and a conservative estimate of the cream received at the fifth, show the receipts for the six months ending June 30, 1901, to be as follows:

Pounds of cream received	1,179,226
Pounds of butter fat	292,127
Paid to shippers	$65,100

Probably not more than two-thirds of the above amount of cream is made into butter. Three of the five factories do a big business in the sweet-cream and ice-cream trade, while the other two both sell considerable quantities of sweet cream. Those shippers who will use sufficient care in the handling of their cream to insure it always reaching the factory in such a condition that it will remain sweet for considerable time afterward, can secure a very substantial advance in price over that paid for cream which reaches the factory in a sour condition. This does not apply to factories where the cream is practicely all made into butter, as is the case at Albany, Salem, Astoria and other points.

There is a large amount of this hand separator cream that does not find its way to factories, but is made into butter on the farms where it is produced. Such butter is commonly, though improperly, called creamery butter. Properly speaking, creamery butter is made from milk or cream produced by several different parties. The National Creamery Buttermakers' Association requires that all butter entered for premiums at the annual meetings of the association shall be made from milk furnished the factory by not less than 20 patrons. At the Oregon State Fair the number required is two or more patrons. If the term "separator dairy" could be used to designate those places where only the milk produced on the farm is handled, much confusion would be avoided.

Creameries and Cheese Factories.

The factory system of making butter and cheese in this state is practically a development of the past 10 years. To the best of the writer's knowledge there is but one butter factory in the state now in operation constructed prior to the year 1892. Very few Oregon creameries or cheese factories are organized on a co-operative basis, and even these few are more of the nature of stock companies. In the Tillamook Dairy Association, which is commonly cited as one of the most successful instances of co-operation in creamery work, the creamery stock is owned by 33 shareholders, while the milk is furnished by 45 to 50 patrons.

The Albany Creamery Association is a stock company and a very successful organization. An outline of its method of dealing with the patrons is as follows:

From the gross receipts for the month is deducted, first, the general operating expenses of the creamery; second, 1 cent for each pound of butter fat delivered to be set aside as a sinking fund; third, an amount equal to the 12th part of the annual interest on the paid-up stock at the rate of 8 per cent per annum. The amount remaining after making these deductions, is divided pro rata among the patrons, according to the number of pounds of butter fat each has delivered in his milk.

Another plan which is quite popular in Washington County is about as follows: An organization known as the Creamery Company owns the manufacturing plant. Then there is an organization known as the Creamery Association, composed wholly of those who furnish milk to the creamery. The Creamery Company enters into a contract with the Creamery Association to manufacture the milk delivered into a first-class article of butter and deliver the same in Portland at a stipulated price per pound, usually 3½ cents.

Among the proprietary concerns probably the more common method of dealing with the patrons is the charging of a stipulated price for each pound manufactured. This price ranges from 2 to 4 cents for butter, and 1½ to 2 cents for cheese. These prices are for the actual work of manufacturing, and do not include the expense of shipping and selling, nor the delivery of the milk to the factory. Other proprietary factories purchase the butter fat in the milk or cream, paying for it "what the market will warrant" to use the words of one of these owners. However, a more definite understanding than this is usually required, and many of these factories agree to pay a price for the butter fat, which will be 2½ cents below the highest market quotations for creamery butter during the time the butter fat is delivered.

The use of the Babcock test for determining the value of milk and cream, is universal among the factories of the state. No other basis of computation was used at any of the 71 factories visited by the writer about a year ago. This was a very pleasing bit of information, indicating that Oregon dairymen, both producers and manufacturers, were thoroughly up to date in this respect. It is doubtful if any other state can show such a general use of the Babcock test. In Iowa, for instance, the report of the Dairy Commissioner for the year 1899 shows that 12 per cent of the creameries, and 69 per cent of the cheese factories in that state still purchase milk on the old unjust and unfair basis of so much per hundred weight, regardless of quality.

Dairy Statistics.

Owing to the fact that only within the past year has the Dairy Commissioner's office been put in condition to collect reliable figures relating to the dairy industry, there have been widely varying estimates of the annual output of dairy products. For the purpose of securing accurate information regarding the operation of the creameries and cheese factories of the state, the writer spent the greater part of the months of July and August, 1900, among the factories of the western portion of the state. Owing to the small number of factories in the eastern part of the state and their scattered location, no attempt was made to visit them, although reports were secured in some cases.

Seventy-one factories in all were visited, and in addition a considerable number of private dairies. Seventeen of the 71 factories were established during the year 1900, hence a statement of a full year's business could not be obtained from them. Of the remainder but two were established prior to the year 1892, which year marked the establishment of both butter and cheese factories in the coast counties of Tillamook and Coos, as well as a considerable number in the Willamette Valley. Of these early factories, those in the coast regions have continued in operation ever since, but most of those in the Willamette Valley are idle, and stand as monuments to the ability of the creamery shark who flourished about that time in various parts of the United States.

Some of these early established factories represent an investment of $5000 to $8000, being equipped for the manufacture of both butter and cheese. But those being built during 1900, and for butter making only, report the cost at about $2100, with an equipment sufficient to handle the milk from 300 to 400 cows.

The cost of establishing a cheese factory alone, as given by P. McIntosh, of Tillamook, who owns five such factories, is placed at about $800 for the building and $800 for equipment, making the cost complete about $1600. There are no better cheese factories in the state than those owned by Mr. McIntosh, but while well built, they are not at all showy, indicating that the money has been judiciously expended.

The 54 factories from which statements of a full year's operations were obtained comprise practically all of the creameries operating in the western part of the state during the year 1899. This of course does not include the private dairies which handle only the milk produced on the owner's farm. The amount of butter and cheese produced together with other particulars relating to these 54 factories is set forth in the following table:

Pounds milk received	36,874,425
Pounds butter fat rec. in milk	1,470,527
Pounds butter fat rec. in cream	356,020
Pounds butter made	1,831,124
Pounds cheese made	1,115,016
Paid to patrons	$416,905
Av. per cent fat in milk	5.95
Av. wages butter-makers, per mo	$61 33
Av. wages cheese-makers, per mo	58 00
Av. wages skim station operators	40 00
Av. price per pound for butter fat	22.8c

From the above figures, and from other information the writer is of the opinion that the total output of creamery butter for the whole state, even including that made on farms from separator cream (which is commonly called creamery butter), was not far from 2,500,000 pounds for the year 1899. In California and some other states careful estimates show that about one-half of the entire butter product for the year was factory made. If we use this basis of computation for Oregon, the entire production of the state for the year 1899 would be about 5,000,000 pounds. While these figures are for the dairy business for two years, they furnish a reliable basis for making close estimates on the production for the year just closed. In Washington County the creameries report practically no increase in business for 1900 over 1899, but the cream shippers have nearly doubled the quantity sent to Portland. Reports from creameries in the coast region, the southern part of the state, and on the Columbia River indicate an increase in product of about 20 per cent. The creameries established during the past two years would perhaps increase the amount of factory-made butter an additional 20 per cent. Hence the writer feels justified in placing the production of creamery butter for 1901 at an increase of 40 per cent over that of 1899, thus making the amount 3,500,000 pounds. It is doubtful if there has been any increase in the amount of farm-made buter, hence the total butter yield for the year just closed may be safely placed at 6,000,000 pounds.

The cheese factories embraced in the above table show a production of 1,115,016 pounds of cheese. The product of the few factories not listed and of individual makers would doubtless bring the cheese product of 1899 up to about 1,500,000 pounds for the entire state.

It is quite probable that the increase in cheese production has been about equal to the increase in butter over the year 1899. Using this basis of computation (40 per cent), the increase would amount to 600,000 pounds, thus making the total cheese output of the state for the year 1901, about 2,100,000 pounds. About one-half of the entire cheese product of the state is made by the factories and individual makers of Tillamook County. This county is easily the leader in the amount of butter and cheese produced, the total value of which will exceed $125,000 for the past year.

The state dairy law provides that all persons or companies manufacturing butter or cheese for sale in amounts exceeding 25 pounds per week shall report the same annually, together with other particulars, to the office of the Dairy and Food Commissioner. The registration of such establishments for the year 1901 amounts to a little more than 100 places for the manufacture of butter, and a little less than 100 for the manufacture of cheese, or about 200 of both combined, and just about one-half of this number may properly be termed creamerics and cheese factories, the other half being individual dairies. Probably the greatest output of butter from any one factory should be credited to the Coos Bay Creamery, with a make of about 225,000 pounds besides some cheese manufactured. The greatest amount of cheese produced by one organization was made in the factories owned by P. McIntosh, of Tillamook, and aggregated about 225,000 pounds for the year 1901.

The retail milk trade in the City of Portland is a large source of income for the dairymen supplying it, although the prices charged are very reasonable. The price advanced during the latter part of the year just passed from $1 50 per month to $2 00 per month for the delivery of one quart per day. It has been estimated that the retail milk trade of Portland amounts to about $400,000 for the year 1901. Outside of Portland this class of dairying is of quite inconsiderable proportions, for the last census report shows that the "town cow" numbers over 10,000 representatives, within the state.

As illustrations of what careful breeding and feeding may accomplish in the matter of annual returns per cow, the following reports are submitted, one from a creamery patron, the other from a shipper of sweet cream:

Mr. C. L. Shaw, one of the patrons of the Albany creamery gives the following statement of his dairy operations for one year:

Number of cows	14
Pounds of milk per cow	7,361
Average per cent of fat	4.6
Value of butter fat per cow	$48.20

The value of hogs and calves raised on the skim milk, added to the amount received from the creamery makes a total return from the 14 cows of $1,079 05. After deducting $392, which represents the value of the cow fed, he realized $687 50 net profit, an average of $49 10 per cow.

Mr. C. A. Hanley, living 3½ miles from Hillsboro, has made a business of shipping sweet cream to Portland for the past 10 years. For the year 1900 he figures the profit from his investment at 12½ per cent. Mr. Hanley's herd consists of 24 Jerseys and Jersey grades. The total amount of cream sold was 3155 gallons, for which he received $1291 20. He raised 45 hogs which sold for $617 50, 20 calves valued at $350, and the skim milk was valued at $117 40, making the total receipts $2376 10. The expense of feeding the cows was $662 for the herd; of feeding the hogs, $210 40 and for the calves $203, making a total of $1075 40, thus making a net profit of $1000 70.

Mr. Hanley's farm comprises 140 acres of land under cultivation, and 104 acres in pasture. The grain produced on the cultivated land yielded a net return sufficient to offset the purchase price of all the food required for the stock during the year. A conservative estimate places the value of the land at $40 per acre, or $5760 for the whole area; cows, buildings, horses and farm implements, $3000, making a total valuation of $12,760.

Markets and Prices.

Practically all the butter and cheese made in Coos County is shipped to San Francisco. A portion of the Tillamook cheese also goes to the same market. The rest of the factory butter and cheese not used to supply local trade is mostly sold in Portland. Rail shipments of butter go by express, there being no refrigerated freight cars used for that purpose. A very liberal rate is made on butter by the Wells-Fargo Express Company.

The butter produce of the northeastern part of the state is mostly sold in the mining regions of that portion of the state. Southern Oregon creameries sell a large proportion of their product to the towns along the line of the Southern Pacific railroad from Roseburg, Or., to Redding, Cal. D. Perozzi, of the Ashland creamery, gives the following table of prices paid to patrons for butter fat during the past three years:

Average price paid patrons per pound for butter fat:

Month	1899. cents.	1900. cents.	1901. cents.
January	25	25	25
February	25	25	25
March	22½	20	20
April	18½	22½	25
May	17½	18	22½
June	17½	17	20
July	18	20	20
August	20	22	22½
September	22½	22½	22½
October	25	25	25
November	25	25	--
December	25	25	--

In response to a request for a memorandum of Portland market quotations on the highest grades of butter for the year 1901, the W. B. Glafke Company submitted the following:

Jan. 1-Jan. 23	27½c per lb.
Jan. 23-March 26	25 c per lb.
March 26-April 9	22½c per lb.
April 9-April 22	20 c per lb.
April 22-July 9	17½c per lb.
July 9-August 13	20 c per lb.
August 13-August 29	22½c per lb.
August 29-September 3	25 c per lb.
September 3-November 1	27½c per lb.

It is highly probable that the price on November 1 will continue for the remainder of the year. The price seldom goes higher than 27½c, owing to the importation of butter from the Middle West States. The break in prices in the early Spring as indicated in the table is largely due to the importation of early grass butter from California.

Considerable quantities of butter are shipped to Alaska, Puget Sound and to the Orient, but this trade is handled by jobbers with perhaps one or two exceptions. An export package and its contents prepared by a Portland firm was awarded highest honors at the recent Pan-American Exposition.

The cheese market does not seem to be susceptible to such extremes of prices as affect the butter market. While the market was well supplied during the past Summer, the price for the best grades did not fall below 11c per pound. Present quotations are 13½ cents per pound for the highest quality or an extreme range of 2½ cents per pound, as against a range for the year in butter prices of 10 cents per pound. The cheese market demands a rather highly colored cheese of mild flavor. The demand for limburger, brick, Swiss, etc., is very light, hence very few factories make anything but full cream American cheddar cheese. The Young America size, weighing 6 to 8 pounds, is very popular for campers' use, and sells about 1 cent per pound higher than the same quality of "twins" or "flats."

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