



University of Illinois
Library at
Urbana-Champaign
ACES

UNIVERSITY LIBRARY

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

The person charging this material is responsible for its renewal or return to the library on or before the due date. The minimum fee for a lost item is **\$125.00**, **\$300.00** for bound journals.

Theft, mutilation, and underlining of books are reasons for disciplinary action and may result in dismissal from the University. *Please note: self-stick notes may result in torn pages and lift some inks.*

Renew via the Telephone Center at 217-333-8400, 846-262-1510 (toll-free) or circlib@uiuc.edu.

Renew online by choosing the **My Account** option at: <http://www.library.uiuc.edu/catalog/>

AGE 5 2006

NOV 16 2006



1

2

3

4

5

UNIVERSITY OF ILLINOIS
Agricultural Experiment Station

BULLETIN No. 140

DAIRY SUGGESTIONS FROM EUROPEAN
CONDITIONS AS SEEN IN THE
BRITISH ISLES, HOLLAND
AND DENMARK

BY WILBER J. FRASER AND ROYDEN E. BRAND



URBANA, ILLINOIS, OCTOBER, 1909

SUMMARY OF BULLETIN No. 140

1. Dairying in England is confined largely to the production of milk by milking Short-Horns. The greater portion of the milk is used for direct consumption,—most of the remainder being converted into sweet cream butter in farm dairies. Page 462
2. Dairying in Ireland is limited almost exclusively to milking dual purpose cows thru the summer. Page 469
3. Dairying in Scotland is primarily confined to the making of cheese in the farm dairy. The excellence of the producing Ayrshire and the high quality of the cheese are the points of interest to American dairymen. Page 472
4. British Agricultural Shows are conducted for the sole purpose of stimulating interest in agriculture. Page 481
5. Dairying in Holland is a grass and hay proposition. Their dairy cattle have a great capacity for roughage, which, with but a small amount of oil cake, enables them to produce, economically, a large amount of milk. Cheese is the main dairy product, and is made both on the farm and in coöperative factories. Some butter is also made in these factories. Page 485
6. Dairying in Denmark is the chief occupation of the people. It is conducted in a more intensive manner than in any other country in the world. Dairy cows of high efficiency produce milk which is made into butter of excellent quality in coöperative creameries. Page 503
7. **Final conclusions.** The uniformly high quality of the dairy cattle, their economical feeding, and the care taken of them and their products were the conspicuous things, and as these four points are the essentials of dairying, the American dairymen can and should learn lessons from the dairymen of Ayrshire, Holland and Denmark. In all the dairy districts visited these points stood out prominently, and need to be emphasized in American dairying. Page 521

DAIRY SUGGESTIONS FROM EUROPEAN CONDITIONS AS SEEN IN THE BRITISH ISLES, HOLLAND AND DENMARK *

BY WILBER J. FRASER, CHIEF IN DAIRY HUSBANDRY
AND ROYDEN E. BRAND, ASSISTANT IN DAIRY HUSBANDRY

A study of the dairy conditions of Illinois shows conclusively that the dairymen are not getting the profits they should from the money and labor invested in the business of producing milk. Since there are dairy sections in Europe where they are feeding American grown grain to their cows and producing dairy products which are sold on European markets in competition with ours, it is important for the American dairymen to know what is wrong with our methods, and the details of the system that permits profitable dairying on land worth from five to ten times as much as that in the Central West.

This bulletin is the result of a summer spent in making a detailed study of the methods employed in the production of milk on the farms of the intensive dairy countries of Great Britain, Holland, and Denmark. The main purpose in the study was to look for points in which European dairymen excel. This was a second visit for the Chief in Dairy Husbandry, who eight years before noted the important features at that time, and the observations of the first visit, coupled with the more mature and deliberate opinions of the second, are herewith compiled. While many of the foreign conditions are, of course, vastly different from ours, and we cannot copy all of their methods directly, the underlying principles of dairying are the same the world over, and the high points of their success are uniformly good cows, economical feeding and care, and sanitary methods, resulting in dairy products of high quality. The observance or non-observance of these points make the difference between success and failure, and are of vital importance to all American dairymen.

*The cuts for this bulletin were made from photos taken by the authors.

DAIRYING IN THE BRITISH ISLES ENGLAND



RURAL ENGLAND.

In England the greater part of the land is owned by noblemen, who care quite as much for beauty as for profit, in consequence of which great attention is paid to the artistic appearance of the farms, and much pride is taken in keeping everything neat and orderly. No fence corners or hedge rows are left to grow up with weeds, nor machinery allowed to stand in the fields. England certainly possesses a charm that is all her own. The larger portion of the country is in grass, and neatly trimmed hedges divide the beautiful, undulating pastures and meadows into small fields, where numerous clumps of trees are allowed to grow. Covering the whole country is a network of winding macadamized roads lined on both sides with hedge rows and trees, and leading thru the fields in every direction are foot paths. The heather-covered hills, vine-clad cottages, and cattle dotting the pastures, make a beautiful picture, not soon forgotten.



A TYPICAL ENGLISH LANDSCAPE. MILKING SHORT-HORNS AT PASTURE.

FARM MANAGEMENT

The farms vary in size from fifty to three hundred and fifty acres, averaging about one hundred and twenty acres, and rent for from \$2.50 to \$10 per acre, depending upon the soil. Their valuation is considered to be thirty times the rental. These farms are often rented by the same family from generation to generation, and it is this stability which makes the English farmer such a successful breeder of

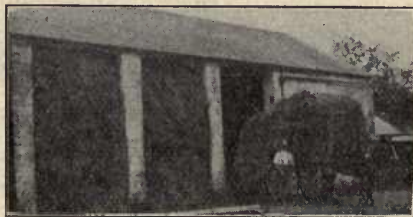
live stock. The English renter must not be confused with the European peasant; he is usually a well-to-do and well-educated man, comfortably situated, contented with his lot, and his heart is in his work.

Climatic conditions affect the crops grown, and while there is more uniformity of temperature, there being neither intense heat nor cold, yet very little corn can be raised. On the other hand, grass grows abundantly, as the rainfall is plentiful and well distributed, and for this reason the greater part of the country is in pasture or meadow, only a comparatively small portion being under cultivation. There is also a growing tendency to have more pasture and less tillable land, owing to the difficulty with which labor is obtained. Good permanent grass land is higher priced than arable land. Agricultural conditions vary in England, as in other countries, and it naturally follows that one section differs from another.



HEAVY ENGLISH CART COMMONLY USED ON THE DAIRY FARMS AND FOR DELIVERING MILK.

Usually, grass seed is put in with oats or wheat and always pastured after the grain is cut. A large number of grasses are sown together, as the grasses adapted to the soil will thrive best. A favorite mixture consists of meadow and tall fescue, perennial rye grass, timothy, cock's foot, sweet vernal, and red, white, and alsike clover. Pastures that have been down some time either run to weeds or establish themselves. The chief difficulty is to have the ground firm, and the tramping of stock does much good if the ground is not too wet. The pastures should be cared for by careful stocking, to prevent coarse grasses from seeding and running out the smaller grasses. If the coarse grasses predominate, the pasture then becomes open in the bottom. Pasturing a mixture of stock is best, as they prefer different grasses. Favorite English sayings are: "Never interfere with a good pasture when once it is established," and "Any laborer can look after arable land, but it requires a master to look after grass land."



ENGLISH FARM AT HAY BARRACKS.

Oats, wheat, barley and rye are the grains commonly raised. These are harvested by cutting a swath around the field with a cradle and then using a self-binder as in this country. The crops which are cultivated while growing are mostly roots. Mangels are grown ex-

tensively for stock feeding and these commonly yield from twenty-five to thirty tons per acre.

The carts, wagons, tools and implements used by the English farmers seem very crude and clumsy compared with those in the United States, but on the other hand, they are more substantial and much better made. The English farmers are fast seeing the convenience and advantage of our

machinery, and are not only using much that is made in the United States and Canada, but are designing and manufacturing implements quite like our own. English Agriculturalists freely admit that they have learned much from Americans, about improving and developing farm machinery.



SHIRE MARES GENERALLY USED ON THE FARMS OF ENGLAND.

LIVE STOCK

The Englishman is a lover of fine stock, and as a rule has a much better quality than is seen in this country. The horses used on the farms are largely Shires. Being of the heavy draft type, they are frequently used singly, and very seldom does one man drive more than two horses at a time on the farms.



HERD OF DAIRY SHORT-HORNS WHICH HAS BEEN BRED ALMOST ENTIRELY FOR MILK PRODUCTION FOR TWELVE YEARS. AVERAGE PRODUCTION 6000 POUNDS MILK PER COW PER YEAR. WHITE COW STANDING PRODUCED 7000 POUNDS MILK WITH FIRST CALF, AND OVER 11,000 POUNDS LAST YEAR. AVERAGE TEST 3.8 PERCENT FAT.

Nearly all the cattle seen in England are Short-Horns, with now and then a few Herefords, Devons and Jerseys. Most of the milk of England is produced by milking Short-Horns. Several excellent breeders of Dairy Short-Horns are breeding for milk alone, paying no attention to beef. In this way two classes of Short-Horns are being developed that are almost as different as Holstein-Friesians and Aberdeen Angus.

FEED AND CARE

It is estimated that on good land it requires from $2\frac{1}{2}$ to 3 acres to keep a cow a year. The cows are turned to pasture about the middle of May, and the time at which they are taken off in the fall varies from October 1 to November 1, depending upon the season. Cows are not soiled, and pasture grass is generally depended upon to furnish the entire feed for the summer. When this is done, it requires about two acres of pasture per cow. This will support the cows until the first of August, when they are then turned on the aftermath in the meadow, and from this time on changed back and forth from the pasture to the meadow. Grain is seldom fed to cows on pasture, until after the first of August, when a small amount of cotton seed cake is fed to many of the best milkers. Ordinarily, the winter ration for dairy cows consists of 40 to 70 pounds of roots; 15 pounds of straw; 7 pounds of hay; and 8 pounds mixed meal and cake. The roughage is fed three times a day and the grain twice,—the grain being fed according to the milk flow, and is cut off entirely when the cow is dry.



RED POLLED COWS COMMON IN EASTERN ENGLAND.



JERSEYS AT PASTURE. SEEN ONLY OCCASIONALLY IN ENGLAND.

At the Agricultural Shows there were numerous and extensive exhibits of condiments and condition powders for stock. Talking with stockmen on the farms, it was learned that there is an enormous amount of these materials fed in England. It would seem from this that English stockmen, like many Americans, over-estimate the value of these preparations.

As straw is valuable for fodder, only a sufficient amount is used for bedding



DAIRY SHORT-HORN THAT TRACES TO VOLUME I. OF HERD BOOK.

to take the rough edges off the cobble stones or brick with which the stable floor is paved. A noticeable feature is the care taken of manure.



ENGLISH LABORER'S COTTAGE.

The best farmers have sheds under which it is kept to avoid waste. The barn yards are paved with cobble stones to keep the cows out of the mud.

During the summer, cows obtain their water from water holes, brooks, and tile drains. In winter they are watered from a trough in the yard, the water never being warmed, as the winters are not severe.

FARM BUILDINGS

The buildings on the farms are substantial, usually being constructed of stone or brick, and having slate or tile roofs. The houses are comfortable, and much attention is given to neat and artistic plantings around the homes. Our farmers have much to learn from their English cousins in this respect.

CITY MILK SUPPLY

England, with no greater area than Illinois, has a population nearly half as great as that of the United States, and the question of supplying this enormous number of people with fresh milk is a problem of magnitude.

In small towns, milk is delivered warm from the cow, twice a day. In the large cities it must be cooled to stand shipping and the unavoidable delay in delivery. As the climate is cool, it is not as necessary to have the milk chilled to a low temperature during the summer as it is in the States. The customary price to the farmer is \$1.40 per 100 pounds for the summer six months, and \$1.60 for the winter six months, making an average of \$1.50 per 100 pounds, after the freight is paid.



DAIRY SHORT-HORN PRIZE WINNERS AT THE ROYAL SHOW.

An example is cited of a dairy company distributing milk, one of the most extensive in Manchester, owned and operated by Mr. Hailwood. He started in the business while young, and has developed a retail trade until at the present time he owns two farms, and runs twenty one-horse delivery carts and eight distributing shops in the city of Manchester where milk is sold by the glass or quart. He rents a double shop in the main part of the city for \$4,000 a year, where he serves refreshments, and employs twenty people. He pays the laborers that work inside his dairies, and also those who deliver milk, six dollars a week.



CITY MILK SUPPLY DEPOT, SHOWING MILK CHURNS AND DELIVERY CARTS.

He buys from 20,000 to 30,000 pounds of milk a day, selling it at 6 cents a quart in summer and 7 cents in winter. Most of the milk is delivered in bulk and in pint and quart buckets, none of the milk being bottled, with the exception of a small amount which is pasteurized and sold in small-necked glass bottles. He sells 50 percent cream in ten-ounce jars, at 12 cents. If the jar is returned, 1 cent is refunded.



DAIRY SHORT-HORNS. A SOURCE OF LONDON'S MILK SUPPLY.

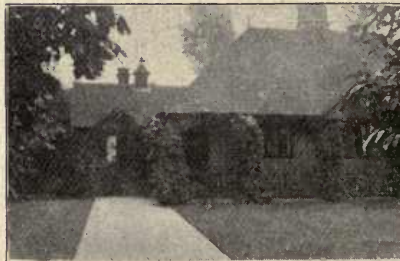
Another example of a dairy company supplying a city with milk is a concern doing a high class business in one of the smaller cities. It has as a depot an excellent two-story brick building with an attractive shop in front where milk is sold by the glass, or in larger quantities. The floors are of cement and the walls of white glazed brick. One entire side of the building and a portion of the roof are of glass, giving ample light in the second story, where most of the milk is handled. A wash room for cleaning cans and dairy utensils is fitted

up with every needed appliance and a large boiler furnishes steam for power and sterilizing. There is also a churn room where any milk or cream that is left unsold is converted into butter. About 7,000 pounds of milk are brought daily to this depot by the farmers in the vicinity. The milk is filtered, pasteurized, and thoroly cooled, and is then ready for the consumer. The twenty men employed in preparing and delivering the milk are required to wear white suits. The milk is delivered with twenty push carts, each having a large can called a milk churn swung between the wheels, and attached to the cart are also several pails, some containing cream and others to be used in carrying milk up the hills where it is too steep to push the cart. As the advantages of thoroly cooling the milk are not appreciated, they incur the extra labor and expense of having the milk delivered twice a day at the depot and also to the customers.

MANUFACTURED PRODUCTS

England has practically no creameries or cheese factories. Nearly all of the milk not used for direct consumption is made into butter or cheese on the farm, by far the greater part being converted into sweet cream butter. The excellent and uniform quality of the butter and cheese used on the tables at hotels and in the homes of England is everywhere noticeable. An Englishman would not think of serving butter of as poor a quality as much of that found on the American markets.

As the population of England is over seven times as dense as that of Illinois, a large percentage of the milk produced is used for direct consumption and most of the butter and cheese consumed has to be imported from other countries. The United States is enjoying practically none of this trade. Denmark and Holland, by studying English tastes and demands, have captured the greater part of the dairy imports and are producing them on land worth from \$500 to \$1,000 an acre.



DAIRY BUILDING ON LORD ROTHSCHILD'S
ESTATE.

IRELAND

Altho having the advantage of favorable natural conditions, the Emerald Isle falls behind in agricultural progress, both as regards the peasantry and the capability of the soil, and it naturally follows that the dairy industry is on a par with the other agricultural operations.

Being directly influenced by the Gulf Stream, Ireland has a climate which,—moist in summer, moderate in winter,—exposes almost 20,000,000 acres of land to a long growing season. The climate and soil are especially adapted to the growing of pasture, hay and green crops, and the unique natural advantages particularly adapt the coun-

try to dairying rather than grain growing. The general size of the farms also lends itself to the intensive methods, which are practiced where dairying is rightly conducted. Yet, as was mentioned, the agricultural conditions are in some respects deplorable. This is especially true of the more densely populated region of the South-west, where the land is poor.



IRISH FARMER'S COTTAGE.

In the North of Ireland there is much mixed farming, while in the South nearly all of the land is in grass. In the North and Central Eastern parts of Ireland the farms are small. The owners of large estates divide up the land and rent it out in small amounts to numerous tenants, many of these having not over twenty acres.

In striking contrast to the careful housing and care of the dairy cattle in England and Scotland, Ireland practices, in many respects, the loosest kind of dairy methods. Excepting near the larger cities, where a constant supply of milk is required, the cows are generally allowed to go dry in the fall when the pastures fail. During the winter their only shelter may be an open shed. Many of the barns are small and have no loft or hay room, thus necessitating stacking in a moist climate where the hay rapidly deteriorates. In the southern part, many of the cows are fed nothing but hay or straw thru the winter. As the supply of these is often limited, Spring finds many of the cows so badly emaciated and in so weak a condition that they can scarcely get up alone, and it takes a month of fine pasture in the Spring to put them in good condition to produce milk. This reduces the por-

tion of the year when the cows are producing anything like their maximum yield to about three or four months, which means that the earning power of the farm is run at full capacity for only one-third of the time, and for the remaining portion of the year not only the stock, but the labor, as well, is partially or wholly idle. There is certainly little profit in this sort of dairying, and its effects are detrimental to both man and beast. To add to their folly, they attempt to make both milk and beef from the same cattle, which are frequently scrubs and good for neither purpose. Still, these are the conditions existing in a large and exclusively milk producing district of Ireland, where the cattle are descendants from the native stock which have been crossed with the Short-Horns for many years, and bred for beef and milk, until now they are almost a distinct breed.



IRISH LABORER'S COTTAGE.

The great problem is how to supply winter butter and keep the English trade the year round. Coöperative creameries are doing much to aid in this respect. Still the majority of farmers persist in the "one-third year dairying" method. There are some good dairymen, yet the poor ones do not learn to profit by these examples and each year the pastures are consumed with but comparatively small profit. Many Irish dairymen, like so many American dairymen, do things the easiest way, and in consequence reap the small end of the profit.

Notwithstanding the bad practices followed, Ireland has 800 creameries and exports about 140,000,000 pounds of butter a year, which is valued at over \$30,000,000. If Ireland could be awakened to her natural advantages, breed efficient dairy cows and feed and care

for them properly, she could easily be a great dairy country. Denmark,—only one-third the size, and lacking the natural advantages of soil and climate,—exports over twice as much butter.

Like many Americans, the Irish dairyman is so exceedingly short sighted that he cannot see that an extra yield of 2,000 pounds of milk, worth \$25 a year, in a single year will alone more than make up the difference in the butcher's price between a special dairy cow and a dual purpose cow at the end of her lifetime.

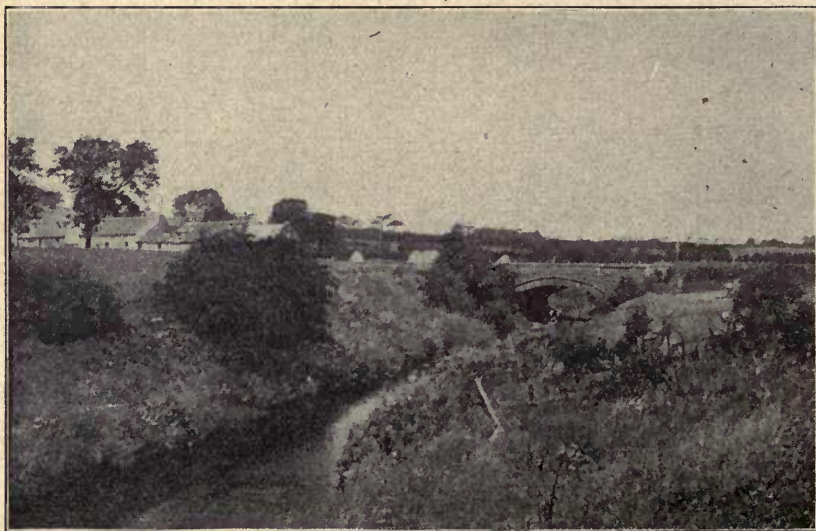
The slack methods followed by many dairymen in some parts of Illinois are but little better than those in Ireland, and without improvement it must follow that we have a class of dairymen who are merely existing in a country where the land is fertile and the market for high grade dairy products good.



IRISH COW MARKET, DUBLIN.

SCOTLAND

The dairy region of Scotland is confined almost exclusively to the southern part of the country, and this is the only section that will be discussed. The general appearance of the country is much the same as that of England, the larger portion being in grass, either pasture or meadow, and the crops grown are also similar. It seems like a mistake to till so little of the land, when compared with the more intensive methods of Denmark, where nearly all of the land is under cultivation. Yet grass grows so luxuriantly that it gives a fair return per acre.



AT THE EDGE OF THE VILLAGE OF FENWICK, SCOTLAND.

FARM MANAGEMENT

The usual rotation is oats, oats, hay, hay, pasture for from five to nine years. The methods of seeding, caring for the pastures, and harvesting are much the same as have been described under England. The farms vary in size from 60 to 300 acres, and some are as large as 1,000 acres, but the average is about 100 acres. On a good farm of this size are usually kept 24 cows, 7 or 8 two-year-old heifers, 7 or 8 yearling heifers and the same number of calves. Most of the farms are rented. The rent varies according to the productiveness of the land, and averages \$7.50 an acre. As a rule, land valuation is not in-

creasing. In some sections land is decreasing in productiveness because less money is spent in keeping up tile drains, and on account of lax methods of farming, one of the reasons for the latter being the lack of laws protecting the tenant farmer from the unscrupulous methods of the landlord. The present laws seem to put a premium



CURING HAY. WHEN DRY THE COCKS ARE PITCHED INTO THE SMALL STACKS AND AFTER ABOUT THREE WEEKS THESE ARE TAKEN TO THE BARN.

on poor farming, for if a tenant improves his farm, making it more productive, he is almost sure to have his rent raised at the expiration of the lease, and this all tenants very much dread. As a rule, a tenant stays on the same farm for a long number of years, and occasionally



BROAD, ROLLING PASTURES OF SCOTLAND. AYRSHIRE HEIFERS IN FOREGROUND.

a line of tenants remain on the same place for one or two centuries. Land has been known to change hands three times, yet the same line of tenants remain on the farm.

Scotch dairymen say that the size of farm most profitable is one which can be run by the family, without hired help, which is often

expensive and inefficient. Married men get \$225 a year, with house and potatoes furnished. Single men receive from \$175 to \$190 and board.

DAIRY CATTLE

In this section of Scotland dairying is almost the sole occupation of the farmers. The cows kept are practically all high grade or pure-bred Ayrshires, and as a class are efficient and economic producers. Heifer calves from the best cows are raised on all the farms. A good registered Ayrshire cow brings from \$125 to \$200 and a good grade cow \$80 to \$100. Heifers drop their first calf at from 2½ to 3 years of age. The cows that are good producers are kept as long as they are healthy. The poor milkers are disposed of while young, on the dairy market, to other dairymen, or fed for beef. In many herds in Scotland are cows twenty years old, and still good producers, but in herds which are fed heavily on grain they do not last as long, and the oldest cow is not more than twelve years old. As a rule, the sires



A TYPICAL SCENE IN AYRSHIRE.

used are from high producing dams, rather than show stock. On farms where milk is sold for direct consumption the cows are usually dry for six weeks, and on farms where cheese is made, the cows are frequently dry for three months during the winter. The best dairymen expect to receive \$100 per cow per year, when the milk is sold at an average price of \$1.40 per 100 pounds. To show the efficiency of the Ayrshire cows it is only necessary to state that the production on 18 farms near Kilmarnock in 1907 reached the high average of 6,920 pounds of 3.9 percent milk per cow, including heifers with their first calf. In comparing the yield of the Ayrshire cows in Scotland with the cows in the United States, consideration must be given to the fact that the cows in Scotland are fed very little grain.

About one-half of the cows in Scotland are milked by women and girls, and the average is eight cows to the milker. Cows are milked regularly twice a day, and in most herds the milkers are rotated around the herd in a regular order, so that a cow is not milked twice in succession by the same person. This is the universal practice fol-

lowed in Scotland, the explanation of it being that if there are any poor milkers, they will not spoil a given number of individual cows. In this particular, Scotland is unique, as in all other dairy countries visited, each milker milks the same cows regularly. Scotch dairymen admit that if all the milkers are good, it is best to have them milk the same cows regularly, but if some of the milkers are poor, it is best to rotate them in this manner.

There are two types of Ayrshires in Scotland; the show type and the producing type. The show type has been developed for the show ring, and bred for beauty alone. The genuine show udder must be compact and closely attached, both before and behind. The sole must be flat, with no indentations between the teats, and the udder must not protrude behind, but be carried up even with the thighs, and have small cylindrical teats, evenly placed on the flat bottom. This is the only kind of udder that can be shown many years in succession and not become too pendant for the show ring. Any intelligent dairyman knows that this type of udder is fleshy and does not belong to the best producers. This craze for tight, close, shallow udders started in the show ring about twenty-five years ago. It has been of untold damage to the Ayrshire breed, and has split the breeders into two factions,—one of which is breeding for show, and the other for production. The breeders who are breeding for production belong to test associations and keep accurate records of their cows. The latter cows have good udders that milk well away, and large, soft teats that are easily milked. One of the best authorities in Scotland



AYRSHIRES, THE DAIRY COW OF SCOTLAND.



AYRSHIRES WAITING FOR THE MILKING HOUR.

upon this subject says: "The show ring has been a curse to the Ayrshire breed. Ayrshires would be a different breed today had there never been a show. The leading exhibitors of show Ayrshires of the flat, fleshy udder type have not made money, even if they have sold their stock at large prices, because they did not get enough milk to bring up the profits. One of the leading exhibition herds produced only half as

much per cow as did another herd bred for production alone. This shows the folly of running to fads. You American dairymen are making a great mistake in allowing showmen to be your importers, as they are taking over only the show type. By this means you are losing, to the American Ayrshire, the advantages of our record Ayrshires in the economy of milk production."



AYRSHIRE CALVES AT FEEDING TIME.

As an illustration that show Ayrshires are not producers, the ring of aged cows at the Royal Agricultural Show last year is a good illustration. The cows placed at the lower end of the show ring were at the head in the production class. They stood as follows:

Inspection class.....1, 2, 3, 4, 5.
 Production on yield of milk.....5, 4, 1.

The cows receiving 2 and 3 in the inspection class were not shown in the production class.

Record Ayrshires are gaining rapidly in popularity. At the Highland Show Ayrshire cows must produce, the night and morning before the exhibition, 36 pounds of milk, or they are not eligible to enter the show ring. This has the advantage of preventing the cows being bagged before showing. To prevent fraud in all competitions, cows are milked out in the open. Foolish fads are gradually passing away, and at the present time color does not count for much, in the Ayrshire show ring in Great Britain.



PROMISING YOUNG AYRSHIRES.

FEED AND CARE

The cows are usually given nothing but pasture during the summer from May 10 until September. After this they get the aftermath in the meadows, which keeps them until about November 1. Soiling crops are not fed, excepting some cabbage in the fall. The amount of pasture required per cow for the summer will vary from one and one-half to three acres, depending upon the land. During the winter, dry cows are fed some roots, and all the straw they will eat, but no hay or grain. Cows giving milk usually receive about 12 pounds of straw, 6 pounds of hay, and some grain,—the amount varying greatly, de-



MILKING TIME IN A SCOTCH STABLE. RECEIVING PAILS IN FOREGROUND.

pending upon the production of the cow. The Scotchman feeds his good producers well, but does not waste grain on dry cows or those giving a small amount of milk. As a rule, the grain consists of bean meal, Indian corn meal, oil cake, bran and dried brewers' grains. The cows are turned out each day for a half hour during the winter to drink from a pond, stream or trough. They are given warm slop in the stable at mid-day.

Calves are never allowed to suckle their dams, but are fed whole milk for six weeks, then skim milk or whey with an addition of oil cake until they are five months old. After this they are given nothing but good pasture, when it is available. Yearling heifers are maintained exclusively on pasture during the summer, and in the winter they are given oat straw with 2 pounds of cake per day, or hay and no cake.

FARM BUILDINGS

The buildings on the farms are usually made of stone, with slate roofs. These are naturally substantially built, and many of them last for more than a century. The buildings are usually placed around an open court,—the house on one side, with the cheese room and cow stable forming the side adjacent to the house, and connected with it. The hay barn forms another side, usually connected with the cow stable, and the horse barn and tool shed



BUILDINGS OF A SCOTCH FARMER. HOUSE IN CENTER, COW BARN ON RIGHT, AND TOOL SHED ON LEFT, FORMING A COURT IN CENTER.

are on the fourth side.

The cow stable is always one story, with both windows and ventilators in the roof. The stalls are double and the cows head directly against the wall, with no feed alley in front. The floor is of cement or brick, and the whole stable is exceptionally clean and sanitary. The sides and stalls are kept neatly white-washed and the floor is scrubbed every day. These are the conditions on the average cheese farm in Scotland.



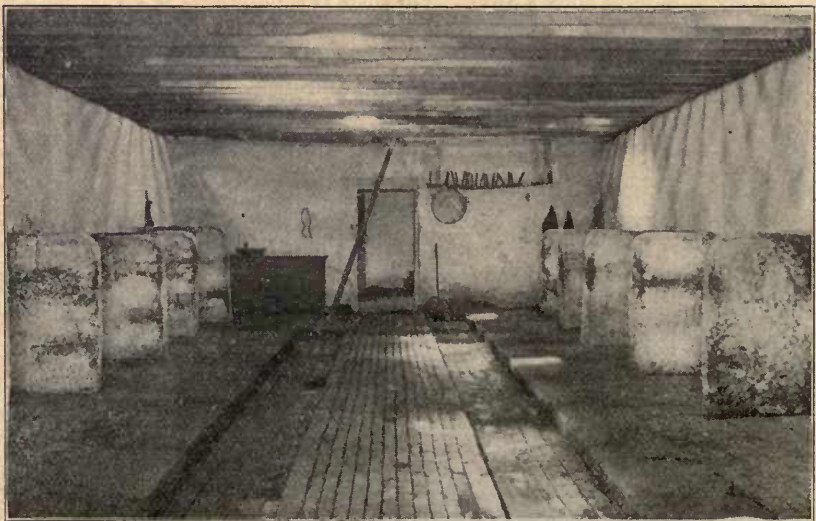
DAIRY BARN AND HAY BARRACKS ON A FARM
IN SCOTLAND.

CITY MILK SUPPLY

The method of supplying milk to the cities and towns in Scotland is much the same as that of England, which has already been described.

MANUFACTURED PRODUCTS

Most of the milk not used for direct consumption is manufactured into Cheddar or Cheshire cheese, and this is almost universally done on the farm. While this necessarily involves more labor than when made in factories, on the whole a better quality of cheese is se-

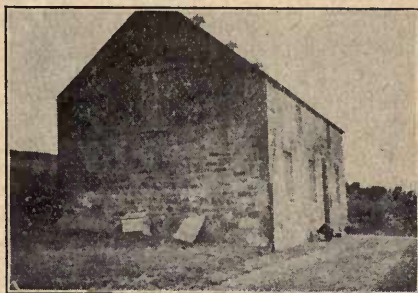


INTERIOR OF COW STABLE. DOUBLE STALLS DIVIDED BY GLAZED TILE PARTITION.
THE FLOOR IS PAVED WITH BRICK, AND IS SCRUBBED DAILY.

cured, and the extra price received more than pays for the increased labor involved.

A cheese making room, always having a cement floor, an abundance of light, and kept in a clean and sanitary manner, is usually close to the cow stable. In this room are to be found all necessary utensils and equipment for making cheese. The cheese is sold, wholesale, for about sixty shillings per hundred weight, which is \$15 per 112 pounds, or 13 $\frac{1}{3}$ cents per pound.

Comparatively little butter is made in Scotland.



FACTORY WHERE THE MILK ON A LARGE FARM IS MADE INTO CHEESE. CURING ROOM ABOVE. NOTE SUBSTANTIAL CONSTRUCTION OF BUILDING, AND VENTILATORS ON ROOF. SCOTLAND.

HIGH POINTS IN SCOTCH DAIRYING

For the American dairyman, the striking features of Scotch dairying are the uniformly good cows kept, the excellent care given them, and the attention paid to feeding them economically on a small amount of grain, never wasting concentrates on cows that are not producing heavily.

To the Ayrshire and dairy interests of America, it is imperative



BUILDINGS ON AN AYRSHIRE DAIRY FARM. IN THIS CASE THE STABLING FORMS THE SQUARE COURT AND THE HOUSE IS OUTSIDE, BUT ADJACENT.

that the Ayrshires imported be not of the show type, but the magnificent producing record Ayrshires so often seen in Scotland. When we consider the low efficiency of the average cows milked in America,

compared with the average Ayrshires milked in Scotland, it is easy to see the great possibilities yet unattained by the dairymen in this country.

To the American cheese maker, the excellence of Scotch cheese is well known, yet the secret of the success in making cheese of such a high quality lies not so much in the skill of the cheese maker as it does in the care taken of the cows, stable, cheese room, and utensils, thus keeping the milk clean so that it is delivered to the cheese vat in almost perfect condition.



A LABORER'S COTTAGE, SCOTLAND.

AGRICULTURAL SHOWS

No discussion of dairying in the British Isles is complete without mentioning the influence of the agricultural shows.

The British appreciate an agricultural exhibit as do no other people in the world, and if there is one thing they do know how to do better than another, it is to arrange and conduct such an exhibition in a high class manner. Their shows are quite unlike American, and we



PARADE OF DAIRY CATTLE, BATH AND WEST AGRICULTURAL SHOW, ENGLAND.

can learn many valuable lessons from our British cousins in this particular. No horse races, side attractions or catchpenny schemes of any kind are allowed on the grounds; the people attend to learn instead of to be merely entertained by some fake show, as is too frequently the case in this country. Another most commendable feature is that everything is in readiness the morning of the first day. All exhibits must be up and completed the night before the show opens or



JERSEYS BEING JUDGED. ENDS OF DAIRY SHEDS IN BACKGROUND. ROYAL AGRICULTURAL SHOW, ENGLAND.

leave the grounds at once. Coupled with this fact the judging begins early the first morning and is vigorously pushed, thus making the first day much the best of all, which is a great advantage, as it makes every day interesting and people are not obliged to wait until the last day to see how the ribbons are to be tied.

There are many smaller agricultural shows held in the different shires, but as they are quite similar, excepting in size, a description of the Royal, the Bath, and West Agricultural Shows of England will suffice.



AYRSHIRES IN SHOW RING. ROYAL AGRICULTURAL SHOW, ENGLAND.

The general scope of the work of the Royal Agricultural Society, under the auspices of which the Royal Show is held each year, is well summed up in the Society's motto: "Practice with Science." In England everyone is interested in agriculture, from the King down to the lowliest laborer, and no man is considered well educated unless he possesses a reasonable knowledge of the subject. The entire royal family hold memberships in the Royal Agricultural Society.

The most prominent farmers and breeders come together at this show to study the best specimens of live stock the country can produce and to exchange ideas as to the best methods of breeding, feeding and handling live stock. They also see the latest inventions and most improved implements and machines for doing all kinds of agricultural work. Some idea of the extent of this exhibition may be gained from the fact that the grounds cover 100 acres and the exhibits are placed close together. This show has not been permanently located, but has been moved each year, thus necessitating temporary buildings, which, however, are very comfortable. Owing to the vast amount of work to be done to get everything in readiness on grounds of this size, the work begins about six months prior to the show, and by the time the opening day arrives everything is completed.



DAIRY SHORT-HORNS IN MILKING CONTEST. ROYAL AGRICULTURAL SHOW, ENGLAND.

The judging began the first morning at nine o'clock and was vigorously pushed, as may be imagined, when we consider that at the Royal there were about 700 entries of cattle, the same number of

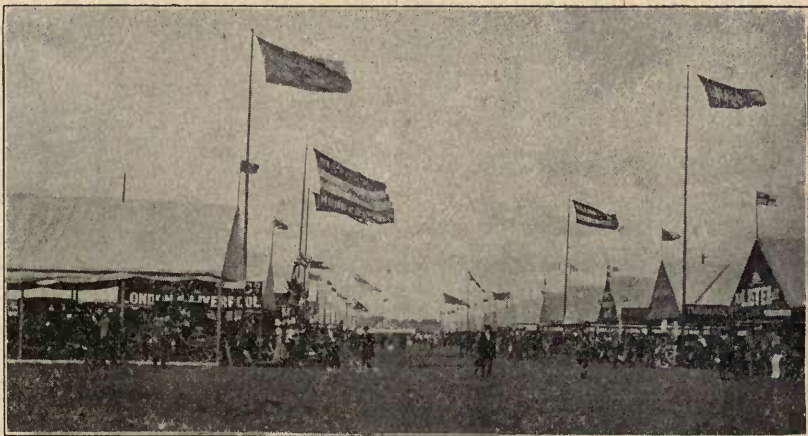
horses, and nearly as many of sheep and hogs, yet the judging was practically completed by noon the first day.

The dairy breeds were represented by Ayrshires, Jerseys, Guernseys and Kerreys, the Short-Horns being exhibited as a strictly beef breed, the same as in this country. There was, however, an exhibit of unregistered dairy Short-Horns. The cattle were paraded each morning in an immense ring, which was surrounded by a crowd of admiring spectators. In the afternoon the horses were paraded, and later in the day judging of the harness classes took place. There were at all times large crowds around the show rings, stalls and pens. People came from all parts of the British Isles to attend this show, which lasted six days, and one day 52,000 people were admitted to the grounds. The amount of money offered in premiums was nine thousand, nine hundred and sixty-nine pounds, or about \$50,000, exclusive of the champion prizes and many valuable medals offered by the different breed societies.

Besides live stock there was an extensive exhibit, numbering more than four hundred stands, of all kinds of agricultural and dairy implements and machinery, from small hand tools to harvesting and threshing outfits, and a large number of wagons and vehicles of all kinds and descriptions, consisting largely of carts, many of which were heavy and high.



GUERNSEY STABLE. ROYAL AGRICULTURAL SHOW, ENGLAND.



ONE OF THE AVENUES IN THE DAIRY AND FARM MACHINERY EXHIBIT. ROYAL AGRICULTURAL SHOW, ENGLAND.

The most attractive part of the dairy exhibit was the working dairy, which was located in a large building erected for the purpose and which accommodated forty hand churns and butter workers. In this building could be seen some kind of dairy work in progress at all times during the show. Separating, pasteurizing, and cooling milk occupied the morning hours and later each day two butter-making competitions for prizes, by dairymaids, took place. These contests were well filled and revealed many excellent buttermakers. There was a milking contest which was rather a novel feature and created a great deal of interest. Each contestant was required to milk three cows. Dealers in dairy apparatus and machinery had many fine stands. This was a most interesting part of the show, for both the separators and utensils used were quite different from ours.



WORKING DAIRY. BATH AND WEST AGRICULTURAL SHOW, ENGLAND.

It is difficult to describe an English show so that one who has not been in attendance can really appreciate its value, but a week's stay at the Royal Agricultural Show of England is well worth a trip across the Atlantic.

DAIRYING IN HOLLAND

The time spent studying dairying in Holland was devoted to the richest and most intensive dairy regions, viz., the provinces of North Holland and Friesland, which take the lead in both quality and numbers of dairy cattle. It is to this section of the country that the following description is devoted.

On the first visit we entered the country thru the Maas river, and as we steamed slowly up for thirty miles to the city of Rotterdam we received our first impressions of Holland with its numerous canals, level fields, and beautiful herds of dairy cattle. The richest and best agricultural sections of the country lie below the level of the sea and have been rescued from it by means of dikes, canals and windmills.



ROAD ON TOP OF THE DYKE RUNNING AROUND THE ZUIDER ZEE. THE WATER IN THE SEA ON THE RIGHT IS 12 TO 15 FEET HIGHER THAN THE LAND ON THE LEFT. NOTICE MEADOWS DOTTED WITH CATTLE.

Sailing up the river we saw cows in the pastures and hay being made in the meadows several feet below the level of the river. Coming into port, after crossing the Zuider Zee, all that could be seen from the deck of the steamer was the roofs of the houses in the village. The whole country is a perfect network of canals and is thickly dotted with large, picturesque Dutch windmills. Near Zaandam sixty-five of these mills could be counted from the train window at one

time. In many portions of the country the canals, which are from ten to twenty feet wide, are not more than ten rods apart. The water flows slowly along, being gradually pumped to higher levels by means of engines or large windmills, until, after passing for a long distance thru large canals with immense dikes on either side, it finally reaches the sea.

Something of the energy of the Hollanders can be imagined by considering that all the country roads are either macadamized or paved with brick, and that all of the water has to be pumped out of the country and kept from one to two feet below the surface of the land. The ditches formed by this drainage system are divisions between the fields, making fences unnecessary excepting along railroads or to enclose small paddocks. A passage from one pasture to another is afforded by a bridge over the canal, or sometimes by filling in earth over large tile, so as not to obstruct the flow of water. Posts are set on either side and a gate closes the passage.



WINDMILL AND ENGINE HOUSE USED FOR PUMPING WATER FROM CANALS INTO THE ZUIDER ZEE ON RIGHT. A LARGE STORAGE RESERVOIR EXTENDS FROM THE MILL BEYOND THE ENGINE HOUSE. THIS CONTAINS A RESERVE WATER SUPPLY, AND IN DRY TIMES CAN BE LET BACK INTO THE CANALS IF DESIRED FOR IRRIGATION PURPOSES. SEA WATER CANNOT BE USED ON ACCOUNT OF THE SALT.

Holland contains but 8,000,000 acres, or less than one-fourth the area of Illinois, only one-third of which is really good land, as large tracts in the eastern part are merely peat or barren sand. This comparatively small area of land, equivalent to one-twelfth the area of Illinois, has developed important things, agriculturally. The size seems to be no hindrance to progress, as over five million inhabitants, noted for their thrift and cleanliness, make their living on this small area. Their exports are \$14,520,000 worth of butter and \$12,480,000 worth of cheese, making a total of \$27,000,000 annually. At this rate, Illinois would have to export \$108,000,000 of butter and cheese.

Most of the farms are owned by the men operating them. These energetic farmers keep their places in the best of condition, and drive to town in a substantial, well finished two-wheeled carriage, behind a sleek, chunky, active horse. A poor farmer is seldom found, as the life of the Hollander has been devoted to the one subject—dairying—and his education has been such as to make him appreciate the importance of thoro, careful methods. His children are well educated, and in some cases are sent to another country to complete their study of foreign language.

From an agricultural standpoint, Holland is one of the most interesting dairy countries in the world. Tho frequently ignored by tourists, it is full of interest, instructive sights, and quaint old customs.

Their conditions differ so markedly from ours in many respects that it is impossible for us to learn much from them that we can copy directly, yet there are many underlying principles which are worthy of our most careful study. The foresight shown by these people in providing permanent roads, buildings, and equipment for their dairy work, and many of their cleanly methods could well be studied and copied on this side of the Atlantic.

FARM MANAGEMENT

There is little grain farming or mixed husbandry in Holland and almost no stock is to be seen excepting dairy cattle. Dairying is the principal occupation of the Dutch and the greater portion of the land is either in pasture or meadow. Milk production is practically a grass proposition. Plows and grain raising are almost unknown in the intensive dairy sections.

The farms are much smaller than with us. They vary somewhat in size with the locality, but usually contain about twenty-five hectares, or sixty acres. On farms of this size the live stock will usually consist of about twenty-two cows, nine heifers, forty sheep, fifteen pigs and one or two horses. Of this land



REAR VIEW OF FARM BUILDINGS SHOWING MANURE PILE WHICH IS TO BE SPREAD ON THE PASTURE IN AUGUST.



A FAMILIAR SCENE DURING SUMMER IN A HOLLAND COW PASTURE.

about ten hectares is devoted to meadow and the rest pastured, as dairying is conducted on a strictly grass basis. There is such an abundance of moisture that the grass grows very luxuriantly and some seasons great difficulty is experienced in curing hay.

Early May sees the cows turned to pasture, and the method of feeding for six months is then very simple, as the cows only crop the grass in the pastures. It is rare to find a field larger than five acres, so the cows are easily restricted to a small area and are frequently changed from one pasture to another, so that the grass may be renewed in growth and freshness. A drought in July or August may cause a shortage of grass, and some oil cake may be fed, but as a rule the cows subsist for six months on grass alone. An exceedingly wet season causes the grass to grow in excess and if it is too wet to be cured as hay it is cut and put in the ground or stacked and covered with mud for use as grass silage.



GATEWAY TO A HOLLAND PASTURE. THE CANALS MAKE FENCES UNNECESSARY. THE BRIDGE OVER THE CANAL IS THE USUAL COMMUNICATION AFFORDED BETWEEN PASTURES.

As the Dutch dairy farmer has nothing but grass, and no land to plow or crops to till, it would seem that he would have an easy time during the summer, but a closer acquaintance with his methods shows that this is not the case.

The pastures and meadows receive special care. Thru the summer the pastures are gone over at frequent intervals and the cow droppings gathered with shovel and wheelbarrow and placed in piles, thus preventing the waste occasioned by fouling the grass, and the tufted appearance so often seen in our pastures. During the winter these droppings, having decomposed, are again spread upon the pasture. The fields are usually pastured one season and in meadow the next. The manure from the winter before has been carefully stacked

and rotted, and the liquid confined in a cistern. In August this well rotted manure is hauled onto the pasture by means of a three-wheeled, one-horse wagon. The manure is put in piles of two to three hundred pounds each, 25 feet apart, making an application of from eight to ten tons per acre. These piles are later carefully and evenly spread over the land and after each pile is spread the man goes over the ground, hitting the chunks a glancing blow with the fork so as to pulverize it all very thoroly. Besides this, the cleanings from the canals, the mud and rank growth of soft reeds and water plants that are yearly removed when the sides of the canals are cut down, are placed in piles, and after they are thoroly rotted are applied as fertilizers to the land.

Some meadows are cut twice in a season, and under ideal conditions it is not infrequent for the grass to grow as much as fifteen inches in a single month. Their method of handling hay seems crude, indeed, to an American farmer. The grass is cut with a scythe and raked by hand. The Dutch farmer claims it is cut closer and that less injury is done the soft sod by this method. When once begun, the mowing proceeds uninterruptedly, regardless of the weather. When partially dry the hay is put into small cocks and later, as the curing advances, these are piled into larger ones, and so on until it is sufficiently dry for the mow, when it is hauled to the barn in a one-horse wagon. It often happens that these piles are wet thru by rain and have to be re-spread and dried, so that the hay may lose its greenish color and aroma, but mustiness or decay is never permitted, and the cows relish the hay as their winter ration.

DAIRY CATTLE

One of the first things that attracts the attention of the traveler in Holland is the large number of fine black and white cattle. Thick as are the sheep on the Cheviot Hills of Scotland, even more numerous seem the black and white cattle on the level pastures of Holland. Everywhere, as far as the eye could reach, the landscape was thickly dotted with fine cows. A more beautiful dairy scene could scarcely be imagined. History tells us that for two thousand years the country now known as Holland has been famed for its cattle. For the last two or three centuries these cattle have possessed good dairy qualities, which have been gradually improved until we find today a breed of dairy cattle of a high order of excellence. Altho only a small percent of the cows are registered, practically all look like pure-breds.

Importations of Holstein-Friesians to this country did not become frequent until about forty years ago, but they have spread rapidly, and at the present time are found in every state in the union.

Successful dairying depends largely upon efficient cows, keeping them comfortable at all times by properly supplying their wants, and treating them kindly. In this particular the Dutch cannot be excelled.

In establishing so fine a breed of dairy cattle, they owe their success, in no small degree, to the careful selection of their breeding stock. Only a few of the choicest bulls are kept for sires and the

greatest care is also exercised in selecting females. The cows, as a rule, are excellent individuals,—a threefold method of selection being employed: first, in the sire; second, in the young calf, judged largely by the milking qualities of the dam; and lastly, the greatest of all tests is applied,—performance at pail. Not till the cow answers this satisfactorily is she accorded a permanent place in the dairy.

In America nothing but black and white Holsteins are eligible to registry, and red and white are met with only occasionally, while in Holland the red and white are seen in all parts of the country. In the province of Friesland are three men who are breeding nothing but red and white Holstein-Friesians.



MILKING TIME IN HOLLAND.

One of the most interesting features of the trip thru Holland was a visit to the farm of Mr. Kuperus. For many years this gentleman has been one of the largest exporters of Holstein-Friesian cattle to the United States and elsewhere. He has an exceptionally fine herd of dairy cattle and keeps a careful record of each cow in the herd by testing the milk every two weeks. The average yield of thirty of his best cows for one year was 11,275 pounds of milk and 394 pounds of butter fat. The average lactation period was 306 days and no cow was milked more than one year. His best cow gave in 329 days 18,986

pounds of milk and 585 pounds of butter fat. He has one cow with an average test for the year of 3.89 percent butter fat. This shows something of the character of the cattle that Mr. Kuperus is breeding and it is not strange that he has won many prizes at the different agricultural shows where he has exhibited.

At the present time there are over 250,000 cows in Friesland, 15,000 of which are registered. Test associations started in the province of Friesland eight years ago, and today there are over two hundred of these associations, having twelve members each.

Cattle markets are held once a week in many of the towns. One section of the market is devoted to discarded dairy cows which are sold for beef. Another section is devoted to springers and cows in milk which are to be sold to dairymen in South Holland. The cows sold on these markets are usually of an inferior quality. At Leeuwarden there was a large market for heifer calves, which go to South Holland to be raised, and later many are sold from there to Belgium for milk and beef. Registered cows of good quality are worth from \$120 to \$200.



THE COWS ARE BROUGHT INTO A SMALL PASTURE AT MILKING TIME. AS SOON AS DRAWN, THE MILK IS TRANSPORTED TO THE CHEESE FACTORY IN THE CANS ON THE DOG CART AT THE GATE.

FEED AND CARE

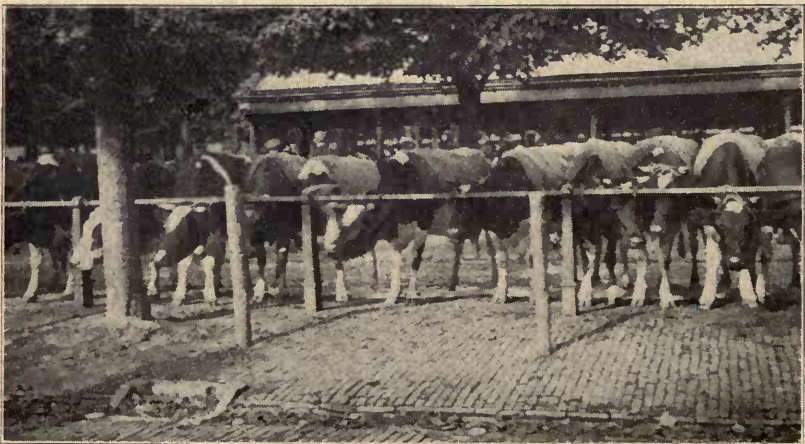
The cows are turned to pasture about May first. During the cold, damp days of early Spring the cows wear blankets in the pasture to protect them from the weather. At milking time they are not driven to the barn, but are milked in the pasture or a paddock, and the milk brought back with a horse or dogs and cart. At the approach of the cold winds of November the cattle are taken from the pastures and put into the stable and not let out again until the following spring.

The feeding is done by the farmer, and all the feed, and many times the water, is carried in between the cows from the rear. The winter grain consists almost entirely of oil cake, fed only to the heavy milkers in quantities of from two to four pounds a day. The principal feed, however, is hay, each cow receiving nearly thirty pounds daily. It takes the great capacity of these cows to handle such a large quantity of roughage, and special care is taken to see that they are always ready for their feed. The cows are given the best of care. They are carefully curried and their tails suspended by a string from the ceiling, so that while the animal has free use of its tail, it can never get into the gutter to be fouled. Scarcely an hour passes, day or night, that the cows are not visited by an attendant. They are watered, fed, and milked with the greatest regularity, and given every comfort possible.

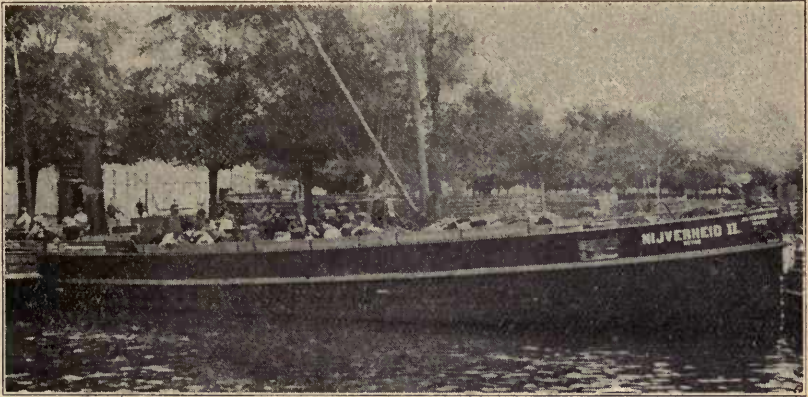
Caring for the cows, gathering food for them, and the manufacture and sale of the product occupies the attention of the Hollander to a degree difficult to understand unless one has paid them a visit. Holland is often called the cow's paradise, and it well deserves the name.



CALF MARKET, LEEUWARDEN, HOLLAND.



"BEAST MARKET," LEEUWARDEN, HOLLAND, WHERE HUNDREDS OF FARMERS, IN THEIR LONG BLUE FROCKS AND WOODEN SHOES, GATHER ONE DAY EACH WEEK.



MARKET DAY IN LEEUWARDEN, HOLLAND. A BOAT BEING LOADED WITH COWS.

HOLLAND COW STABLES

It is not easy for a stranger to gain access to a Holland home, but it was our good fortune on both visits to Holland, in company with interpreters who were acquainted in the vicinity, to get inside of many farm homes in North Holland, where the house and stable are under one roof. These homes are models of neatness, and are interesting in the extreme. The buildings are commodious, the roof steep and the eaves rather low, usually not over ten feet from the ground.



TYPICAL HOLLAND FARM HOME.

The walls are built of stone or brick and the roof covered with an ingenious arrangement of tile and thatch, giving the building a substantial and artistic appearance. The one building contains the cow stalls, wagon shed, hay loft and living apartments.



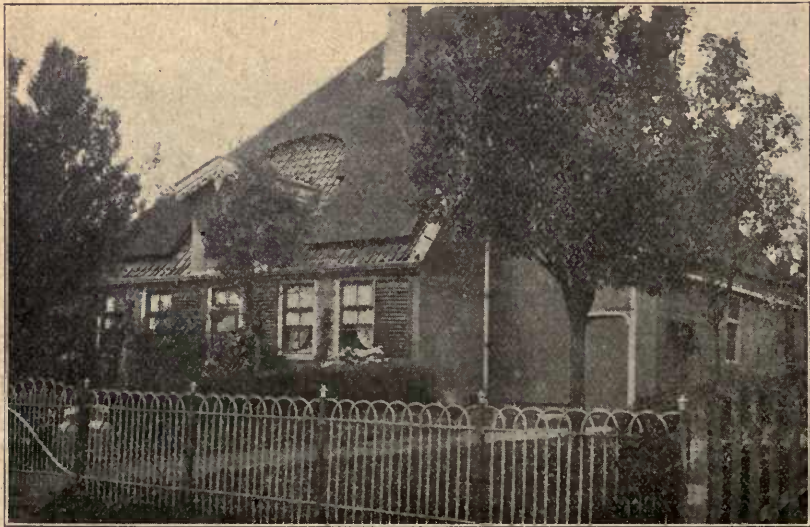
SHOWING THE USUAL LOCATION OF A HOLLAND HOME. THE BRIDGE, AFFORDING A COMMUNICATION BETWEEN THE ROAD AND HOUSE, IS CLOSED IN THE MIDDLE WITH A GATE.

uninviting, and in many cases absolutely filthy place where, to the disgrace of civilization human food is produced. In Holland a cow stable is as clean and carefully cared for as any other room in the house. The Holland cow stable usually contains from twelve to

The houses are usually richly and artistically furnished—much better taste being displayed than is often seen in America. The furniture is of good quality and many times some finely carved old pieces are seen. The Dutch love music, and a piano is not infrequently a part of the household equipment.

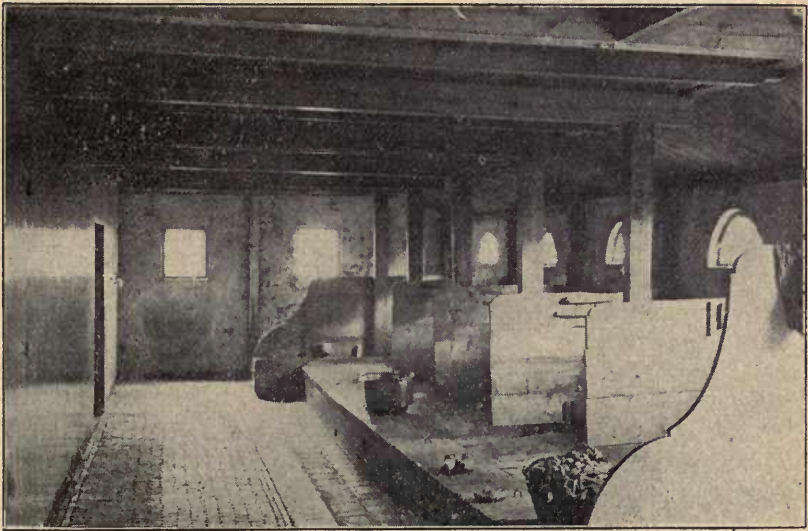
The stables are as different from what we are accustomed to in America as one can well imagine. A cow stable in

America is usually an untidy,



FARM HOME. HOUSE AND COW STABLE UNDER ONE ROOF. DOUBLE DOORS IN BARN. WINDOWS IN PARLOR.

sixteen double stalls, the floor of which is raised about eighteen inches. In one stable this portion of the floor was covered during the summer with small white sea shells; in another it was covered with matting, while the floor behind the stalls was of polished stone. The woodwork in all of the stables was neatly painted a bright blue. Some are elaborately appointed. On the floor of one stable, around each stall was a row of china plates, and at the end of each division between the stalls was a milk stool on which rested a plate. In one stable a polished copper teakettle occupied the stool at each stall and the partitions between the stalls were covered with fine rugs. The small semi-circular windows in front were draped with lace curtains. In one end of this room was exhibited a fine specimen of wood carving. The

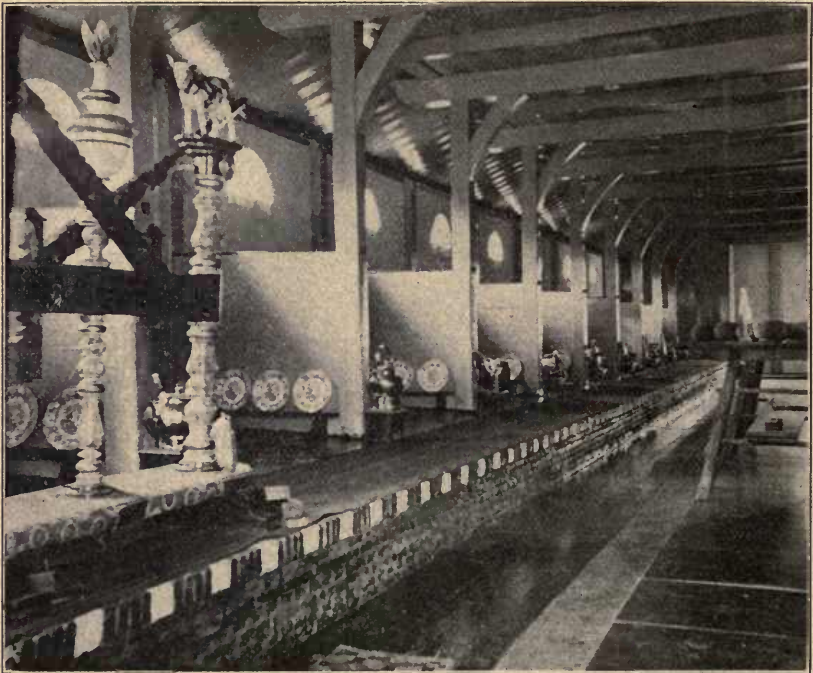


A TENANT FARMER'S COW STABLE IN HOLLAND. NOTE THE RAISED PLATFORM AND DOUBLE COW STALLS WITH WINDOWS IN FRONT.

family frequently occupies a portion of the stable itself. In several instances the dining room was at one end of the stable and either a sewing room or kitchen at the other end. The parlor and other living rooms are separated from the cow stable by a single partition.

When winter comes the plates, shells and carpets are removed. The cows are arranged in the stalls so that the largest ones are in the center, thus giving the herd a more uniform appearance and causing them to make a more pleasing impression upon a prospective buyer. Since so many of the cows are sold for dairy purposes, this is a rather important item in the dairy management. Long and short cows are

lined on the gutter by means of a double tie, the usual rope from the horns being fastened to one side of the stall and a trace chain attached to a wood or iron yoke about the cow's neck is brought back and hooked over a staple in the floor back of the stall partition, thus preventing her moving forward. A backward step would put the cow in the gutter, and as its bottom is about three feet below the stall floor, one step over the edge is usually sufficient to cause the cow to remember the occurrence and recover herself on the slip edge that protrudes some four inches a little way below the platform on which she stands. This ledge is also used to support the portable approach used to span the gutter while placing the cows in the stalls.



A WELL-TO-DO FARMER'S COW STABLE IN HOLLAND. STALLS FOR COWS DECORATED WITH PLATES, COPPER TEA KETTLES AND WOOD CARVING. LACE CURTAINS AT WINDOWS. EDAM CHEESE CURING ON TABLE AT RIGHT. THIS IS THE WAY THE STABLE IS FURNISHED DURING SUMMER MONTHS WHILE COWS ARE ON PASTURE.

CITY MILK SUPPLY

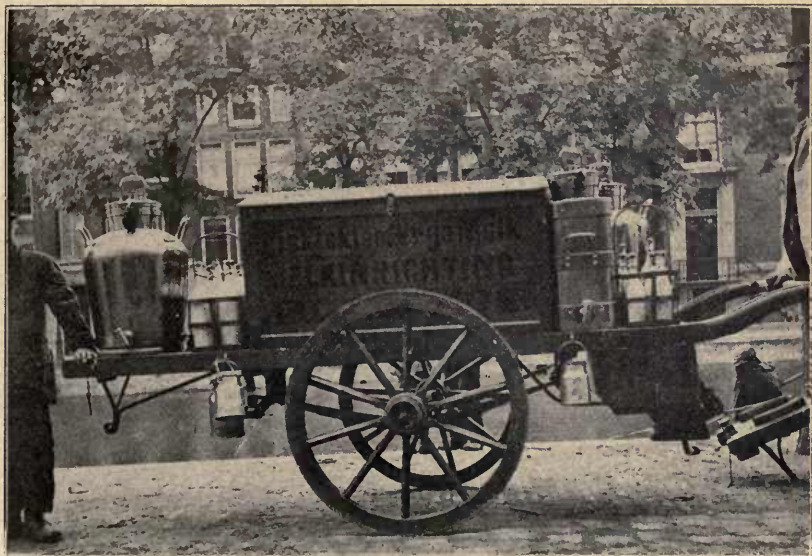
The greater part of the milk consumed in the large cities of Holland is distributed thru central supply houses or milk depots. A visit was paid to one of these depots in Amsterdam where over 16,000 pounds of milk were received and distributed daily. The milk is brought by wagons from farms eight or ten miles out, and by steam

canal boat from a greater distance. It is brought in tin cans or wooden casks holding about six gallons.

In Holland, as in all other European countries, they do not appreciate the advantage of thoroly cooling the milk and holding it at a low temperature. In the smaller towns it is frequently delivered warm from the cow and is at best very improperly cooled in



FARM BUILDINGS IN FRIESLAND. HOUSE AND BARN NOT UNDER THE SAME ROOF, BUT CONNECTED.



MILK DELIVERY CART, AMSTERDAM. BOTTLED MILK IN BOX AND IN CRATES. BULK MILK IN COPPER CASKS.



FARMER'S WAGON DELIVERING MILK AT DISTRIBUTING PLANT, AMSTERDAM, HOLLAND.

the large cities, thus necessitating frequent, delivery, as the milk will remain sweet but a short time after reaching the customer. Nearly half the milk handled by this distributing house is delivered in long-necked, small-mouthed bottles. The greater part of the bottled milk is pasteurized. Milk is sold by measure and not by the amount of butter fat it contains, altho objection is made if the butter fat falls below three percent. The

farmer receives \$1.20 per 100 pounds for the milk. The price delivered to the customer is four cents a quart for whole milk, two cents for skim milk, and twenty-five cents for 25 percent cream.

All milk in Amsterdam is delivered by hand, either in a cart pushed by a man, or carried in pails with a yoke. The supply house which we visited runs fifty delivery carts,—a man and a boy going with each cart. The bottled milk is carried in a box in the middle of the cart and usually on each end is a brass cask having copper hoops and handles. As the Hollanders pay much attention to appearance, these are kept highly polished. There are one hundred men and a large number of boys employed,—the men receiving from fifty to ninety cents a day and the boys ten cents. The cheapness of labor accounts for the popularity of hand delivery.



CHEESE MARKET, ALKMAAR, HOLLAND. SHOWING CARRIERS ON WHICH CHEESE IS TRANSPORTED FROM THE MARKET TO THE BOATS.

CHEESE AND BUTTER

At Rotterdam we made a more familiar acquaintance with the chief product for which Holland is noted, namely, cheese. We paid a visit to the commission firm of Leaming & Sons, who are the largest cheese exporters in Holland. They have shelving capacity for 600 tons of Edam and Gouda cheese, these being the two varieties most commonly made in Holland. In the province of North Holland, Edams are made almost exclusively, and until recently were made in

the farm dairies. During the last few years factories are coming in quite extensively. The Edam is the spherical variety, and when sold in America is stained red. In Holland they are left their natural color—a deep yellow—being stained only for export. The standard size is four pounds, but some are made as large as eight pounds. We saw one installment of Edams that was to be sent several hundred miles up the Amazon river, and each cheese was encased in a bladder. We were allowed to sample cheese of nearly every description; some were made to the queen's taste, and others so tough that it was difficult to get a trier into them. The price ranged according to the quality, varying from seven to twenty cents a pound.

A cheese market is held one day each week in the towns and it was our privilege to visit the towns of Leeuwarden, Pemebrand, Hoorn,



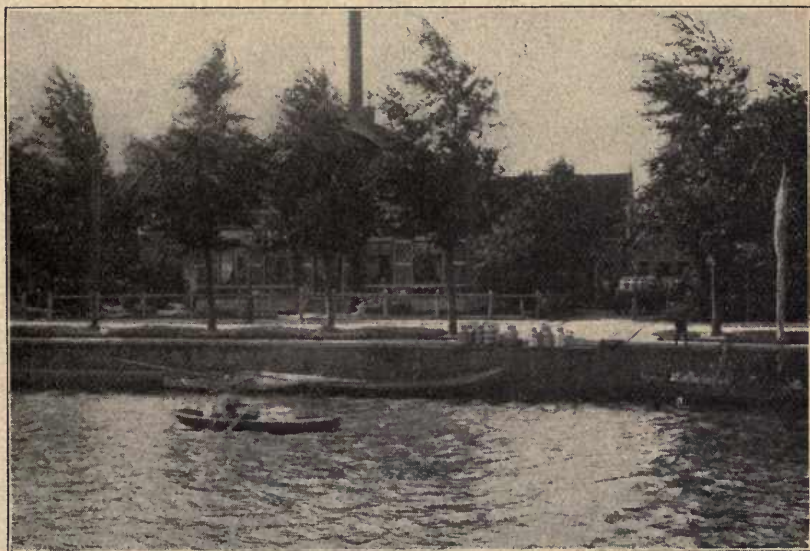
LOADING EXPORT BUTTER AND CHEESE ON BOATS AT THE CLOSE OF MARKET-DAY IN LEEUWARDEN, HOLLAND.

and Alkmaar on market day. One of the largest markets is in the town of Alkmaar, and as these markets are quite similar a description of this one will suffice. The market consists of a government weigh-house and a square block of pavement. On market day the farmers drive in early with the cheese they have made, pile them in neat piles on straw on the pavement and cover them with a canvas to protect them from the sun or rain. Cheese buyers representing commission firms from the different parts of the country are present. Precisely at ten o'clock the gong sounds, the market opens, and the scene is a busy one. In about two hours we saw 60,000 cheese change hands. After being sold the cheese were removed on carriers, each borne by two men, to the official weigh-house, where they are weighed and then packed into boats on the canal near by and taken to the different cities, or stored in large curing houses close by.



CHEESE MARKET, HOORN, HOLLAND. GOVERNMENT WEIGH HOUSE IN DISTANCE.

In the province of Friesland most of the butter and cheese is made in factories, practically all of which are coöperative. There are 70 coöperative factories that receive on the average 25,000 pounds of milk per day. The average price paid the farmer last year at these factories was $4\frac{3}{4}$ Dutch cents per lieter, or practically one dollar per 100 pounds of milk. The butter sold on the average at 25 cents per pound and the cheese at 10 to 12 cents.



DELIVERING MILK TO COÖPERATIVE CREAMERY AND CHEESE FACTORY, LEEUWARDEN, HOLLAND. THIS FACTORY RECEIVED MILK FROM 2000 COWS. ABOUT ONE-THIRD IS DELIVERED BY BOAT ON THE CANAL AND TWO-THIRDS BY WAGON.

Most of the butter exported from Friesland goes to England. It is put in wooden casks resembling a small barrel. Each cask of butter is numbered so it can be traced back to the creamery and to the churning from which it was made. The butter must contain less than 16 percent of water or the manufacturer is fined.

We visited a combined creamery and cheese factory near Leeuwarden that cost \$50,000. This fine brick structure with its slate roof, tile floors, whitewashed walls and ceiling, and everything built in the most sanitary manner possible, is in striking contrast with most of the cheaply constructed creameries and cheese factories in this country, with their soft wood floors, filthy sewers, and general unsanitary conditions. This factory receives 50,000 pounds of milk a day in summer and 16,000 pounds in winter. It comes from 150 farms averaging ten cows each. The milk is delivered twice a day and paid for according to the amount of butter fat which it contains.

FEWER NATURAL ADVANTAGES THAN ILLINOIS

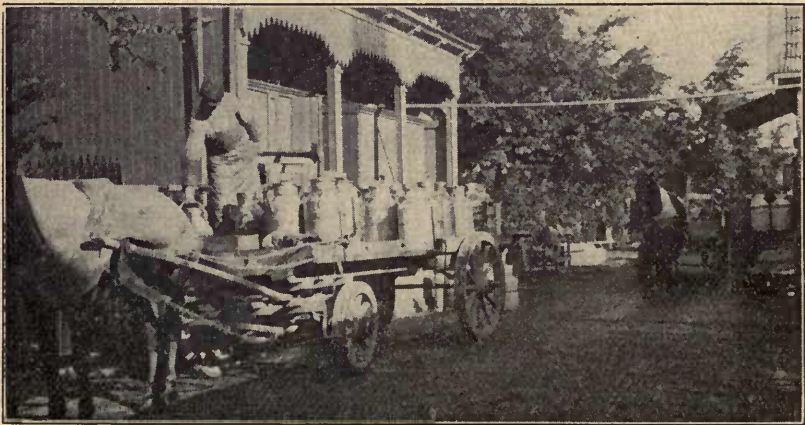
The little country of Hölland supports a population nearly twelve times as dense as that of Illinois, and exports an immense amount of butter and cheese, without the natural advantages enjoyed by the Central States. They do, however, have cheaper labor, and the milk flow is not reduced for three months during the summer by the cows being tormented with flies.



MILK HAULER IN HOLLAND. ONE HORSE WILL HAUL TWO TONS ON THE GOOD, LEVEL ROADS.

Here is a country where the land is worth from \$500 to \$1,000 an acre, and in many cases naturally no better than much of our Illinois land. Yet these people pay their rents or interest on the investment by producing butter and cheese

which they place on the European markets in successful competition with that produced in America on land of less than one-fifth the value. They do this in spite of the fact that they cannot produce the amount of digestible nutrients per acre that we can with either corn or alfalfa.



CREAMERY AT LEEUWARDEN, HOLLAND. UNLOADING AT RECEIVING ROOM ON RIGHT. FILLING CANS WITH SKIM MILK ON THE LEFT.

The secret of their success is easily understood, and may be stated in a few words,—efficient cows, excellent care, coöperation, and superior quality of butter and cheese.

DAIRYING IN DENMARK

Denmark is a country of small land holdings. The chief occupation of the Danes is dairying, and in wealth per capita Denmark is next to Great Britain, but has the advantage of having this wealth distributed among the many. One-half of the two and one-half millions of people in Denmark are engaged in agriculture. These self-respecting farmers live in a style of refinement and comfort that is surprising. They are intelligent, industrious, and honest, and their system of coöperation is based on these conditions. Their interests are those of a small nation given up largely to one occupation and one aim so that the difficulties of one are experienced by the many, and that which is beneficial to one is a benefit to the country as a whole.

It is important for the American dairyman to consider briefly the recent history of the agricultural conditions of Denmark and what has brought about the marvelous dairy development. After the Napoleonic wars the country was worn and wasted. When only partly recovered, the Prussian war of 1864 again brought great agricultural and commercial depression. At this time the chief agricultural pursuit was wheat raising, and it did not take the shrewd, far-seeing mind of the Dane long to discover that a continuance of wheat raising on the already worn and impoverished soil was not in accordance with sound, economic principles. Some radical changes in their general methods of farming were imperative if they were to prosper in any marked degree. It is because of these facts, coupled with their present prosperous conditions, that every American farmer should study what has taken place in Denmark, agriculturally, in the last forty years. Some of the factors that led to their success are here noted.

The history of the rise of dairying in Denmark is one of the most interesting and instructive chapters in Agriculture. It is only a generation ago that the Danes changed from wheat raising to livestock, and the cows of the country were very inferior dairy animals, but by a course of careful, persistent and systematic selection and coöperation they have built up two strictly dairy breeds of a high order, and an efficient system of cropping adapted to the largest possible production of milk. To show what Denmark is producing it is only necessary to mention that she exports annually \$87,000,000 worth of butter, bacon and eggs, nearly all of which go to Great Britain.

As a part of the general movement for reconstruction, the increase of the high schools and all other agencies of education formed no small part. The number of small holdings was also increased and a general system of coöperation started which was followed later by government assistance. Each community, with the help of its neighbors and the government, has worked out its own plan, based on the principles of economic production and co-operation. It is on these two principles that Danish agriculture is built. While the size of the

country lends much to the possibility of a national system of coöperation, the fact that the United States is so large and has such varying aims and conditions does not prevent the application of economic methods, nor does it in any way hinder the development of successfully planned community coöperative interests,—interests, which would greatly aid in the establishment of a uniform product, a dependable basis of supply, and constant markets.

FARM MANAGEMENT

Lying as it does, with the narrow peninsula exposed to the cold north winds, and the islands in a land locked sea, Denmark exposes its area to varying climatic conditions and contains markedly different soils. Compared with the sandy lands of the northern peninsula, the warm, rich soils of the islands are much more productive and enjoy a longer season of growth, calling for different management. It should be kept in mind that the country contains less than 15,000 square miles, or only one-fourth the area of Illinois. On the whole, the land is naturally poor and the climate not congenial. The country lies low and is either flat or undulating. The summers are comfortable, but so short and dry that oats have only time to mature, and of course Indian corn cannot be raised. The cows have to be kept indoors more than half the year.



A TYPICAL DANISH FARMER AND HIS HOME.

The two significant and important factors in Danish agriculture are that ninety percent of the land is owned by the men operating it, and that the greater part of the country is under cultivation. The British farmer has sought economy in putting more land to grass and thus saving labor, while the Danish farmer has found success in the opposite direction. About the only resource of the Danes is their land, and, altho it is in many places poor by nature, they have made the most of it. Improved land laws and systems of land tenure, with education

and coöperation, have gradually changed the agricultural conditions of Denmark from distress to prosperity. Large estates have been divided into small farms that are now tilled by their owners. The careless methods of former days have given place to an intensive and skillful dairying. The beef producing cattle have been displaced by dairy cows until they hold full sway on almost every farm and have brought success and prosperity to Denmark.

The farms vary in size from ten to three hundred acres, the average being about fifty acres. The whole country is given up to the most intensive methods of agriculture, about seventy percent of the farm land being under cultivation, and the thirty percent, that is in grass, is not pastured. A seven year rotation is in general practice, as follows:



A LARGE WINDMILL FOR GRINDING GRAIN.

First year.....	Clover and grass
Second year.....	Clover and grass
Third year.....	Rye
Fourth year.....	Wheat
Fifth year.....	Roots
Sixth year.....	Barley
Seventh year.....	Oats

The land is in grass only two years. The first year it usually grows a strong crop of rye, grass and clover. Part of this is carted to the barn and fed to the cows green, part is eaten off by the cows being tethered on it, and the remainder is made into hay. The second year



DANISH FARM COTTAGES.

in grass, the land is treated the last of April or first of May with the liquid manure which every farmer carefully saves in a cistern. In this way they produce heavy crops of grass, for the first crop is generally good as a result of previous manuring.

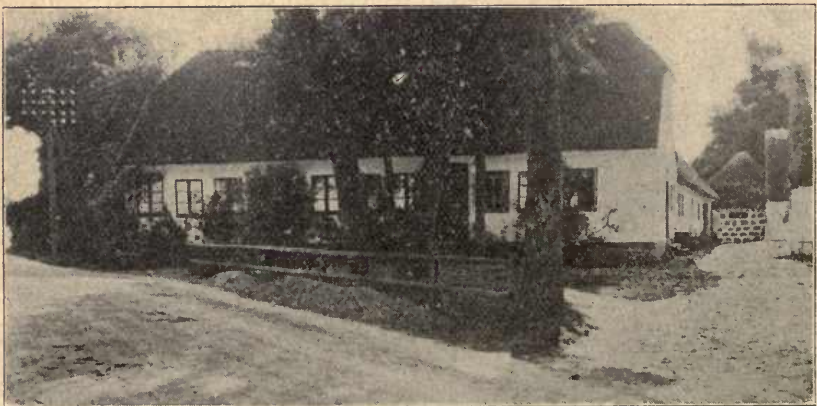
The rye is cut green for early soiling, and from this time until fall the cows are either soiled with green feed in the barn or tethered on it, or both.



A DANISH FARM HOUSE, WITH ROSE GARDEN
IN FRONT.

The aim of the Danish farmer is to keep the largest number of efficient cows possible on a given area. On the large farms a cow is kept to about two and one-half acres, while on the smaller farms a cow is kept on even less area, as more intensive methods are practiced. In addition to this, enough young stock is raised to keep the herd supplied with cows.

From their feeding of cake and meal and the stall feeding of green crops, an immense amount of manure of fine quality is made, and with their careful methods of husbanding the solids in a covered manure pit and the liquids in a cistern, and applying in small quantities at frequent intervals during the rotation, the producing power of their land is increasing from year to year. This, again, increases the number of cows they are able to keep and thus from year to year the country is becoming more productive and more dairy products are being made. But even the Danes have not yet realized the full possibilities of intensive dairying.



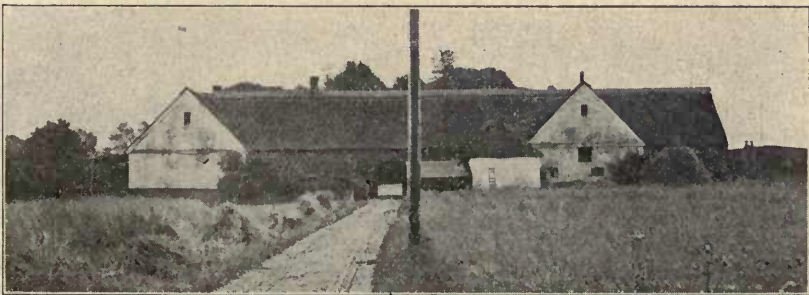
· OLD DANISH FARM HOUSE.

FARM BUILDINGS

The arrangement of the buildings on the Danish farms is quite uniform. They are usually placed in a square around an open court. On the smaller farms the square is frequently incomplete, having buildings on only three sides, while on the smallest farms there are but two buildings, placed at right angles. When the buildings are in a square the house occupies the side of the court toward the road. Opposite this is the hay and straw barn. On one side of the court are the horse stable and cow stable and on the other side the granary, storage for machinery, and the pig sty. In the central court, which is paved with stone, is frequently found a large Danish pump and a horse power for threshing and cutting hay or straw. Outside of this court, but adjacent to the stable, is usually the manure pit, which is walled up four feet on the sides and has an impervious bottom. Many times this has a roof to protect the manure from waste by rain. A cistern for liquid manure is near, and if the manure in the pit becomes too dry to decompose properly, the liquid is pumped onto it. On some of the large farms where the court has more size the manure pit is inside the court.



CORNER OF DANISH COURT SHOWING COTTAGE AND STABLE. STORK'S NEST ON RIDGE OF ROOF.



A LARGE DANISH BARN.

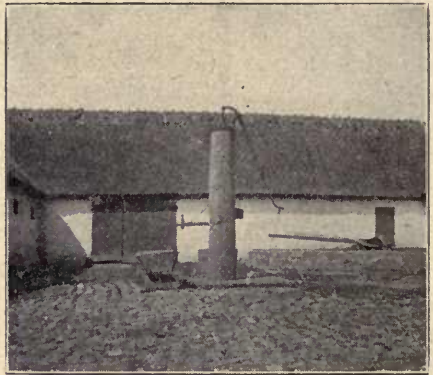


HOUSE ON LARGE DANISH FARM.

This determines the size of the mow for storing hay over the cows.

The cow stable is universally built with a feed alley in front of the cows. In some of the stables the cows head toward the center, and in others they head toward the wall, but are never placed against the wall with no feed alley in front, as in Scotland and Holland. The floors of the older barns are of cobble stones, but in the more recently constructed ones they are of cement. The cows are fast-

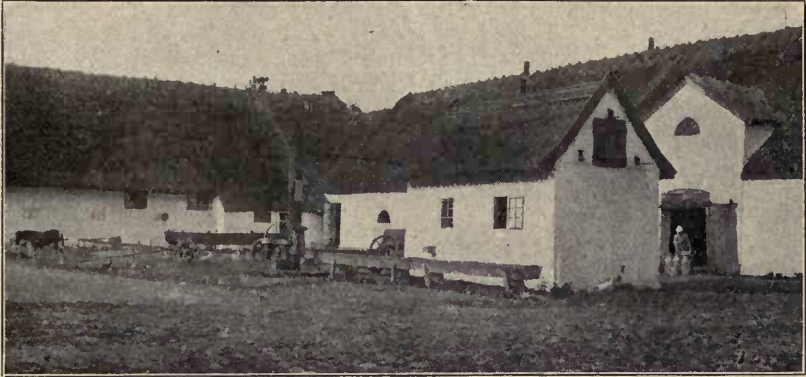
Danish buildings are constructed of stone or brick, and on the older ones the roof is of thatch, held on with cross sticks at the ridge. The buildings are kept whitewashed, and with their thatched roofs present a neat, tidy and artistic appearance. The barns are low at the eaves,—not over eight to ten feet, and the height of the peak depends upon the width of the barn.



STABLE CORNER OF COURT. DANISH PUMP IN CENTER. HORSE POWER ON RIGHT.



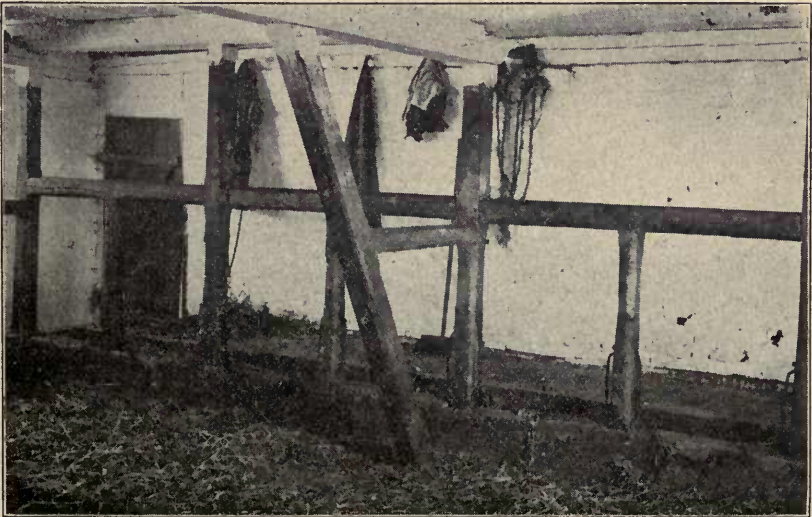
INTERIOR OF COURT ON LARGE FARM. DAIRY ON RIGHT. COW STABLE ON LEFT.



CORNER OF COURT ON A LARGE DAIRY FARM.

ened with a rope around the neck, rods extending from a swivel on this rope below the neck to a perpendicular rod fifteen inches long fastened to a post at either side, giving the cow a considerable amount of freedom with her head. The platform on which the cows stand slopes gently toward the gutter, the latter being about nine inches deep and eighteen inches wide, and connected with the liquid manure cistern.

The houses are neat, attractive and homelike, with frequently a fine rose garden in front and large trees to furnish shade.



INTERIOR DANISH COW STABLE.

DAIRY CATTLE

The million dairy cows of Denmark are confined almost exclusively to two breeds,—the Danish Red, of Zealand and the islands, and the Jyske, or Black and White cow of Jutland. Both of these have been developed within the last thirty-five years from the native stock of the country, by careful selection for milk production. The Red cow is a product of a cross of Schleswig blood on the native rather



LARGE HERD OF DANISH RED COWS TETHERED IN SECOND CROP CLOVER, AUGUST 3.

scrubby cattle. The result is a race of fine dairy cattle, weighing from 1000 to 1100 pounds. They are dark red, with black muzzle, medium size, deep body, medium bone, fine skin and well developed udder and veins. The Black and Whites of Jutland have been developed from the beef breed in use in earlier times. They are a larger breed than the Red cows, resembling the Holstein-Friesians in color and size, but are



THE BLACK AND WHITE COW COMMON IN JUTLAND. HERD TETHERED IN DISTANCE.

shorter in leg and deeper in body than the Dutch cow. Both of these breeds have a distinctively dairy conformation and are good, economical producers.

The development of the breeds to such a high degree in twenty-five to thirty years has been due to the farmers' skill, intelligence and common sense in selecting and breeding for milk production alone, and the efficiency of these cows is a most striking example of what may be accomplished in a short time if good, systematic work is done and common sense and judgment are exercised. While many of the bulls used are young and untried, they are always individuals of merit and from cows with large records. Only the best heifers are raised, and with the record of the dam and the qualities of the sire known, their selection is comparatively simple, and better cows can be raised than can be bought on the open market. The price of cows is from \$80 to \$90, some of the best averaging as high as \$100, so that it is also



COWS AT TETHER. A TYPICAL SCENE ON A DANISH DAIRY FARM.

profitable from the financial standpoint to raise the young stock to replenish the herd. Heifers drop their first calf at from two to two and one-half years of age, and if they prove to be good producers are usually kept in the dairy until twelve years old, when they are fattened for beef. In fairly good condition, cows bring $5\frac{1}{2}$ cents per pound. Old, thin cows bring less.

FEED AND CARE

The cows are treated with kindness and every effort is made to have them comfortable at all times. On many farms the cows are regularly groomed. Tethering the cows on grass is usually commenced the fore part of May, for a portion of the day, at least.

The soiling crops used are rye, oats and peas, oats and vetch, and clover and grass. These are hauled to the barn and fed green, or pastured off by tethering the cows along the edge. In some sections where the farms are small all the land is under cultivation and the cows are kept in the barn until the oats and peas are nearly mature,

when the cows are tethered on these during the month of July, after which they are too ripe to be well relished. The cows are then changed to the second crop of clover which by this time is from twelve to eighteen inches high. Some dairymen practice partial soiling all



TETHERED IN PLENTY. HARVESTING OATS
THREE FEET HIGH, AUG. 7.

the time, cutting green rye the last of May which was sown the previous September. When this rye becomes ripe in June they feed clover, and when this is mature, about July 1, oats and peas are fed. After these, the second crop of clover is ready. It must be remembered that in the cool European countries it requires much more time for grain to ripen after it is fully headed than in the Central States,

thus making the soiling season of the crop much longer. It is the general rule to pasture until short of grass, about July 1, and then soil until the grass is good again. The cows are left on pasture until October, the exact time depending upon the season, thus making the period cows receive green feed extend over nearly six months.



BRINGING TETHERED COWS TO STABLE AT MILKING TIME. FIELD OF ROOTS
IN FOREGROUND.

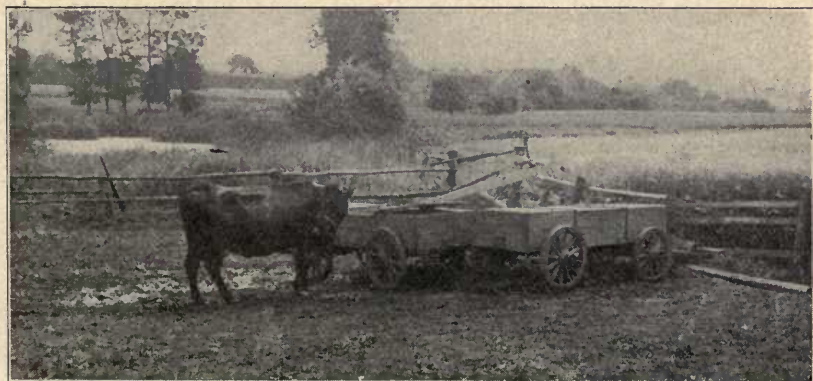
The cows are seldom turned to pasture in Denmark, but tethered by means of a halter on the head and a rope or chain twelve to twenty feet long, which is attached to a ten-inch pin driven into the ground. The cows are moved, five times a day, from three to six feet, depending upon the amount of feed. In this manner the crops are grazed off without waste from tramping. The great advantage of this system of tethering is that the crops can be allowed to grow two or three feet high and yet be eaten down without wasting, thus producing much more feed per acre than can be grown on pasture that necessarily must be kept cropped fairly close. This is the Dane's chief point in the

economy of feeding during the summer. Practically no grain is fed while cows are on grass. A few dairymen feed a little oil cake to their best milkers.



CALVES TETHERED 'IN CLOVER.

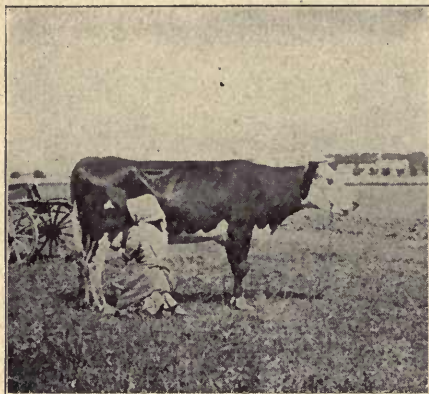
The usual method of watering is to haul the water in a tank on a low wheeled, one-horse wagon twice a day to the tethered cows. Doors are placed in the top of this tank at either end, and by proceeding directly across the field along the line of tethered cows, stopping the horse midway between the tether stakes, two cows can drink at the same time, making the task of watering easy. Some take the cows to the stable to be milked three times a day, and in this case the watering is done there. During the winter the cows are watered by pumping into the cement manger, or at an indoor watering tank.



WATER SUPPLY FOR TETHERED COWS. INSTEAD OF DRIVING COWS TO WATER THE DANE DRIVES THE WATER TO THE COWS.

The cows are put into the stable in the fall and not let out again until the following spring. They are fed all the straw they will eat, and, on the average, 4 pounds of hay, 40 to 100 pounds of roots, and about 6 pounds of grain per day, consisting of oil cake, bran, barley and oats,—the grain being fed according to the milk flow.

Many of the dairymen on the small farms milk three times a day, having ten cows to the milker. On the large farms they usually milk but twice a day, having from fifteen to twenty cows to the milker, requiring two and one-half hours, night and morning, to do the milking.



MILKING IN DENMARK.

The cows are allowed to go dry from six to eight weeks. To supply the Danish export trade of butter, an even flow of milk is required the year round, and most of the cows freshen from September to May. The male calves and any heifers not needed for future cows are sold for veal at from three to four weeks old. Calves are not allowed to suckle their dams. They are fed whole milk for the first week. After this it is gradually changed to skim milk and this is fed to the heifers until they are four to six months

old. From this time on they are raised on pasture during the summer, and in winter are given hay, straw, and roots, and sometimes a little oil cake.

COW TESTING ASSOCIATION

The first coöperative cow testing association was organized in 1895. Later these proved so helpful a factor in weeding out the unprofitable cows, that they have increased rapidly, until at the present time there are about five hundred associations in operation. A man is employed by each association to visit the farms and do the testing every three weeks. He weighs the milk of each cow and keeps an accurate record of the feed consumed, so that at the close of the year the dairyman can determine the net profit per year from each individual cow, and which of his cows are the most efficient producers. By raising the future herd from the best cows the average production has been greatly increased, both in milk and butter fat, and, as would naturally be expected, the yield per one hundred feed units consumed is also greater. This system of feed and milk records has been a prime factor in improving the dairy cattle of Denmark to such a high degree in so few years.



RETURNING FROM MILKING COWS AT TETHER.
LABORER'S COTTAGE IN BACKGROUND.

CITY MILK SUPPLY

The question of a pure milk supply for cities was first solved in Denmark when, about 1878, Mr. Busck, an able and philanthropic man, attempted to supply Copenhagen with absolutely reliable milk produced from cows warranted free from tuberculosis. He was assisted by a board of physicians, and established the basis on which the city is now supplied with milk as nearly perfect as can be obtained.

The real problem of supplying a large city with milk occurs but a few times in Denmark, so that a brief description of the methods employed by the two large companies of Copenhagen will give an idea of the care taken to secure the proper results. These two companies handle over 100,000 pounds of milk



TOWN DAIRYMAN'S HOUSE AND COW STABLE.

a day, all of which is produced under veterinary inspection and in accordance with strict rules laid down by the company. Inspectors are employed whose duty it is to see that every producer lives up to these rules, which require cleanliness at every step. As soon as drawn, the milk must be cooled and kept below 50° F. until delivered at the bottling plant in Copenhagen. Here it is sampled and tasted,—the slightest off flavor being sufficient to cause its refusal. After passing the inspector and weigh can it is pasteurized at 180° F., cooled to below 50° F. and put into small-necked bottles sealed with corks or expanded pulp covers.

Milk of different standards is sold, but each is distinctly marked with a label stating the quality and price. Milk sold in bulk is sent out in large sealed cans from which it may be drawn only thru a faucet, over which must appear a statement of its quality. In this

way skim, one-half skim, whole milk and cream may be put out by the same wagon at prices varying according to the quality without danger of the purchaser being defrauded. But all of this milk is of the same high standard from a sanitary standpoint, as it has all been produced under the same rules, which require the dairymen to provide healthy cows, clean barns and utensils, proper care and feed at all



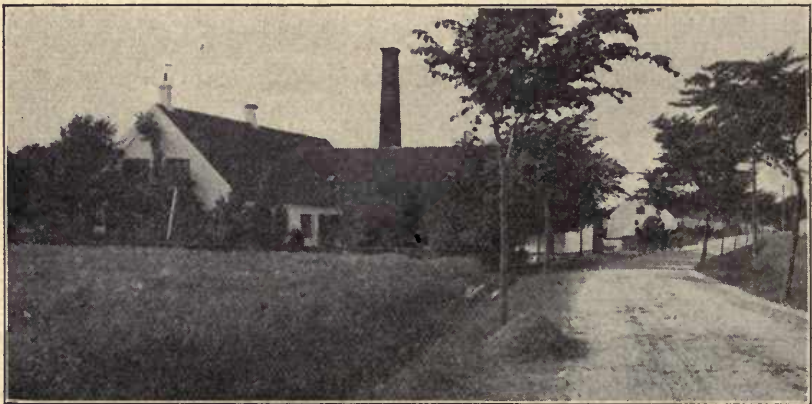
CITY MILK DELIVERY.

seasons, and, to insure proper cooling thirty pounds of ice must be provided for every eleven gallons of milk produced.

This system of inspection and company control has been brought about largely thru the guidance of the directors who, without remuneration or money interests, serve to see that the supply of milk is as nearly perfect as possible.

MANUFACTURED PRODUCTS

In Denmark dairy manufactures are confined almost exclusively to the making of butter. The first coöperative creamery was started in 1863, but coöperative creameries were not generally successful until after 1880. It was about this time that the centrifugal cream separator came into practical use, and this gave creameries a special impetus and advantage. From this time the dairy industry grew with marvelous rapidity until for several years the production of milk and



COÖPERATIVE CREAMERY.

making it into butter in coöperative creameries has been the chief industry of the country. There are 1100 coöperative and 300 private creameries in Denmark. These manufacture over 200,000,000 pounds of butter a year, eighty percent of which is exported to Great Britain.

The milk is hauled to the creameries in large milk wagons which pass along the main roads. Farmers living off these roads bring the milk to the hauler. Some farmers combine with their neighbors and haul the milk themselves. In summer the milk is delivered twice a day and in winter once. Stringent rules are laid down in regard to cooling the milk on the farm and in not mixing morning's and night's milk. All foods which may impart an objectionable flavor to the milk are forbidden. Milk from newly calved cows must not be sent to the

creamery until after the fifth day, and milk from diseased cows is prohibited. The creameries are compelled by law to pasteurize all skim milk by heating to 180° F. before it leaves the creamery, to pre-



REAR VIEW DANISH CREAMERY. MILK CANS ON RECEIVING PLATFORM AT LEFT.

vent the spread of tuberculosis thru this medium. Penalties are imposed for non-observance of these rules, but the loyalty of the Danes to their own organization makes it rarely, if ever, necessary to inflict these penalties.



MILK HAULER.

When the Danes decided to make butter for the English market, they of course had a large amount of skim milk as a by-product, and in looking for a way to get the most money out of this, they soon discovered that English bacon was selling at a high price and at once set about converting their surplus skim milk into bacon hogs, and exporting bacon to England with the butter.



A MOTHER OF DANISH BACON.

The creamery buildings are always sanitary and substantial, being constructed of brick, with slate roofs and cement or tile floors. They have a tidy appearance and are surrounded by a lawn kept neatly trimmed and planted with trees, shrubs and flowers.

The machinery used in the creameries is not as convenient or up-to-date as ours. Of the 1400 creameries in Denmark, only 300 have the combined churn and worker,—the remaining 1100 using the old upright Danish churn and table worker. Many of the butter makers still use six or eight old fashioned shot gun cans in which to develop their starter.

The secret of the Danish buttermakers' success lies largely in their habit of thorness. They first construct a sanitary building and then keep it clean by daily scrubbing. This applies equally well to all the machinery and apparatus in the creamery. In addition to this they have milk delivered to the creamery in almost ideal condition. Another secret of the Danish buttermakers' success is that they study their business thoroly, becoming very proficient, as they expect to remain at this occupation for their life work. Because of this proficiency they turn out a product of uniformly high quality which is the chief factor in their success with an export trade.



DANISH FARMER'S WAGON DELIVERING BACON HOGS AT TRAIN.

WHAT WE MAY LEARN FROM DENMARK

To show the marvelous recent development in Danish dairying it is only necessary to state that the receipts from cows at the present time are seventeen times what they were thirty years ago. From the million dairy cows of Denmark is exported 200,000,000 pounds of butter a year, worth \$44,000,000. At this rate, Illinois, in proportion to her area, would have to export \$176,000,000 worth of butter annually.



A LOAD OF DANISH BUTTER FOR EXPORT TO ENGLAND.

With all our boasting about rapid progress and a developed civilization in America, we are a slow people. The Danes owe their rapid rise and marvelous success as a dairy nation to the fact that they were alive to the demands of the markets of the world and strove to meet those offering the greatest remuneration. To secure and hold these, when a practice has been proved of economic value they do not waste a generation or two in adopting and putting it into general use.

The Danish dairyman understands that coöperation is one of the chief underlying principles for the highest success. This attitude is in striking contrast to that of the average American dairyman. Coöperative creameries are frequently pointed to in America as the only thing in which coöperation among farmers has been successful, yet most of our creameries in Illinois started coöperative and in a few years either closed or changed to independent ownership. This shows in a most striking manner the lack of the coöperative, trustful spirit among American dairymen, which has proven of such great value to the dairymen of little Denmark.

The Danes have incorporated in their people the important knowledge that money is not the only thing in life, and that each man owes a duty to his fellows,—that the interests of the community,—yes, the nation—may prosper. This has yet to be instilled in the hearts of many Americans.

The Danes do not have as good a climate or soil as is enjoyed in the Central West. They have small patches of different crops, and cannot take advantage of four-horse teams, large implements and machinery, as can the Americans. They cut much grain by hand, and many of their methods are laborious.

The important question, then, is: How can the Dane afford to import and feed our corn and sell his butter in competition with us? He does this by being a close student of all the principles of dairying. He understands that dairying is an occupation requiring brains, thought and skill; that he must have efficient cows, economically fed and well cared for.

“When such a state of dairy intelligence as is found in Denmark exists among even the American farmers who pretend to be dairymen, there will be less wasting of years of weary, unprofitable toil.”—Hoard.

FINAL CONCLUSIONS

It is the history of the world that it is not the largest nations that have done the really great things. In the dairy world it has remained for the little countries of Denmark and Holland to achieve the most economical production of high grade dairy products.

The production of clean milk is what every American dairyman must come to before we can hope to attain for our dairy products the high standard of excellence so conspicuous in the dairy products of Scotland, Holland and Denmark.

In general European dairymen have learned most thoroly that to make money in dairying the first essential is to eliminate every "star boarder" that pulls down the profits, and have a good herd,—a herd in which every individual cow is an economical producer of a high order. They have also learned that these good cows must be well and economically fed and cared for.

The American dairymen should wake up to a full realization of his natural advantages in the cheap feed and good markets, and go at dairying in earnest, realizing that it requires brains, study, and common sense to succeed. He should fit up convenient, substantial, and permanent buildings, and not shift from one phase of agriculture to another, but stay at dairying for a lifetime.

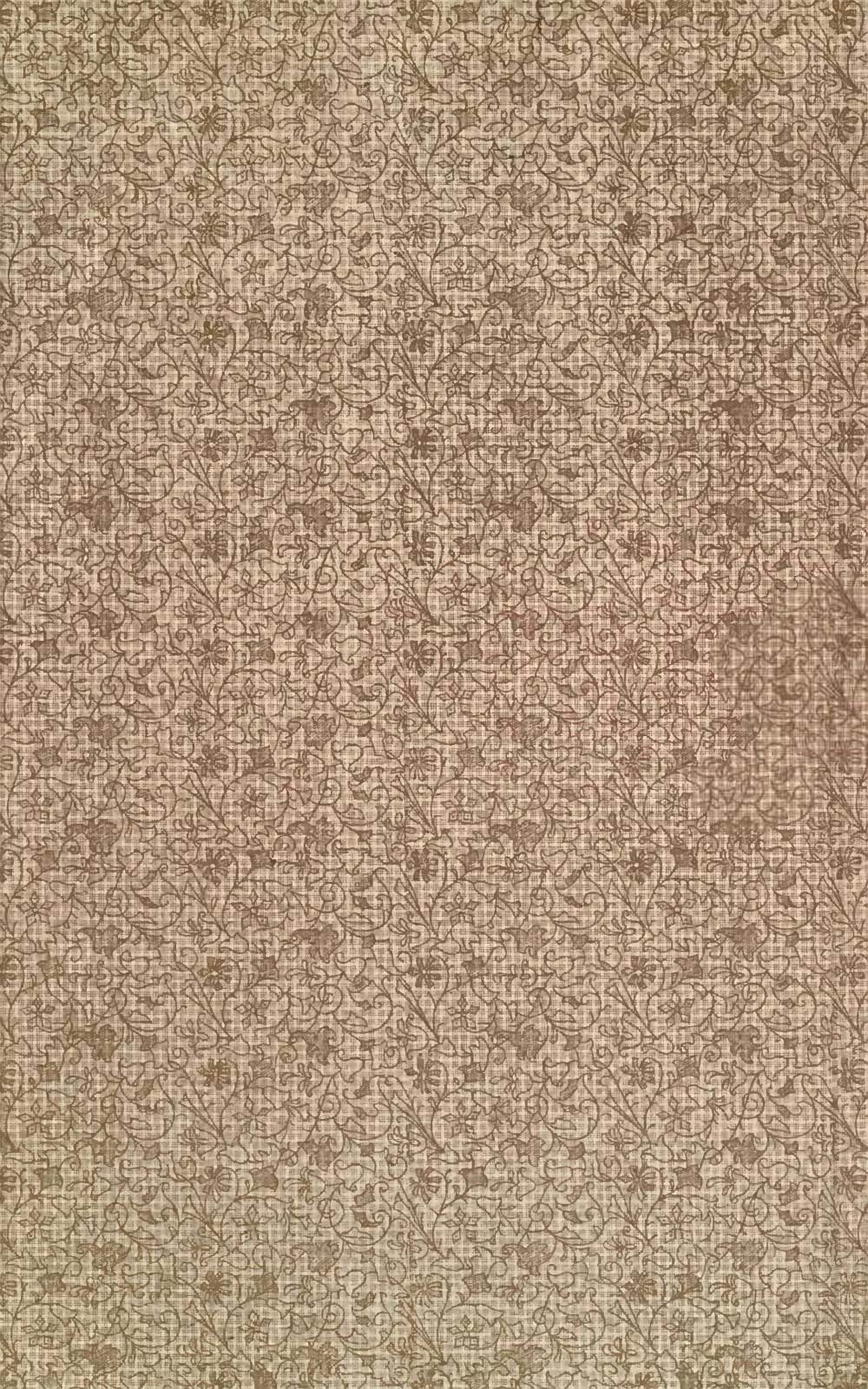
In no country does everything give place to dairying as it does in Denmark and Holland, and in no country in the world are the farmers so prosperous and self respecting.

There is no dairy country, tho the land may be worth \$1000 an acre, that has the natural advantages for the production of dairy products enjoyed in the central part of the United States. None of the intensive dairy countries of Europe can produce and preserve in good condition for winter feeding of dairy cows the amount of digestible nutrients per acre that can be secured in the Central West with corn silage and alfalfa hay.

There must be great opportunities ahead of the American dairymen if Denmark can profitably feed our grain and maintain, thru dairy exports, her place as one of the most thrifty nations of the world.

To embrace these opportunities, the American dairyman must realize that the four things practiced in Europe that make the difference between success and failure with the individual and that apply directly to the American dairyman are: a herd of efficient cows; economical feed and care; and clean methods.





UNIVERSITY OF ILLINOIS-URBANA



3 0112 078530349