

# OPPORTUNITIES FOR DAIRYING.

## I. GENERAL.

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### DEFINITION.

Strictly speaking, dairying is the business of conducting a dairy farm. Commonly, however, we use the word to include the varied industries which have to do directly with the production and handling of milk and milk products. The industrial salvation of this country depends ultimately on its agricultural resources. The profits of agriculture depend ultimately on the intelligent cultivation of the soil. Dairy farming is increasing in almost every section of the country, largely because it is recognized as one of the most economical forms of agriculture where the preservation of soil fertility is considered. Taking this broad view of dairying, we find it one of the greatest wealth-producing industries in the land.

Opportunities for dairying are found everywhere in the United States. The different sections of the country have characteristic peculiarities, but all need milk and its products. Success awaits the dairyman who fits his work to the conditions of the place in which he lives. He should know the value of a good dairy cow and how to treat her. He should recognize the necessity of cleanliness from the time the milk leaves the udder until the finished product is in the hands of the consumer. He should know and meet the needs of his market.

### OPPORTUNITIES IN VARIOUS LINES.

The equipment and practice found on the dairy farm afford great opportunity for improvement. Better buildings as to construction and sanitation need not be expensive. The best machinery and utensils are available at moderate prices. Thorough and cleanly management in the stable and milk room is simple and cheap. The necessary refrigeration can also be provided without elaborate or costly fittings. The indispensable silo can be erected of such material as may be best suited to the climate.

The maintenance and increase of soil fertility constitutes one of the greatest opportunities for dairying. A ton of wheat, worth \$22,

removes from the soil \$7.50 worth of plant food. A ton of butter, worth \$500, takes less than 50 cents' worth of plant food from the soil. Land on the Pacific coast, reduced to such poverty by the continued raising of wheat that it produced only 8 or 9 bushels of wheat per acre, has been so restored by dairying that it now produces from 20 to 40 bushels, and the land has doubled in value.

Careful dairying goes hand in hand with the most helpful rotation of crops, encouraging especially the production of legumes. Diversified farming needs dairying for its best results. The improvement of the forage crops best suited to a given locality is the natural study of the dairyman.

#### IMPROVEMENT OF DAIRY CATTLE.

The improvement of dairy cattle offers great opportunity. The cows supplying Iowa butter factories are making an average of only 140 pounds of butter per year. By the weighing and testing of the milk of each cow those which fail to pay their board can be detected and rejected. The rearing of the heifer calves from the most profitable cows is the simplest course for the improvement of the herd at least expense. In this selection regard must be had for dairy type of form and function. A pure-bred dairy sire should be at the head of every dairy herd. It is entirely practicable to add largely to the wealth of every dairy farmer in this way, and every dollar added to the average income from the dairy cow in the United States adds \$20,000,000 to the nation's production of wealth.

To assist in this improvement of the dairy herds cooperative test associations have been organized. They were introduced ten years ago in Denmark, and are now found in most of the prominent dairy sections of Europe. In Germany these associations have been the means during the last five years of increasing the income of the dairy farmers by an average of \$14 per cow per year. Similar associations in a few States of our own country, led by Michigan, have shown the practicability of increasing the income from dairy farming at least one-fourth without additional expense to the producer. Cooperation in the organization and management of these test associations is needed to promote their practical and general efficiency.

The associations of breeders of pure-bred dairy cattle have a similar opportunity to increase the value of their records of tests of dairy cows. By agreeing upon uniform rules under which these tests should be conducted, general standards of dairy performance would be established, and by the registration of all such records in a national office their general acceptance and use would be secured.

#### IMPROVEMENT OF DAIRY PRODUCTS.

Opportunity for dairying appears also in the increased demand for pure milk, especially in the larger cities. This opportunity is for

intelligence and cleanliness in the production and for reliable purity in the product. The market-milk producer can now profit by improved methods for the care, distribution, and sale of milk of the best quality. There seems to be practically no limit to this market.

On many dairy farms near cities and places of popular resort opportunity for profit is afforded by the demand for ice cream. One great advantage in supplying cream is the saving of the skim milk for the feeding of farm stock and ultimately for the fertility of the soil.

Farm dairy butter of the highest quality is always in demand at the highest prices. Uniformity of excellence must be maintained, and this requires patient attention to details. Success in this line will follow the use of the improved methods which have been worked out in the creameries, with such modifications as may be required in the smaller operations of the farm. The new rapid method for the determination of water in butter will be of material assistance. Taints and defects must be promptly discovered and corrected. The farm separator must be kept clean.

The furnishing of fancy farm-made cheese offers an opportunity for great profit. Recent investigations have shown that it is entirely practicable to produce in this country the finest grades of cheese of the Camembert and Roquefort types, heretofore only had by importation from Europe. Prices for such goods are high, and the farm dairy can easily be equipped for their production.

There is large opportunity for profit in dairying by the improvement and varied uses of the by-products from the manufacture of butter and cheese, such as casein, ash, and milk sugar. While some forms of these by-products require expensive machinery, others are entirely within the reach of the farm dairy. Under present conditions, however, the most profitable use of skim milk and whey is as food for farm stock and poultry.

#### CONTROLLING MOTIVES.

In fairly estimating the advantages of dairying one should consider the opportunities presented for the legitimate gratification of the strongest and best motives to action. The best dairyman is the one who is most effectively controlled by such motives.

The desire for profit is strong. A Connecticut dairyman makes 22 per cent net profit annually on his investment. In Georgia one acre and one dairy cow have produced in one year, under careful management, a net cash profit of \$28.75 in addition to \$20 worth of manure contributed to the fertility of the soil. The dairyman's income is conveniently distributed throughout the year, enabling him to keep out of debt. Supplying home markets keeps money at home. There is no danger of overproduction with the world for a market.

The desire for leadership is strong. It may be gratified in the

organization and management of dairy enterprises. There is opportunity for leadership in plans of cooperation connected with creameries, test associations, State experiment stations, and the improvement of the condition of the rural community.

The desire for knowledge is strong. The dairyman has opportunities for the search after truth in scientific investigations concerning the soil, the culture of forage crops, the breeding and care of live stock, the chemistry and bacteriology of milk products, and the principles involved in the invention and use of machinery.

The desire for pleasure is strong. The dairyman has opportunity for pleasures of the better sort, in the enjoyment of the poetry and beauty of rural life at its best. He may enjoy the improvement of the farm home. Love for animals finds pleasure in their daily care. The endeavor to supply the best of pure food gratifies love for his fellow-men, the highest of merely human motives.

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## II. NEW ENGLAND.

By GEORGE M. WHITAKER,

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### PASTURES AND GREEN FORAGE.

New England offers exceptional advantages to the dairyman. The leading crop in the feeding of cows is grass; and the soil and climate of New England are such that grass grows readily. The strong, retentive clay soil of the hillsides is excellent grass land, producing large crops of hay with ordinary care. Grass also grows naturally; and many hills, too rough and rocky for cultivation, will grow wild grasses if the ever-encroaching bushes are kept back. In these pastures of low-priced land many cows and young stock get their summer living at very little expense to the owner. The crop of second importance is the corn plant, which is grown more for forage than for the grain. It grows well in almost every section, and responds readily to cultivation and fertilization. It is frequently fed green from the field, as the pastures begin to dry, in order to keep up the flow of milk. Large amounts are cut for the silo, grain and forage both going into the pit. The geological formation in many parts of New England is such that an abundance of pure water gushes from thousands of mountain springs. There are likewise excellent opportunities for getting ice of the best quality, which almost every dairyman puts up for his summer use.

### MARKETS.

New England's second distinctive advantage is in excellent, well-located markets. Her surface is liberally dotted with manufacturing

towns and cities where reside a large part of her population. New England, with only one-fiftieth of the area of the contiguous United States, has one-fourteenth of the population. According to the census of 1900, Rhode Island is the most densely populated State in the Union, having 407 persons to the square mile. Massachusetts, though forty-fourth in territorial rank, is seventh in amount of population and second in density of population among the States and Territories of contiguous United States. Connecticut ranks fourth in density of population, while New Hampshire and Maine, though further down the list in this respect, have a number of large manufacturing cities and towns.

But the superiority of New England's markets for dairy products is not told wholly in statistics of a large population located on a comparatively small area. The purchasing ability of this population is large, as it is largely composed of well-to-do merchants, professional men, and skilled mechanics. Even the unskilled common laborers have steady employment at good wages and consume large amounts of dairy products.

Such markets mean a quick demand for all dairy products. Aside from milk and cream, New England does not produce all the dairy products she consumes. Hence there is always a good demand for the fresher article produced near by. The New England dairyman has an advantage as to price. Even in the wholesale market New England butter is usually quoted at one or two cents above western. But many dairymen are located so that they can sell milk, cream, or butter in a near-by market or direct to consumers, thus getting the further advantage of a retail price. And few New England dairymen are located so far away from a center as to be out of reach of the milk car to the city, the cream gatherer for some butter factory or cream-shipping station, or the cheese factory. The producer of milk and its products in New England is closer to the consumer than in other sections.

Not a few New England dairymen are so favorably located and have so much skill that they get an advance above the ruling price for an article of extra quality.

#### DISADVANTAGES.

The disadvantages of New England dairying are a comparatively sterile soil, cold winters, relatively short growing seasons, rough, rocky topography, and high freight rates on small shipments for short distances. But the quality of the market offsets these to a large degree. Thorough cultivation and plenty of applied plant food make the land under cultivation produce large crops. Four tons of hay per acre is frequently harvested, though this is above the average, and 6 tons is no uncommon production. High yields of ensilage corn are common.

## RELATIVE IMPORTANCE OF THE DAIRY INDUSTRY.

Dairying is the leading agricultural specialty in New England. Market gardening receives much attention near the cities and large towns, but many market gardeners keep a dairy herd to consume the refuse from the truck garden and to increase the size of the manure pile. Fruit growing is also a specialty with many, but even in those cases dairying is often a side issue of importance. Hence dairying is almost universal. All the leading breeds of dairy cattle are represented by pure-bred animals of high quality. Some of the famous pure-bred dairy stock of the country is of New England ownership or origin. All of the leading national breeders' associations have many New England members, two have come to New England for secretaries, while prominent officers of others are New England men.

Market milk is the leading feature of New England dairying. Milk cars for Boston every morning leave northern New Hampshire, central Vermont, western Massachusetts, and central Connecticut. Between thirty-five and forty carloads of milk arrive at Boston daily, almost all being of New England origin. The supply of milk for the smaller cities is also a business of large dimensions. The increasing use of cream makes that product of second importance. Maine sends a carload of cream to Boston daily, while large quantities are received from other sections along with the regular milk supply. Much of this market cream is separated by the farmers either by the Cooley process or the centrifugal separator, gathered by creameries, where it is run through a separator for standardizing, and then shipped to the city in bulk.

In northern New England much butter is made. All the butter produced in New England is consumed while it is comparatively fresh—in many instances while it is only a week or two old. Cheese production is no longer prominent in New England, although many factories still exist in Maine and Vermont, and many private dairies still manufacture cheese.

Among methods characteristic of the section perhaps the use of the Cooley creaming system is the chief. The Cooley system of cream gathering was of New England origin, and the apparatus has always been of New England manufacture, so that this particular method gained such a strong foothold there that the separator has not yet supplanted it, although many separators are now in use and the number is yearly increasing.

## NEEDS OF NEW ENGLAND DAIRYMEN.

The needs of New England dairymen are chiefly those common to dairymen generally: (1) Improvement of methods; (2) elimination of cows that do not pay their board; (3) more attention to the little

details of cleanliness; and (4) more of a spirit of cooperation and less cutthroat competition, particularly in the selling of milk.

The needs of dairying which seem to be peculiar to New England are four. The first is an appreciation of the good markets in this section. People generally see at close range the hard work and perplexities of their own business, and have a vivid realization of them; hence it often happens that one is a poor judge of the relative advantages of his occupation. New England dairymen are no exception to this rule, and they lose sight of the broader and relative side of their business. More appreciation of the advantages of the situation would lead to better utilization of it.

A second need of New England dairying is more attention to the pastures. Here can be obtained, at a merely nominal expense, large amounts of the very best cow feed. Yet it is the common testimony that on the whole the pastures of New England are retrograding; the coarse weeds, bushes, and encroachment of the forest are driving out the native nutritive grasses.

The third need is more attention to growing legumes. The New England dairyman is to-day dependent upon the West for most of the nitrogenous element in his cow rations, this being bought in the by-products of the factories which handle grain either for grinding or the manufacture of "breakfast foods," glucose, and other articles. If the New England milk producer raised more clover, peas, and other legumes, he would be more independent; his farm would be more nearly self-sustaining; it would increase in fertility, and his dairy products would cost less. Several dairymen have experimented with alfalfa, which in some cases has promised well for a few years, but no permanent successes are as yet reported. The experiment stations are doing good work in introducing vetches, rape, and soy beans; but in the common old-fashioned red clover farmers have a convenient and valuable legume.

The fourth need is the doing of business, in most cases, on a larger scale, making it possible to practice some of the economies which come from wholesale methods of production and selling. Too many go to market with such small amounts of butter as to be compelled to accept whatever the village trader may offer.

#### THE OUTLOOK.

As long as business is prosperous and population continues to concentrate in the cities and towns, requiring them to reach out farther and farther for supplies of fresh milk, the market-milk business will crowd back the making of butter and cheese, especially of the ordinary grades; and factories for their manufacture will be abandoned in order to sell milk or cream to the city. The outlook, therefore, for the market-milk business, as far as demand is concerned, is good. The

only question is that of price. The farm-labor situation is acute, the cost of grain feeds is high and increasing, and the awakening of health authorities to the importance of clean, sanitary milk is adding to the cost of production. There seems to be no danger of the overproduction of milk, cream, or fancy fresh butter.

We may conclude with the statement of Prof. W. A. Henry: "The eastern farms, for inherent beauty, for all that goes for home-making, for possibilities in the range of crops, and for good markets, are without a rival anywhere in the world."

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### III. THE NORTH CENTRAL STATES.

By B. D. WHITE,

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#### RECENT PROGRESS.

Wonderful progress has been made in the dairy industry during the past decade, and many changes have taken place, especially in the North Central States. Among the States which have become prominent in dairying recently are Michigan, Indiana, North Dakota, South Dakota, Oklahoma, and Missouri. Northern Oklahoma and Missouri are especially adapted to dairying.

In the last fifteen years the States of Illinois, Iowa, Wisconsin, and Minnesota have made great progress in dairying. In the last two States thousands of farms have been taken up and put under cultivation, and hundreds of creameries and cheese factories have been built and put in operation, manufacturing the milk or cream from hundreds of thousands of cows into prime butter or cheese. There is yet much untilled land not only in those States but in many others in the Middle West waiting to be converted into fine farms.

#### FAVORABLE CLIMATIC CONDITIONS.

There seems to be a belt particularly favorable to the dairy industry in the North Central States. This belt extends from Ohio west to the Missouri River slope and to the arid region east of the Rocky Mountains. Some profitable dairying, however, is carried on in all the Western and Southern States, but thus far it has not been made a common adjunct to general farming as it has in the North and East.

The northern climate seems to be conducive to dairying. The farther north we go the more dairying we find, until the pine-timbered region is reached. Even this is being converted very rapidly into dairy farms. Silage has come to be recognized throughout this section as the cheapest possible kind of roughage in a succulent and palatable form. Another northern condition favorable to dairying is the abundance of fine natural grasses and the adaptability of the



soil to clover, especially in the timbered sections of Wisconsin and Minnesota. The coolness of the nights in summer also makes it possible to keep milk and cream easily, and this makes the work of dairying more agreeable. Even the necessity of giving stock proper protection during the winter months tends indirectly to increase dairying, and especially winter dairying, which the northern farmers have found to be the most profitable.

The reasons for the greater profit in winter dairying are not hard to find. Higher prices are paid during the winter months for milk and cream. Cows freshening in the fall will, if properly fed, give milk all winter, and when turned out to grass in the spring will give practically as much milk as when fresh. Farmers have more time in winter to do the work required for dairying. Calves may be fed on skim milk during the winter months, and when turned out to grass in the spring need very little more care, and the skim milk may then be fed to the spring pigs. Under the system of winter dairying, cows go dry in July and August, at a season of the year when the farmers have the most work to do and the least time to give to the care of cows and calves.

#### SOIL CONDITIONS.

The soil throughout the dairy districts of the North Central States is generally good, except in a few localities which are sandy; but on account of the large number of cows and other animals kept, the fertility even of the poorer soils is kept up, and such crops as are necessary for the maintenance of a dairy herd are raised. In sections where a portion of the land is too rolling or hilly to be fit for the growing of crops it is used for pasture, and only the lower land is used for tillage. In other localities, where lakes abound, the land near the shores for a certain distance is too wet for cultivation, but makes good pasture and is used for that purpose. In such localities also the stock is well supplied with water; hence both the high land and the low is used to good advantage for stock raising and dairying. Throughout the localities where dairying and stock raising are extensively carried on the fertility of the soil has not only been kept up, but in many sections it has been largely increased.

#### DAIRY COWS.

It is with regret that one must say that a large percentage of cows throughout the North Central States are yielding only a trifle more than 100 pounds of butter each per year. In some dairy States the average yield is less than 150 pounds per cow per year, when it is possible, under quite ordinary conditions and with grade cows of dairy breeds, to produce twice that amount. Evidently there is plenty of room for improvement. By proper selection, care, feeding, and breeding of dairy cows the output of dairy products can be doubled

without increasing the number of cows now in the country. On many farms the dairy herd could be made to produce an increased profit simply by testing all the cows and disposing of those which are proved to be unprofitable.

The increase in the number of cows is noteworthy. Take Minnesota as an example. The number of cows supplying creameries increased from 382,356 in 1901 to 458,466 in 1904. Considering the average cow worth \$30, the assets of Minnesota dairymen were thus increased 2½ million dollars in these three years, besides the amount obtained from the sale of young stock.

In Iowa the number of cows supplying creameries increased from 600,000 in 1905 to 650,000 in 1906.

#### MILK.

The center of butter production has been gradually moving westward, while market milk is relatively of less importance westward than in the East. Eastern cities are learning the value of milk and milk products for food. The agitation by boards of health for cleaner and purer milk seems to have stimulated the demand, and difficulty is experienced in most of the large cities in obtaining an adequate supply of milk and cream during the winter season, though prices are higher to the consumer than in former years. Condensing factories are using large quantities of milk, which in its condensed form is shipped to nearly every country on the globe. A considerable quantity of milk is being used in the manufacture of fancy brands of cheese.

It has been estimated that skim milk is worth from 15 to 25 cents per hundred pounds for feeding purposes on the farm. It is difficult to estimate the total feeding and fertilizing value of skim milk to the farmer. Without it less stock will be raised on the average farm. With less stock there will be less manure, and the fertility of the soil will decrease year by year until the land has reached such a stage of poverty that it will no longer produce profitable crops. Farmers should receive at least 25 cents per hundred pounds for skim milk sold from the farm. Even where that price is received, the average farmer does not invest an equal amount, as he should, in commercial fertilizers. When more stock is kept and the skim milk fed to it, the fertility taken by the crops is replaced and the land kept in proper condition. The farmer of the North Central States is learning this lesson. The price obtained for milk in these States is not as high as in the East, but the net profit seems to favor the western farmer, as he is able to produce milk more cheaply on account of the abundance of feed which can be raised on his fertile soil.

#### BUTTER.

Western methods followed in the manufacture of butter are worthy of note. The system of delivering fresh sweet milk daily to the butter

factory, which was the common practice after the discontinuance of the gathered-cream system, has been largely changed. The farmers have bought separators, and they now skim the milk at home, feed the fresh warm skim milk to the stock, and deliver only the cream to the factory. This is the ideal system from the farmer's standpoint, but new obstacles have appeared which tend to lower the quality of the butter made. The farmers do not deliver the cream as often as they should, because many butter factories will accept cream which is no longer sweet.

Many factories also solicit cream shipments from farmers, either direct to central plants or to receiving stations at points on railroads, from which it is forwarded to the central or churning plants, in some cases hundreds of miles from the source of supply. At these stations or central plants cream is received in any condition, without regard to age or quality. On account of the poor quality of butter made from such cream and the cost of transportation, the price to the farmer has been during the past season about 4 cents per pound less for butter fat than is paid at the creameries where the cream or milk is delivered sweet, so that it can be made into a first-class article of butter. A loss of 4 cents per pound for all the butter fat delivered to creameries for butter-making purposes in six of the largest dairy States would mean a loss of about 13 million dollars per year, or a loss of about  $3\frac{1}{2}$  million dollars in such a State as Iowa, Minnesota, or Wisconsin.

The manufacture of butter seems to be increasing rapidly, especially in the sections where the cooperative system prevails—in Wisconsin, northern Iowa, and Minnesota. The creameries in Wisconsin, as reported by the State authorities in 1900, made 60,000,000 pounds of butter, and in 1905, 88,500,000 pounds. The increased creamery production has not decreased the amount of butter made upon the farms, which, according to reports, in 1900 was 25,000,000 pounds, and in 1905, 34,500,000 pounds.

In Iowa the product of butter has increased from 77,000,000 pounds in 1900 to 91,000,000 pounds, which sold for more than \$20,000,000, in 1905.

Minnesota shows an increase from 44,000,000 pounds in 1900 to 77,000,000 pounds in 1905. In other States proportional increases have probably been made.

There has been increase during the last year in nearly every particular. The number of smaller centralizing plants has increased, as have the number of the dairy farmers and the size of their herds. The per capita product of the cows has increased and with it the demand for cattle of the dairy breeds.

From the increased production we are led to ask the question: What effect does the increased production have upon the price? The

census reports give the total number of pounds of creamery butter made in the United States in 1899 as 420,126,546. The amount of butter of all grades exported for five fiscal years ending with 1900 was 114,923,530 pounds, at an average price of 15 $\frac{3}{4}$  cents per pound. The amount of creamery butter made in 1904 was 531,478,141 pounds, and the amount exported for the five years ending with 1905 was only 68,931,172 pounds, at an average price of 17 $\frac{1}{4}$  cents per pound. The average price of extra creamery butter as quoted in New York for the five years ending with 1900 was 20.3 cents per pound, and for the next five years 22.24 cents per pound, which indicates that the demand for butter at home has increased at a greater rate than the production, causing an advance in the price. At the present time a large proportion of the extra creamery butter sells at a premium of 1 $\frac{1}{2}$  to 2 cents per pound above the quoted prices.

From present indications it would appear that the outlook for the dairy industry, especially the production of butter, in the North Central States is bright. The increased demand for milk and cream for direct consumption, with the increase in population, will have a great influence on the consumption of butter at home. Another hopeful sign is the probability of increasing exports to Cuba, which has been largely supplied by Denmark, and to European countries which have been largely depending upon other nations for their supply of butter.

The butter exported from the United States has heretofore been principally of an inferior quality. The demand at home has taken all of the better grades at good prices. It is only natural to expect that a large percentage of the butter made in this country will hereafter come from the North Central and Southern States and that there will be an increasing demand for the best grades.

#### CHEESE.

Throughout the North Central States there has been a steady increase during the last five years in the production of cheese, as well as butter, but the amount of cheese made is less than the amount of butter, except in Wisconsin, where more cheese is made. In 1900, 78,000,000 pounds, and in 1904, 109,000,000 pounds were made in factories in that State. The percentage of increase in other States has in some cases been as large as that of Wisconsin, which is the largest cheese-making State among the North Central States.

Recent investigations have led to the use of improved methods in the manufacture of cheese. Many of the causes for the poor quality of the cheese previously manufactured have been learned and corrected. By the cold curing and ripening of cheese a more uniform article is produced, and it is commanding an increased price as consumption and demand increase.

In some of the North Central States which have not yet undertaken the manufacture of cheese there are excellent opportunities for profitable production to supply the increasing local demand. In localities where there is not enough milk for the profitable supply of a butter factory a cheese factory could be operated with success. It appears to require about 400 cows to produce the milk for a successful butter factory, whereas cheese can be made with profit from the milk of 200 cows.

The cheese factory can usually afford to pay more for the milk than can the butter factory; and for the last year cheese making has been more profitable for the dairy farmer in the North Central States than has the manufacture of butter.

The success of the Wisconsin cheese factories has been largely due to the fine quality of cheese made, which finds a ready market in the West and South. The demand for cheese, as for butter, depends chiefly upon the quality. Quality should be the watchword of every farmer who produces the milk, as well as of the manufacturer of the cheese.

Another important element in the outlook for the cheese industry is the evidently increasing appreciation of the food value of cheese. Americans have been slow to learn that cheese is one of the most economical, wholesome, and digestible of our concentrated foodstuffs.

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#### IV. THE SOUTH.

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##### REVIEW OF THE INDUSTRY, BY STATES.

A survey of dairy conditions in the South, extending during the last year to 103 towns in 10 States, affords the material for this sketch.

**SOUTH CAROLINA.**—In South Carolina the dairy industry is, on the whole, developed to a very limited extent, although the northern section of the State is especially suited to this industry. The dairies of this section are, in the main, using very inferior stock, their buildings and equipment are frequently very inadequate, and they have no system of marketing their product. In several places, however, the dairies were found to be profitable, the animals in good health, and such dairy farms are distinguished from others of the community by their generally improved condition. With but two exceptions, none of the dairy farmers were using silage, and only a few of them are feeding liberally enough on green feed. That part of the State, with its especially fine climate, good lands, and abundance of

cool water, will, with a proper development, eventually become a dairy section. The southern portion of South Carolina is usually low and in many parts very productive. Forage crops can be grown in great variety and cheaply, but the dairymen are for the most part confined to the towns and cities and rely principally upon commercial foodstuffs. The cows are, as a rule, inferior to those in the northern part of the State and, while there is an abundant water supply, frequently artesian, the temperature is on an average much higher than in the northern portion of the State. The principal menace to the industry in the southern part of this State may be said to be the existence of the cattle tick.

GEORGIA.—In Georgia the conditions vary from the mountainous counties of the northern part of the State to the flat, level counties of the coast. In the northern counties there is an abundance of land that is not utilized, with natural pastures, an abundance of cool water, having in many cases a temperature of 54° or 55° F. This section is above the Texas fever quarantine line, the climate is good, and it is well suited to the production of butter and cheese. In the southern part of the State there is very little dairying, except for the purpose of supplying milk to the cities. Silage is not generally in use, and the city dairymen as a rule rely largely on cotton-seed meal and hulls for feeding; yet they are often prosperous.

FLORIDA.—In Florida little attention is given to dairying, and the dairies in the vicinity of the places visited—Lake City and Jacksonville—are engaged in supplying to the towns milk at a high price and of a rather inferior quality. Inferior scrub cattle are generally in use, and no special provision is made for economical production of forage crops for feeding. Owing to the attention which is usually given to the production of fruit and vegetables, and to the large amount of swamp lands, the outlook for dairying is limited, to say the least.

ALABAMA.—The northern portion of Alabama is very similar to the northern portion of Georgia, being mountainous, well supplied with an abundance of cool water, thickly populated, and having numerous towns and a great variety of industries. Dairy products command a very high price and the conditions are excellent for dairying. In the vicinity of Birmingham one dairyman visited by the writer found his dairy very profitable; in the same vicinity, however, under exactly the same conditions, others were found to be very unprofitable. With one exception, no silos were found in use in that section of the State, and the buildings and stock were inferior. In the southern portion of the State, as is the case in the southern portion of Georgia, the milk production is confined principally to supplying the cities. There are a few dairymen in middle Alabama

that are making good profits, and have been in the business for a number of years, but, on the whole, the dairy industry of this section is uncertain. Feed can be raised very cheaply, however, and dairying should be made profitable.

LOUISIANA.—In Louisiana the principal interest in dairying is found in the vicinity of New Orleans, the greater portion of the State being devoted largely to the production of cotton, corn, sugar cane, and rice. In the small towns near New Orleans, however, a considerable dairy industry is found. The cattle in that section usually run on the coast, where a variety of grazing is found almost the entire year. New Orleans offers a practically unlimited demand for dairy products. The cattle used are frequently very inferior, and while, especially at Hammond, the dairy industry is much more advanced than it is in any other place in the coast section, many improvements are needed. The dairymen need silos, they need to improve their herds, they need to produce more feed on their farms, and to abandon the excessive use of cotton-seed hulls. Several successful dairies in this vicinity indicate that, in spite of the disadvantages, the possibilities for the skillful dairyman in this section are encouraging.

MISSISSIPPI.—In Mississippi the pine lands of the southern part show little agricultural development. In recent years the removal of the timber from the lands has left what are known as the stump lands, which are very cheap. The soil is light and rather sandy, but productive when improved; and the development of a dairy industry in that section which is near New Orleans would be profitable. Fertilizers are needed, which dairying would supply. In the central part of the State there are few dairymen of the better class, although there is a large production of hay, this section being favorable to the production of all kinds of forage crops. In the northern part of the State, in the vicinity of Memphis, Tenn., there are a number of dairies shipping milk to that city. The conditions there are somewhat similar to the conditions in the vicinity of New Orleans, except that the country is probably not quite so low. Some dairymen are making money, but many of them are not. There are very few silos in use, and the dairy buildings are usually inferior. The conditions in the State of Mississippi warrant the development of a good dairy industry.

TEXAS.—In Texas there is a small creamery industry in some sections. In many cases, however, the promoters of the creameries seem to have misled the farmers, who, having been disappointed in their venture, are not now very optimistic about the dairy industry. The conditions that exist in Texas are very similar to those of Mississippi, and the dairy industry at present is in its infancy. There are some excellent herds of pure-bred dairy cattle near Marshall, San Antonio, Dallas, Fort Worth, El Paso, Houston, and other towns,

from which the equipment and practice of the dairy farms in these localities are gradually being improved. The opportunities for dairying in Texas are almost unlimited.

ARKANSAS.—In Arkansas many different conditions exist. In the northern part of the State magnificent pastures are seen and an abundance of cool water, with an excellent climate for all seasons; but there is very little dairying there, notwithstanding these favorable conditions. In the southern part of the State we find level lands but a more limited supply of water, and much attention is given to the production of sugar cane. Between Little Rock and Memphis, however, there are a number of small towns that produce a considerable amount of milk and cream. The section of Arkansas, however, that offers the best opportunities for the dairy industry is the northern portion of the State, and there are few sections where better natural advantages may be had.

TENNESSEE.—Tennessee may probably be called the dairy State of the South. It is above the cotton belt, and also above the Texas fever quarantine line. Mountainous conditions prevail in the eastern part of the State, and here the dairy industry is well developed in the valleys. In the Sweetwater Valley are found in use many silos, and many good herds, including some pure-bred stock of a high class. The central part of the State, with its natural bluegrass pastures and supply of pure water, is already the home of many herds of pure-bred dairy cattle, and produces market milk and butter of the highest grades. There is no State in the South in which the dairy industry is as highly developed as in Tennessee, and the outlook here is very favorable.

NORTH CAROLINA.—In the western portion of North Carolina the conditions are very similar to those of eastern Tennessee, although on the whole the dairy industry is not as well developed as in Tennessee, and in many cases very inferior dairies are found, both in equipment and methods and in the kind of stock kept. In the eastern section of North Carolina the conditions are more like those in the coast sections of South Carolina and Georgia.

#### THE SOUTH AS A WHOLE.

In reference to the conditions that exist in the South as a whole, attention should be called to the following facts: In some cases herds are found producing as good results as are ordinarily made in any section of America. At other places dairy products are made as cheaply as in any of the dairy sections. Altogether there is an enormous demand in the South for dairy products; almost all of the butter and cheese is imported, some cream is shipped in from States a great distance away, and a great deal of condensed milk is



used as a substitute for milk because of the scarcity and the poor quality of the fresh milk put on the market. Silage is used to a very limited extent, but in a number of the different sections, on the coast of Florida especially, the silage is of good quality. Probably the greatest reduction in profits is usually caused by the use of inferior cattle, which are found in a large majority of the dairies throughout the entire South.

On the cotton farm cotton is usually the all-absorbing crop, and little attention is given to feed crops. In many cases no more animals are kept upon the farm than are actually necessary to cultivate the cotton crop, and often there is not enough feed raised to supply even these. This system is of course exactly the reverse of dairy farming, in which the feed crops are converted into more easily marketable and more profitable products, and practically all the fertilizing ingredients of the feed (the manure) are returned to the soil, which continues to increase in productiveness.

The labor is often irresponsible and this discourages many from going into dairying, even though they appreciate its advantages. The warm summers and the disorganized condition of the dairy markets have also been discouraging. However, with the use of artificial ice, which is cheap, improved transportation facilities, and the mild winters, the thinking man is about convinced that the seasons are not unfavorable to the dairy industry.

The demand for dairy products in the South has become enormous, and inasmuch as the markets have not usually been supplied with fresh products, the trade does not demand absolutely first-class articles, although the prices are comparatively very high.

With the highly improved southern farms, the question of cheap feed is settled, for there is probably no section of America that can produce cheaper feed. Especially is the great variety of legumes that thrive in the South worthy of notice, and these crops, with cotton-seed meal, settle the question of protein.

While very little attention has been given to the development of the southern pastures, it is demonstrated on farms throughout the South that an unexcelled pasture can be maintained for at least eight months in the year.

The old southern plantation with its haphazard system is being gradually transformed into a well-organized and diversified farm, and in the transformation dairying promises to be one of the most potent factors. It will occupy a portion of the cotton farms, and even if it is conducted in such a way that the dairy itself is not profitable, it will make the farm fertile and therefore profitable in other lines.

While the southern dairyman therefore will have some difficulties that are not found in the northern sections of the country, he also has many advantages over the northern dairyman in the milder climate,

cheaper cost of buildings, the greater variety of forage crops, and good markets. The South will always be a great cotton country, but it will some day be also a great dairy country.

## V. THE PACIFIC COAST.

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### NATURAL ADVANTAGES FOR DAIRYING.

No section of the United States offers greater returns to the intelligent dairyman than the States on the Pacific coast. Owing to the numerous streams which have their origin in the snow-clad peaks of the Coast Range, the Cascade Range, and the Sierra Nevada Range, there is a never-failing supply of fresh, pure water. In this equable climate young stock and beef cattle can run out the year round, while dairy cows require to be stabled only from two to four months, according to the locality. The soil on the western slope of the Coast Range includes extensive alluvial deposits, and that on the east side is composed largely of volcanic ash. Owing to the productiveness of these soils, it is stated that twice as many cows can be fed on these lands as can be fed on the same amount of land in the East. These advantages have not been fully appreciated. The early pioneers made their money so easily, growing from 40 to 50 bushels of wheat to the acre and from 80 to 120 bushels of oats, that they did not give thought to the fact that their land would some day become impoverished. The time has come when these farmers must recognize the value of diversified farming. During the last five years there has been a strong movement toward more intensive farming and a system of crop rotation which will restore and preserve the fertility of the soil. The dairy cow has been called upon to perform a leading part in this work, as she has in other parts of the country.

### EXTENT OF THE DAIRY INDUSTRY.

The following table shows the manufacture of creamery butter and factory cheese in the years 1897 and 1904 on the Pacific coast. Returns of farm-made products are not complete.

*Manufacture of creamery butter and factory cheese on the Pacific coast, 1897 and 1904.*

State.	Butter.		Cheese.	
	1897.	1904.	1897.	1904.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>	<i>Pounds.</i>
Washington.....	2,094,457	7,722,911	709,364	921,383
Oregon.....	2,565,000	5,080,599	500,000	2,255,592
California.....	10,866,646	26,837,386	6,399,625	3,601,051
Total.....	15,526,103	39,640,896	7,608,989	6,778,026

The grade of cows on the coast has been very greatly improved during the last ten years. Many of the prominent dairymen have been securing pedigreed pure-bred stock; others are simply using pure-bred bulls to head their herds and breeding up from their best grade cows, so that the average herd shows good dairy characteristics. Here and there are found pure-bred herds of Jerseys, Holsteins, and Guernseys, and there are a few Ayrshires. The yield per cow has been gradually increasing. Many farmers weigh and test the milk of each cow, and in this way discover the profitable cows, so that there is a general weeding out of the poorest cows of the herd. In every valley on the coast may be found mixed herds, which have been bred up in this manner, and which are now large producers.

#### MOVEMENTS OF DAIRY PRODUCTS.

Butter and cheese manufactured in Washington is mostly consumed in the home markets, a small amount being shipped to Alaska. Butter and cheese manufactured in Oregon is only partly consumed in the home markets, the surplus dairy products being shipped to San Francisco and to the cities on Puget Sound. California, after supplying her own markets, ships her surplus to Alaska and foreign ports, and, during the first three months of the year, California is shipping more and more each year to the Eastern States. Washington is the only State on the coast which still handles a large amount of eastern butter. One reason for the demand for eastern products in Washington is her trade with Alaska. Being nearest to Alaska and having more regular means of transportation, she naturally secures a large percentage of that trade.

The possibility of increasing our trade with foreign countries depends on our ability to produce as cheaply and to deliver the product in as good condition as do other countries. When the coast States have a surplus, South American countries and the Orient seem to be the natural outlet. There is a large demand throughout the Orient for tinned butter and condensed milk and cream and for cheese. The markets at present are largely supplied by Australia, Holland, Germany, and France, with a few shipments from Sweden. Price does not seem to be so important a factor as quality, and especially uniformity. San Francisco has been making an effort to secure this trade with fair success, using a vacuum 1-pound tin. A Portland firm has also shipped some tinned butter to the Orient with varying success.

#### DAIRYING IN WASHINGTON.

The State of Washington may be divided into four sections, differing from each other in rainfall, temperature, and agricultural products.

The first division is the west side, or the section west of the Cascade

Mountains, for the most part heavily timbered and characterized by a rainfall varying in different parts from 30 to over 100 inches, according to direction and distance from the mountain ranges. As in all other parts of the Pacific slope, by far the largest part of the rainfall is confined to the winter months, the summer months being comparatively free from rain. This section includes the fertile valleys along the numerous rivers and creeks, the tide lands, and the fresh and salt water deltas. The soil is rich in alluvial deposits. The climate is ideal for the dairy industry. The water supply consists of beautiful streams from the mountain sides which flow through these valleys. On account of the mild winters and proximity to the market centers, the west side is eminently adapted to dairying.

The upland prairies of eastern Washington constitute the second section of the State. These prairies lie east of the Columbia River, extending to the mountains of Idaho and from the Blue Mountains on the south to the mountains of Stevens and Okanogan counties on the north. The Palouse and Big Bend prairies, which have a world-wide reputation for their immense yields of wheat, are included in this section. Except where land is far removed from the mountains dairying is profitable. The rainfall is sufficient, as the soil is a retentive clay loam. Since the coming of the hand separator there has been a gradual increase in dairy products. There is a tendency to diversified farming, making dairying an adjunct to the growing of wheat.

The third section includes the Walla Walla, Yakima, and Wenatchee valleys of central and southern Washington. These lands are all in the drier parts of the State, and their low altitude gives them warmer summers than are found elsewhere in the State. These are largely sagebrush lands, and when irrigated are very productive. This is a great fruit and dairy section. Alfalfa is the principal forage crop, and yields under proper cultivation from 5 to 7 tons to the acre, making this section particularly adapted to the dairy industry.

The farming areas of the fourth section are scattered widely. They are situated east of the Cascade Range, and are at a higher altitude than the land in the third section. The Kittitas, Colville, and Kalispel valleys are included in this section. Timothy, clover, root crops, and all the cereals are grown. The tendency of the farmers in this section is to diversified farming, with dairying as the leading branch. The Kittitas Valley will lead all the others in the amount of butter produced.

The valleys of the State are so productive that, everything else being equal, butter and cheese can be produced at a less cost here

than in the Middle West or the Eastern States. Rich, succulent food, pure water, and a temperate climate are the essentials in the manufacture of a "nutty," high-flavored, sweet butter. Nature has been lavish in her gifts to the State of Washington in this respect, and we may look forward to this State becoming a large producer of butter. There is also every reason to believe that the State will become noted for a high grade of butter which will command the highest price. Owing to the diversified industries of the State—consisting of fish, lumber, coal, and other minerals, the development of which will employ a large number of men—the rapid growth of her cities, the development of Alaska, and the growth of trade with the Orient, South America, and the islands of the Pacific, the State can always count on the demand for dairy products being greater than the supply.

#### DAIRYING IN OREGON.

The State of Oregon is in the same latitude as South Dakota and the New England States, but the Japan Current equalizes the temperature and gives Oregon an ideal climate. All kinds of forage crops are grown without irrigation, except in a very small area in southeastern Oregon. The State has five natural dairy divisions.

The coast section lies between the Coast Range and the Pacific Ocean. The northern part of this section has become famous for its salmon. The annual value of the salmon industry is approximately \$3,000,000. The profits in this industry have been so large that very little attention has been given to dairying, which is still in its infancy. Tillamook County is the great cheese section of the Pacific coast. It is an ideal dairy section. Six different streams traverse this county, taking their rise in the Coast Range and emptying into the Pacific Ocean, so that this valley has an abundance of pure fresh water.

The Willamette Valley includes the counties on either side of the Willamette River, lying between the Cascade and Coast Range of mountains, a distance of about 100 miles. If the natural resources of this valley had been properly utilized they would have made it a greater butter producer than any other section on the Pacific coast; but the soil became so impoverished by continuous cropping with wheat that where 40 bushels were once produced 13 bushels per acre is now an average crop. How shall we redeem the land? There is but one reply: By the use of the dairy cow. This valley can be made to produce butter to supply ten times the population of the State. New blood, dairy literature, and farmers' institutes are the leaven which is changing the "mossback" into an intelligent dairyman. Here and there may be seen pure-bred herds of Jerseys, Holstein-Friesians, and Ayrshires.

Southwestern Oregon has the most desirable climate in the State, having neither excessive rainfall nor excessive heat. Two beautiful rivers—the Umpqua and Rogue—and their tributaries traverse this section, which has already become famous for its apples. On the higher lands the dairy industry will flourish, and alfalfa will be the principal forage crop. The manufacture of butter has been increasing very rapidly. Almost every farmer has the foundation for a dairy herd. Creameries with modern equipments are in operation in several places.

Northeastern Oregon constitutes the fourth section. Wheat and beef cattle are the principal agricultural products, and dairying is still to be introduced.

The fifth section is the undeveloped part of Oregon. It lies to the southeast. One can travel through this section only by stage or private conveyance. Here are thousands of acres of rich, alluvial loam and volcanic ash, capable of being irrigated. It is certain that this section, which a few years ago grew only sagebrush and whose principal inhabitants were the jack rabbit and the coyote, is destined to become the home of thousands of prosperous dairymen.

Portland, the metropolis of Oregon, located near the confluence of two great rivers—the Columbia and the Willamette—is the only city of any commercial importance in the State. This city must find ways and means of disposing of the vast resources of Oregon and of providing the implements of production for the development of this great State.

#### DAIRYING IN CALIFORNIA.

California has a soil and climate so varied that all fruits, both deciduous and citrus, can be grown to perfection. All kinds of cereals are grown with success. California has also great possibilities as a dairy State.

The counties surrounding the bay of San Francisco comprise the best developed dairy district of California. It is from these counties that California is receiving one-third of its butter and San Francisco all of its milk. The production of butter in these counties is already up to the limit, as the city of San Francisco and the contiguous cities draw their milk supply from these counties, so that California will have to look to some other section of the State for her future supply of butter.

The second section is an ideal section for the production of milk and for converting it into butter and cheese. This section includes all the counties north of the bay counties to the Oregon line, between the Coast Range and the Pacific Ocean. The soil is very rich and almost all of it is productive. The natural grasses are

clover and rye grass. The size of the average herd of dairy cows is 20, and the produce averages about 200 pounds of butter per cow. This section has been the greatest butter producer in California, but the production has apparently reached the limit.

In the third section, including the counties south of the bay counties, extending along the coast to the Mexican line, we find varied conditions. With irrigation and proper management the section about San Luis Obispo should become a large butter producer, as it is better adapted to the dairy industry than to any other branch of agriculture. The butter from this valley is shipped to Los Angeles and San Francisco. Los Angeles County is credited with the manufacture of over 2,000,000 pounds of butter per year, which would indicate that this county is especially adapted to the dairy industry. This, however, is not the case, for, while there are some good dairy herds in this country, a large proportion of the cream comes from outside the county. The country along the coast from Los Angeles to San Diego enjoys an equable climate well suited to fruit growing with irrigation, but the small rainfall will always hinder this section from becoming great in dairying. The hope of southern California is in what is known as the Imperial Valley. This valley contains 500,000 acres of very rich land, which is being irrigated from the Colorado River. When irrigated, this land will grow large crops of alfalfa. There are two drawbacks to this section, the heat and the flies. Dairying will undoubtedly be carried on to a considerable extent, but the difficulty of securing labor will be a serious disadvantage. This valley will probably become a great livestock section.

The fourth section includes the San Joaquin Valley. To this section and the Sacramento Valley, California must look for the great increase in dairy products. A large portion of the San Joaquin Valley is irrigated by means of artesian and pumping wells, assisted by irrigation ditches which draw their supply from the rivers near their sources in the Sierra Range. The conditions of soil and climate are ideal for the growth of alfalfa. Grass starts with the first fall of rain and continues through the winter, so that there is green grass throughout the year. Near Stockton is one of the largest and best of pure-bred dairy herds. Nature has provided all the conditions for an ideal home for dairy cattle and the owners are utilizing these conditions in the most practical manner. The barns are strictly modern, well ventilated, and with every convenience for the comfort of the cows.

We now pass to the fifth section, the Sacramento Valley. This entire section has been noted for its immense yields of wheat and barley, but continuous cropping with wheat has impoverished the soil

so that where 30 bushels were once grown now from 8 to 10 bushels is all the land will produce. The dairy cow will be called upon to reclaim these impoverished lands, with the aid of irrigation, and they will be made to blossom with the alfalfa flower. The surface of this wonderful valley has only been scratched. One can not estimate the possibilities of the increase in the dairy industry. The scarcity of labor is a great hindrance to the development of this valley. If California could secure labor at a reasonable wage, the State could easily triple its production.

#### CONCLUSION.

Sufficient data have been given to show that the Pacific coast States will become large producers of dairy products. Owing to the unparalleled growth of the cities and the varied industries, it may be that the supply will not increase more rapidly than the demand, but a reasonable conclusion to be drawn is that there will be a surplus within a few years. The markets of China and Japan, the countries of South America, and the islands of the Pacific Ocean are the natural outlets, and everything should be done to secure these markets for the dairymen of the Pacific coast.