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THE GREAT
CREAMERY SECRETS.

W. Knisely

THE GREAT

CREAMERY SECRET PROCESS.

A GUIDE FOR

FARMERS AND DAIRYMEN.

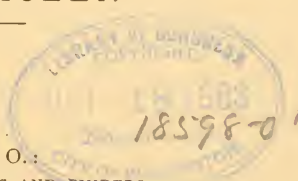
CONTAINING RECIPES, PROCESSES, CALCULATIONS, AND
OTHER VALUABLE INFORMATION PERTAINING
TO MILK, BUTTER AND CHEESE; DISEASES
OF CATTLE AND THEIR CURE.

BY L. M. KNISELY.

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P R E F A C E .

In publishing this little volume the Author is prompted to do so from the many and frequent solicitations of those familiar with his practical ability, and from actual experience. With this view, and trusting that those who have an opportunity will follow out the teachings as laid down throughout in the different subjects as they may be presented—if this be done—the Author, in full confidence, guarantees perfect satisfaction.

Hoping that you may peruse this carefully, and follow it out to the letter, I remain, your obedient servant, the Author,

LEVI MYRON KNISELY.

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THE GREAT CREAMERY SECRET.

SUBJECT I.

SOURCE AND COMPOSITION OF MILK.

This fluid is secreted from the blood of females, of the class mammalia, for the nourishment of their young. It is the only substance completely prepared by nature as an article of food, and is so constituted as to furnish materials for the development of all the various organs and compounds of the young animal; its composition must, therefore, be a matter of interest. It is a white liquid of a sweetish taste, is of a peculiar odor, and contains dissolved sugar, casein, and salts, also a fatty substance—butter—which is diffused throughout in the form of minute globules that are visible with the microscope, while at the same time the liquid is transparent. The composition of fresh cow's milk will, further on in this work, be chemically resolved into its primary elements.

SUBJECT II.

THE GREAT CREAMERY SECRET, OR HOW THE QUANTITY OF CREAM IS INCREASED TEN PER CENT., AND THE QUALITY OF BUTTER ONE HUNDRED PER CENT. OVER THAT MADE BY THE ORDINARY PROCESS.

It is a well known fact that butter made by the creamery process demands thirty-three per cent. more in price than that made by the ordinary process. The many reasons why the yield of cream is so much above that of ordinary productions is because they keep the milk, as soon as drawn, well strained (to free it of any foreign matter, as cow hairs and dirt,) placed in clean stone crocks or pans, not over

five or six inches in depth, and the milk to produce the greatest quantity of cream, not over three or four inches in depth, and placed in a cool place that animal heat may be reduced as soon as possible. The proper temperature for the fullest amount of cream to rise, which is from 55 to 60 degrees of heat, which is easily maintained, as elsewhere to be seen in this work, and will be well described further on. Creameries gather and churn their cream daily, thereby giving it little time for the accumulation of lactic acid. The temperature of cream, previous to churning, is scrupulously brought to the proper temperature of churning, being 60 degrees of heat on the scale. The most approved method for handling and preparing the cream for the churn is by having a good tin can, of suitable size for the amount of cream you expect to handle, (or two may be used,) with a good light lid; place this in a larger can or other vessel, giving at least two inches on all sides, also making outside vessel a little lower than the *creamer*, to prevent water being thrown into the cream while filling the vessel surrounding the *creamer*. By these means cream may be brought to the proper degree by the addition of hot or cold water deposited around the cream can. This plan entirely prevents water, either hot or cold, being added directly or indirectly to the cream, which so much lays the foundation for its early rancidity by the conveyance of minute thread-like, woody or vegetable fiber, into the butter (which is easily detected by the glass). While creameries churn every day the farmer and some others churn only every other day, or even the third or fourth day. Hence, when cream is taken and conveyed to the general cream receptacle, it is generally accompanied with more or less of milk, which readily giving up its sugar or saccharine properties, and the acid set free thereby, coagulates the remainder, and a cheesy casein is formed, and being conveyed to the churn with the cream the result is a cheesy or casein butter, with its usual cheesy flavor instead of butter aroma. Producers of creamery butter always and particularly keep the crocks, pans and all other vessels, sweet and clean by frequent rinsing with a small quantity of lime or boiling hot potash water, and their frequent exposure to the sunlight. Creamery butter makers invariably keep cream, and the milk producing it, entirely separate from vegetables and decaying matter, such as cabbage, turnips, beets, carrots, potatoes, &c., as fresh drawn milk and cream, already taken, readily absorbs and partakes of the mixed flavors, as such would

produce. Butter made under such circumstances is always devoid of its true flavor instead of its true butter aromatic flavor. As a remedial agent for the keeping of milk and cream, and preventing any trace of acidity in the milk or butter, and improving its flavor and keeping qualities, I cheerfully recommend this industrial fact (worth many times the price of this book) for the raising of every particle of cream to the surface of the milk, and in a perfectly sweet condition, even if the same has not been touched for some days. It is simply the addition of a small quantity of *crystalized soda*. Remember that this is a perfectly healthy article, even if taken in ten-fold proportion to that laid down in this volume, for the retarding influence against the accumulation of lactic acid in milk, cream and butter. If you can not procure it in a crystalized state of your nearest druggist send to me and I will send it to you for the small sum of five cents per lb., as I am perfectly familiar with its purity, although a fear of its purity need not be entertained, as its cheapness would not enhance profits sufficiently remunerative for its adulteration.

SUBJECT III.

GRAINS OF STRENGTH YIELDED BY ONE LB., OF 7,000 GRAINS.

	Grains.
In Skimmed Milk.....	34
“ New “	35
“ Butter “	35
“ Skim “ Cheese.....	36.0

SUBJECT IV.

GRAINS OF WARMTH YIELDED BY ONE LB., OF 7,000 GRAINS.

	Grains.
In Milk Whey.....	150
“ Butter Milk.....	335
“ Skimmed Milk.....	351
“ New Milk.....	378
“ Skim Milk Cheese.....	2.300
“ Cheddar Milk Cheese.....	2.550
“ Butter	4.700

SUBJECT V.

TABLE SHOWING THE AMOUNT OF BUTTER AND CHEESE OBTAINABLE FROM MILK.

100 lbs. Milk contains about.....	3	lbs. pure Butter.
100 " " " "	$7\frac{8}{10}$	lbs. Cheese.
100 " " averages.....	$3\frac{1}{2}$	lbs. Common Butter.
100 " " "	$11\frac{7}{10}$	lbs. Common Cheese.
100 " Skimmed Milk yields.....	$13\frac{1}{2}$	lbs. Skim Milk Cheese

SUBJECT VI.

TABLE SHOWING THE INGREDIENTS IN VARIOUS KINDS OF MILK.

In 100 parts there are of

	Woman.	Cow.	Ass.	Goat.	Ewe.
Water,	87.9	87.	91.7	86.7	85.6
Milk Sugar,.....	6.5	4.8	6.1	5.3	5.
Butter,.....	3.6	3.1	0.1	3.3	4.2
Casein,	1.5	4.5	1.8	4.1	4.5

SUBJECT VII.

VARIATION OF QUALITY AND QUANTITY OF COW'S MILK ACCORDING TO BREEDS, FOOD SUPPLIED, &C., ALSO, TEMPERATURE AND PERFECTION OF MILK KEEPING.

In every 1,000 parts of milk there are of

Water,.....	840	Parts.
Milk Sugar,	45	"
Butter, or Oil,.....	40	"
Casein,.....	40	"
Phosphate of Lime,.....	17	"
Chloride of Potassium,.....	9	"
Phosphate of Magnesia,.....	4	"
Free Soda,.....	3	"
Common Salt,.....	3	"

The time required for the full amount of cream to rise to the surface of new milk, at different temperatures, may be seen from the following table :

If temperature of the air is 77 degrees, it will take 10 to 12 hours.							
“	“	“	68	“	“	“	10 to 20 “
“	“	“	55	“	“	“	24 “
“	“	“	50	“	“	“	36 “

One gallon of milk weighs 10 lbs. 4 oz., being heavier than water in the proportion of 103 to 100. The best temperature at which to churn cream is from 55 degrees to 60 degrees Fahr. Milk will produce scarcely any cream, even in the space of a month, if it is kept at 33 degrees to 38 degrees Fahr. Milk turns sour by the fermentation of the sugar and its transformation into lactic acid, thus causing the milk to curdle. Vinegar or renet will produce the same effect. Good cream will produce about one-fourth its weight in butter. Cheese made from good milk contains nearly 33 per cent. of water, and cheese from skimmed milk about 60 per cent. The perfection of milk keeping is attained when a stream of pure spring water flows through the room where the milk is kept, and fresh air circulates through slatted windows or doors uncontaminated by the odor of decaying vegetables or animal matter, and when the temperature ranges from 55 degrees to 65 degrees Fahr. During winter great profits would result from bringing the temperature of the milk to about 120 degrees Fahr. previous to setting, and during all seasons the greatest amount of cream will be collected when the milk in the pans is not over two inches in depth. During warm weather the milk, as soon as drawn from the cow, should be cooled down to 62 degrees. This may be done by setting the pail of milk in cold water. A small piece of crystalized soda, about the size of a marble, (as spoken of elsewhere in this book,) dissolved in a little water, and added to a pail of freshly drawn milk, will increase the amount of cream, improve the butter and correct acidity. Milk vessels, strainers, churns, &c., should be kept scrupulously clean and free from taint of every kind by frequent scalding with boiling water. During very hot weather the milk room may be cooled by hanging wet linen sheets near the doors and windows with the lower parts of the sheets immersed in cold water, and in cold weather the temperature may be raised by means of a stove

on which a vessel of water may be placed to prevent too much dryness of air. In skimming the milk, deposit the cream in clean stone crocks or tin pails, and after sprinkling a handful of fine salt over the surface, set in a cool place to remain until churned. In filling the churn, leave out whatever milk may be found at the bottom of the cream crock, as its sour taste will be sure to promote acidity in the butter. Churning should occupy from thirty to forty-five minutes. Rapid churning should be avoided as it tends to lessen the quantity and effect the quality of the butter. If it should be hard and granular, refusing to come together well (which will not be the case if you use a thermometer in the beginning) throw in a little warm water, churning all the while, and the butter will soon be gathered ready to take up. As correct temperature is all important in the manufacture of butter and cheese, frequent use should be made of a good thermometer. Great loss is certain to result if this useful instrument is dispensed with. In churning use care in keeping the cream well washed down so that the whole will granulate with regularity, and when the butter is formed in small lumps pour off the buttermilk, leaving the butter in the churn. Pour in a pailful of pure cold water, and well wash the butter in it, at the same time gathering it into a solid compact mass, and working it to squeeze out the buttermilk. Next remove it to the butter dish and well work out the remaining milk, if any, and at a temperature not higher than 55 degrees or 58 degrees, until the milk is entirely removed from the butter, and the water is left quite clear, then salt with the best Ashton salt at the rate of one half lb. salt to ten lbs. butter. Work the salt well into the butter and use every effort to rid the butter of water and milk brine, for depend upon it the product will not be first class unless this be done. In packing butter, use neat firkins, tubs, or buckets made of white oak. Purify each by filling with a strong solution of bicarbonate of soda boiling hot, and allowing the water to stand in them for twenty-four hours. Avoid packing butter in vessels containing undissolved salt at the bottom unless covered with a cloth, as the butter will be damaged by coming in contact with it. Take great precaution to remove all rancid or suspicious butter from firkins that are to be refilled. Lime may be used with good effect in recleaning vessels having once had butter in them. All butter made during the early part of the summer should be shipped and sold

without loss of time, unless salted and packed as above described, (under the head of To Cure Butter,) as it will only keep sweet for a short time. Butter made during warm weather should be packed in firkins and kept in a cool place. To preserve it from the air cover the butter to the depth of half an inch, or enough to exclude the air with a strong brine containing in solution two tablespoonsful of white sugar and a piece of saltpetre double the size of a pea. In the Fall the butter may be replaced in pails and tubs and sent to market as fresh butter. If butter is too soft while being worked and salted allow it to stiffen for three or four hours in a cool place, then begin again and finish the work. In packing never mix the least amount of poor butter with good, it is certain to taint and ruin the whole package. The rancidity of butter may be prevented by thoroughly washing and salting before the cheesy particles and milky matter is acidified by exposure to the air, and by using due caution to exclude the air from the package by a covering of water well saturated with salt. The oil of butter is of peculiar richness, unlike any other oil, and the fat of butter, when compact by expressing the oil, is identical with the solid fat of the human body. Chemical analysis and numerous experiments show and prove that the butter in cows' milk comes direct from the fat of the animal. The fatty globules are carried into the circulation of the animal deprived of stearine by respiratory combustion, and the oil is then sent to the udders where under the influence of mammary pepsin it is changed into the components of butter. It is on this principle that oleomargarine, now being vended in such immense quantities in the United States and Europe, is based. It is manufactured from cow's fat or beef suet. First class butter such as *creamery* is free from every trace of a rancid taste or smell. When cut with a knife it should neither soil the blade, exude any dew or milky brine, and it should be neither sticky nor greasy, but should, in summer, possess a rich, yellow color or tint. A plentiful clover pasture surpasses all other food for producing the best quality of milk and butter.

SUBJECT VIII.

The reason why dairymen wash butter is to remove all foreign matter and retain all the butter with its aroma unaffected. When the milk

is drawn off and the butter left in the churn, the latter is still surrounded with many impurities of which particles of buttermilk are the most numerous, also particles of casein or cheesy matter. This matter is more liable to spoil and become tainted than the butter itself. Butter becomes rancid through the action of the oxygen contained in the atmosphere, but casein becomes putrid, the latter is being rapidly produced while the rancidity of the butter is much slower in development. One of the important problems of the dairy is whether or not these impurities, viz.—buttermilk and casein—can be removed by washing with water. There is no doubt that the buttermilk can be all worked out, but casein cannot be disposed of in such a manner since it adheres to the butter, and can only be washed off or removed by water. The best method for its removal is as follows: Before making any attempt to gather the butter, and while it is yet in its granulated state, or rather in separate particles, say about the size of a pea, the buttermilk should be drawn off and a quantity of pure, clean water thrown into the churn. Draw off the water, and then add more water, agitate again, and finally draw off all the water, provided the last that is drawn off is not milky in appearance. In other words, continue to add fresh quantities of clear water, and continue the agitation and the drawing off of the milky water until the water is perfectly clear after the agitation. Then the washing has had its proper effect. The butter will now be likely to need little working, and the grain is not liable to be broken, but if the buttermilk is to be worked out and with it the casein, it is very likely that the grain of the butter will be broken and the product will have a salvy appearance which, when cut with a knife, instead of having a bright, shining appearance will appear dull as lard. Those who contend for working butter instead of washing, urge as one reason that the aroma is washed out, and that the coloring of the butter is removed. This is not correct, since the water removes the impurities of the butter by its mechanical action and not by its solubility. There is no doubt if butter be kept for a length of time in water its color and aroma would be removed, but that is not the case in simple washing, and the butter is not soaked. In the operation nothing is taken from the butter that would be desirable to retain. Washing butter, in its effect, may be compared with the rinsing of clothes in the wash tub. Much labor is saved in the washing

of butter over the working of the product, and besides through the former process the keeping qualities of the butter are best secured.—
Fireside Magazine.

SUBJECT IX.

EFFECTS OF LEAVING BUTTER STAND UNWASHED AFTER BEING CHURNED.

Such a practice is one of serious consequence. If the perpetrators of this practice knew of the chemical effects, and cause of the same, would no doubt resist its further continuance. In the first place, the amount of casein or cheesy matter that is usually attendant in the manufacture of butter being left in after a churning is done at once, takes up not only rancidity, but if kept in a very warm place will, in a very short time, not only become rancid but purtrid as in the manufacture of Limburger Cheese. Butter, if not taken as soon as churned and at once freed of its casein and buttermilk by being washed with pure water until all traces of milk are gone, would be useless to expect a palatable article, and much less one fit for market or even culinary purposes. The cause of the presence of casein is due on account of the quantity of milk accompanying the cream by too close or too deep skimming. This milk is always to be found at the bottom of the cream receptacle, which if of glass the cream could be seen floating on the top of the milk, similar to that viewed on pouring oil on the surface of water. The greater part of this may be prevented by carefully decanting off the cream and leaving the milk, as close as may be seen, remain and used for other purposes than to be converted into casein or a cheesy like butter.

SUBJECT X.

TO SALT OR CURE BUTTER.

Take two parts best Ashton Salt, one part Saltpetre : Mix completely; use one ounce of this mixture to each lb. of butter, having the buttermilk whey well worked out. Put down in crocks, if for long keeping, and cover with a brine made as follows : To 6 lb. Ashton Salt (because it has no lime in it, being solar dried,) add 2 lb. white sugar and 2 oz.

saitpetre. Bring the same to a boiling heat and pour all in a clean pail to cool, and then pour over the clear liquid. Butter for present use need not be brined, but when it is brined in this manner and set in a cool place, it will keep perfect for two years. This I use in my packing and shipping trade.

TO INCREASE THE FLOW OF MILK IN COWS.—Three times each day give your cow water slightly warm and slightly salted, in which bran has been stirred, at the rate of one quart of bran to two gallons water. You will find if you have tried this daily practice that the cow will give twenty-five per cent. more milk, and she will become so much attached to that diet that she will refuse to drink clear water unless very thirsty, but this mess she will drink at almost any time and ask for more. The amount of this drink necessary is an ordinary water pail full three times a day, morning, noon and night. Always avoid giving coarse slops, as they are no more fit for the animal than the human. I mean by this no greasy dish water and the like; although the animal may have hesitancy in drinking such it nevertheless is injurious as regards the milk and butter.

SUBJECT XI.

A RELIABLE SUBSTITUTE FOR CREAM FOR TABLE USE.

Take two or three whole eggs and beat them up in a basin; then pour gradually over them boiling hot tea to prevent curdling. It is then quite difficult to distinguish it from rich cream. Good if the genuine is not obtainable.

SUBJECT XII.

COMPARATIVE YIELD OF PRODUCTION PER ACRE.

One acre will produce as per table :

	Lbs.
Beef,	186
Milk,	2,900
Butter,	300
Cheese,.....	200

This estimate I compute from the one acre for the pasturage season usually from May to October.

SUBJECT XIII.

MILK TESTS.

The quality of milk is in a great degree known by its taste and color. It should be sweet and of good flavor, and should present a delicate cream-colored tint. When bluish it should be suspected of having been fraudulently treated, or having been given by an inferior cow. Milk that is in the least degree sour curdles with tea or coffee, and cannot be boiled without separating into whey or curd. The two principal frauds to which milk is subjected, are the deprivation of its cream by skimming, and watering. It is also said to be adulterated with starch, flour, yolks of eggs, turmeric, chalk, &c., but these latter adulterations are hardly practicable. Bicarbonate of soda is sometimes added to restore sour milk. The turning of milk may be prevented without injuring the quality by adding two or three thousandth parts of bicarbonate of soda. The most certain way of testing the quality of milk is to separate it into its proximate elements. The amount of water may be determined by evaporating a weighed portion over a water bath. The residue should not amount to over 11 or 12 per cent., the loss being water, and the ashes which should not amount to over one per cent. at most may be determined by insinuating the above residue, an excess of over 1 per cent. is an inorganic adulteration. The abstraction of cream is found out by the lactometer or creamometer. This instrument consists of a glass tube eight or ten inches in height and about one inch in diameter. It is graduated from above downwards into one hundred parts, 0° being at the top. The milk to be examined is poured in up to this mark, and is then left for twelve or twenty-four hours, when the thickness of the stratum of cream is observed. All milk which does not yield over 11 or 12 per cent. by volume of cream may be considered as having been skimmed. A rough method used by inspectors of milk for testing the amount of watering, is to dip an iron rod tapering to a point into the milk, and then observing the greater or less transparency of the drop which falls from the end of this rod as it is held up to the light. If the drop is too transparent the milk may be suspected and rejected as having been watered. The same principle of testing milk by its degree of opacity is applied accurately by means of a small instrument called a lactoscope, which consists of two plates of glass be-

tween which a layer of milk is contained; the milk being better the thinner the layer required to prevent light passing through it. The value of milk may be determined by the amount of butter it will yield. A quart of good milk will yield about one ounce of butter. Flour or starch in milk is indicated by giving a blue coloration with tincture of iodine. Milk should not be kept in zinc or lead vessels, as it readily dissolves both of these metals, which are poisonous.

SUBJECT XIV.

PRESERVED OR SOLIDIFIED MILK.

Fresh skimmed milk one gallon, sesquicarbonate of soda (in powder) one and one-half drachm. Mix and evaporate to one-third part either by heat of steam or water bath with constant agitation; then add of powdered sugar six and one-half lbs., and complete the evaporation by a reduced heat of temperature. Reduce this dry mass to powder, then add the cream which is to be well drained, and which was taken from the milk. After thorough admixture put the whole into well stopped bottles or tins and hermetically seal.

Another plan is laid down with following ingredients:

Carbonate of soda $\frac{1}{2}$ drachm, water 1 fluid ounce—dissolve; add of fresh milk 1 quart, sugar 1 lb., reduce by heat to the consistency of a syrup and finish the evaporation on plates by exposure in an oven.

OBSERVE. About 1 oz. of the powder agitated with 1 pint of water forms a good substitute for milk.

SUBJECT XV.

MUCH BUTTER FROM LITTLE MILK.

Take 4 ozs. pulverized alum, $\frac{1}{2}$ oz. pulverized gum arabic, and 50 grains of pepsin. Place all in a bottle for use as required. A teaspoonful of this mixture added to one pint of new milk will, upon churning, make one lb. butter. Agents are selling this secret for five dollars.

SUBJECT XVI.

TO KEEP BUTTER DURING HOT WEATHER WHEN YOU HAVE NO CELLAR.

A simple mode of keeping butter in warm weather is to invert a large earthen crock or flower pot, if need be, (varying with size of crock containing butter,) over the dish or firkin in which the butter is held. The porousness of the earthenware will keep the butter cool and all the more so if the pot be wrapped in a wet cloth with a little water in the vessel containing the butter. It is not the porousness of the earthen ware, but the rapid absorption of heat by external evaporation which causes the butter to become solid,

SUBJECT XVII.

TO RESTORE RANCID BUTTER.

Use 1 pint of water to each lb. of butter, previously adding 20 grains of chloride of lime to each pint of water. Wash well the butter in this mixture, and afterward re-wash in cold water and salt. Butter may also be restored by melting it in a water bath with animal charcoal coarsely powdered and previously well sifted to free it of dust, skim, remove, strain through flannel and then salt. Another way is to melt the butter in twice its weight of boiling water, shake well, and pour the melted butter into cold water to gain a proper consistency, or wash in good new milk, in which the butric acid, which causes the rancidity, is freely soluble. Wash afterward in cold spring water. Still another way is to wash the butter in strong lime water, previously giving the lime ample time to settle, and using only the clear portion.

SUBJECT XVIII.

TABLE SHOWING THE PERIOD OF REPRODUCTION AND GESTATION OF THE COW.

	Years.
The proper age for reproduction	3
Period of power of incubation.....	10 to 14

PERIOD OF GESTATION AND INCUBATION.

	Days.
Shortest	240
Mean	283
Longest	321

SUBJECT XIX.

DISEASES OF ANIMALS.

Many of the diseases of animals are referable to distinctive germs. Ignorance of this fact has wrought great suffering to mankind. Thus: when stagnant water is given to cows for drink the milk becomes affected. The bacteria (an animalcula-like being) swarming in the water when taken into the cows stomach, enter the blood, and as irritant or poison are secreted out of the blood in the milk. Such milk has an offensive smell and taste and quickly sours; it may even become putrid, and the butter is especially objectionable. The milk may coagulate before being drawn and garget (a disease in the udders of cows) and inflammation supervene. An examination of such milk with a microscope will show it swarming with bacteria, and yet while not poisonous is wholly unfit for food. The blue color of old milk is produced by bacteria, but there seems to be some distinction in the type of those in the milk after the cows have drunk stagnant water, and those which always appear after milk commences to sour; nor are plants of certain species exempt, and the most incurable maladies to which they are subject result from the attack of these microscopic animalculæ. Hence the necessity of having cattle either for milk or food provided with pure living water and their pasturage well rid of all foreign or wild weeds. From this source the milk sickness, with its prolonged distress, may be traced. As a disinfectant and blood purifier I should recommend a cattle powder in which sulphur predominates as Professor Myron's or Thorley's.

COWS GIVING BLOODY MILK.—A cow may give bloody milk from irritation, from cold, or from going a long time without being milked, or being forced to jump fences, or compelled to cross a gap or bars not sufficiently low for the animal to cross without danger of striking and inwardly bruising her udder. Sometimes from the effects of some powerful drug taken for some other disease; in such cases the blood usually subsides with the disease. Cows giving bloody milk may be checked by giving the cow the root of the *Polk Berry Stock* (cut fine) for one or two days. If a cow hides herself with her calf and the calf does not clean the udder, sweltering and festering may ensue and a bloody exudation flow, and if she is not discovered and well milked out and bowels kept free with Glauber Salts, bran, or cattle powder, such as elsewhere given, the animal may be lost. I know of several cases of this latter class.

CRACKED TEATS.—Teats cracked from the calf sucking, or from washing and not being well dried, or teats and udders becoming wet from cattle fording sluices or streams, and cold winds striking them soon become chapped and make a serious annoyance to the milker from the uneasiness of the animal to resist the torture. Sore teats and udders may be speedily cured by rubbing them with a salve made of tallow 4 parts and camphor gum 1 part. Alum is sometimes used, but owing to its acidity and its stringency and sting, the tallow is more preferable as it resists water and the action of the atmosphere.

SUBJECT XX.

TO RELIEVE CHOKED AND BLOATED CATTLE.

In choking the accumulation of gas (chiefly sulphureted hydrogen) is the cause of the animals death. This gas can be decomposed by forcing a strong solution of salt water down the animals throat or force the beast to jump over the bars of a gate or fence; when she touches the ground on the opposite side the obstruction will be ejected. A knife plunged in the animals left side the breadth of the hand from hip bone, and as near as possible to the back bone is attended by immediate relief, provided the puncture is kept open by a quill or any hollow tube, and is nowise injurious to the animal. Another way is to use four or five feet of rubber hose, and push the ob-

struction down. If cattle are choking on apples, turnips or the like, wrap the end of a ramrod or whipstock, or something of the kind, with wool twine until about the size of a walnut, grease the same with tallow or lard, and with it drive the obstruction down. This is frequently done with satisfaction to the choked cattle.

SUBJECT XXI.

CURE FOR SWELLED BAGS IN COWS.

An excellent remedy for swelled bags in cows, caused by colds, &c., is gum camphor $\frac{1}{2}$ oz., to sweet oil 2 ozs. Pulverize the gum and dissolve over a slow fire.

M. MOORE.

SUBJECT XXII.

EYE WATER FOR CATTLE OR HORSES.

Alcohol,	I	tablespoonful.
Extract of Lead,	I	“
Rain Water,		$\frac{1}{2}$ pint.

SUBJECT XXIII.

CHEWING THE CUD.

A cow when sick ceases to chew her cud, and such an omission is one of the best evidences that she is sick. In fevers, and not unfrequently when injured by accident, the cow will stop chewing her cud. Any derangement of the stomach stops the chewing of the cud, and the best evidence we have of convalescence in a sick cow is when she resumes ruminating. It is not necessary that a cow should chew her cud in order that life be sustained. Young calves do not chew the cud. Frequently the practice does not commence with young animals until they commence to eat coarse food, rarely making a cud when fed exclusively on milk. Cows fed entirely on short meal will not chew their cud. Probably the cow described as ill is suffering from indigestion caused by over-feeding. It might be well to keep

feed from her and give her a dose of Epsom Salts, say about a pound. Then obtain about 4 ozs. of essence of gentian, and the same quantity of sweet nitre ; divide this into two doses and give it in about a pint of warm water. Also give the cow scalded bran in her drink. In a few days your cow will probably resume chewing her cud.

SUBJECT XXIV.

LICE IN CATTLE.

We hear many inquiries in regard to the best manner of freeing cattle from lice. The best and safest remedy I believe to be common road dust. To apply this take it by the handful and rub it well into the hair of the animal. Kerosene applied with an old shoe or horse brush is certain death to the pests ; but in the hands of an ignorant or careless person it is sometimes dangerous. A small quantity of flour of sulphur mixed in their feed may be given occasionally with very good results.

SUBJECT XXV.

RELIABLE MEDICATED FOOD FOR CATTLE.

Take linseed oil cake and grind or pulverize it up in the shape of meal, and to every fifty pounds of this ingredient add ten pounds of Indian meal, two pounds sulphuret of antimony, two pounds of ground ginger, one and three-fourths pounds saltpetre, and two pounds of powdered sulphur. Mix the whole thoroughly together and you will have an article equal in value to Thorley's Food, or almost any other preparation that can be gotten up for the purpose of fattening stock or curing disease in every case where food or medicine can be of any use whatever. This article can be fed in any desired quantity, beginning with a few teaspoonfuls at a time. For a horse mix it with his grain, and in the same proportion to smaller animals, repeating the dose and increasing the quantity, as the case may be required.

SUBJECT XXVI.

PHYSIC FOR CATTLE.

If cattle are very sick and have trouble in making dung, a very effective physic, and at the same time being perfectly harmless as regards injury from taking the medicine, is, for a mild physic, give a cow as a dose, one tablespoonful of Glauber Salts three times a day, dissolved in some palatable food or water, and if a speedy physic is required, dissolve one-half lb. of the salts in water, and drench the animal similar to drenching a horse.

SUBJECT XXVII.

SCOURS AND PIN WORMS IN CATTLE.

Take white ash bark, burned into ashes and made into a rather strong lye ; then mix one-half pint of it with one pint of water and give all to each animal two or three times daily. This will certainly carry off the worms which is the cause, in most instances, of scours and looseness in cattle.

SUBJECT XXVIII.

TO KEEP MILK SWEET AND SWEETEN SOUR MILK.

Put into the milk a small quantity of carbonate of magnesia.

SUBJECT XXIX.

WHY DOES MILK AND CREAM TURN SOUR DURING SEVERE THUNDER SHOWERS.

The most plausible reason for its explanation is obvious from the laws of caloric. We know that when a body of electricity is discharged during a thunder storm the crystalline vesicles of vapor in suspension in the atmosphere are separated and at once form drops of water, and by the laws of gravitation are driven to the earth ; therefore, upon the same natural law the crystalline globules of aqueous bodies, as milk, are separated by caloric force and are no longer held in their

homogeneous mass, and being thus separated are subjected to the action of the atmosphere, and at once absorb oxygen, and their saccharine properties are transformed into coagulation by the escaping acidity thus formed. The only known remedy is to have, in such milk, the finely diffused solution of the crystalized bicarbonate of soda, which so much retards the rapid accumulation of lactic acid which is so predominant in souring of milk and cream. With such a retarding influence the dairyman has time to make good use of his milk and cream.

SUBJECT XXX.

THE LACTOMETER OR MILK MEASURE.

When freshly drawn milk is permitted to stand the butter globules rise to the surface and form cream. The proportion of milk may be determined by means of an instrument called the lactometer, which consists simply of a glass tube six or seven inches long, which is marked off in a hundred equal divisions from above downward. It is filled with a sample of milk and allowed to stand; when the per cent. of cream which form can be read upon the scale.

SUBJECT XXXI.

PRODUCTION OF BUTTER.

Butter is obtained either from cream or from milk by agitating it in various ways (churning). This is necessary because the oil globules are invested by a delicate membrane which requires to be ruptured before the butter will cohere into a solid mass. Heat also bursts the globules and causes them to unite, but the butter thus formed is of a poorer quality. The best temperature for churning is for cream 55 degrees to 58 degrees, and for milk 65 degrees. During the process of churning the temperature rises from 4 degrees to 10 degrees, and the milk or cream, if sweet, turns sour; oxygen is absorbed and acid formed, which seems to aid in the coalescence of the oil globules. From a great variety of causes butter is liable to change, by which its quality is impaired; among these may be mentioned the absorption of bad odors by cream if not kept in a perfectly clean place with a frequent renewal of fresh air, washing with water containing much

lime or other organic matter, and packing with impure salt. But the chief source of injurious changes in butter is the putrefaction of cheesy matter (casein), of which it always contains a small portion. The casein converts the sugar of milk into lactic acid and that into butric acid to which the disagreeable smell of rancid butter is mainly due.

SUBJECT XXXII.

MILK SUGAR (LACTINE.)

This is the substance which gives to milk its slightly sweet taste. It is obtained by evaporating clarified whey until it crystalizes. It is much less soluble than cane or grape sugar and therefore much less sweet; it is also hard and gritty. Casein, or the curd of milk, has the same composition and properties as vegetable casein. It exists in milk in a state of solution but is very insoluble in water, for it requires four hundred lbs. of water to dissolve one lb. of casein. Casein is held in solution in milk by a small quantity of soda; if this is neutralized by an acid the casein is at once precipitated as insoluble curd, and an addition of a little carbonate of soda or potash, so as to form a weak alkaline solution, dissolves it.

SUBJECT XXXIII.

NATURAL CURDLING OF MILK.

When milk is exposed to the air for a certain length of time it becomes sour and curdles; that is, its casein is precipitated. The curd, however, does not readily separate from the liquid part (whey) unless a gentle heat be applied, when it contracts in bulk and rises to the surface of the milk, where it is in contact with the air. The changes that here occur are begun by the oxygen of the air which induces decomposition in the nitrogenized casein; this decomposition is propagated to the sugar of milk, which is changed to lactic acid probably by being first converted into grape sugar. But this is not precisely known. The lactic acid gives to milk its sourness, and by neutralizing its soda precipitates the casein.

SUBJECT XXXIV.

ARTIFICIAL CURDLING OF MILK.

It seems to matter nothing whether the acid is generated spontaneously by the elements of milk or is added artificially, the effect being the same. Almost any acid substance possesses the power of curdling milk. In Holland muriatic acid is said to be extensively employed for this purpose in the cheese manufacture. In Switzerland they add a little sour milk to produce the curd, while in other countries vinegar, tartaric acid, lemon juice, cream of tartar and salt of sorrel are also employed. But the substance most generally used for this purpose usually consists of the lining membrane of the stomach of a calf, prepared by salting and drying. This rennet is soaked in water or whey, which, being added to milk and the temperature raised to 95 degrees, coagulates it promptly. It has been hitherto considered that the coagulating action of rennet is due to a portion of gastric juice which it retains, but late researches show that it acts in the same manner as casein by changing milk sugar into lactic acid through its decomposition. Gastric juice, it is true, curdles milk rapidly, but the thorough and repeated washing and dryings to which the rennet may be subjected, without destroying its efficacy, renders it impossible to ascribe its action to that solvent; while it is well known that other membranes besides that of the stomach, in a state of decomposition, convert sugar of milk into lactic acid.

SUBJECT XXXV.

PRESERVATION OF MILK.

Milk or cream may be preserved or restored to a state of sweetness, when it has begun to sour, by adding to it a small quantity of soda, pearlash or magnesia, which neutralizes the lactic acid, and the lactates thus formed are not unwholesome. The action of curd in decomposing milk sugar is arrested, or prevented, by heating it to the boiling temperature. Hence, if milk be introduced into bottles, well corked and put into a pan of cold water, and raised to the boiling point, and after cooling be taken out and placed in a cool place, the milk may be

preserved perfectly sweet for half a year. If the bottle in this case be uncorked and the milk exposed to the air, the casein, after a few days, resumes its property of decomposing milk sugar and forming lactic acid. By evaporating milk at a moderate heat, with constant stirring, its solid constituents are left as a dry mass which may be kept for any length of time, and which, when dissolved in water, is said to possess all the properties of the most excellent milk.

SUBJECT XXXVI.

ADAPTATION FOR FOOD.

Milk contains all the saline substances which are found in the blood, or which the grôwing animal requires, phosphate of lime in large quantities (40 gallons of milk contains 1 lb.) for the development of bones, common salt to furnish, by its decomposition, the hydrochloric acid of the gastric juice and the soda of the bile, and also a trace of iron which reappears in the coloring matter of the blood. The other constituents in milk perform equally important offices in nutrition; the butter yields fat, the sugar is burned for the production of heat, the casein forms flesh, and the large proportion of water supplies the necessary elements of the system.

SUBJECT XXXVII.

ANIMAL FATS.

The fat forms about one-twentieth the weight of the healthy animal. Beef tallow is of a yellowish white color, firm, and yields 75 per cent. stearine to 25 per cent. oiline. Neat's Foot Oil is obtained from the feet of oxen by first divesting them of the hoofs and hair and then boiling them in water. This oil remains liquid below 32 degrees, and is not liable to change or become rancid. It is used for oiling leather, machinery, and particularly steeple clocks which require, in consequence of the cold to which they are exposed, an oil not liable to solidify.

SUBJECT XXXVIII.

FOUNDERED CATTLE CURE.

If cattle become foundered from an excess of eating new clover you need not be seriously alarmed if you take, say an ordinary sized butcher's knife, the blade of which should not be less than 5 or 6 inches and at least one inch broad, and if you stand in front of the animal, then just back of the last ribs and high up on the left hand side stab the animal, and the excess of accumulation of gas will at once be dispelled and the animal will soon resume her food.

N.B.—If you stand back of the animal then the insertion should be made on the right hand side. A smaller blade is of very little consequence as the incision must reach full into the paunch.

SUBJECT XXXIX.

FARROW COWS.

A dry cow is said to be a farrow cow, one not producing young in a particular season or year. If a cow has had a calf, but fails in a subsequent year, she is said to be farrow or to go farrow. Such a cow may give milk through the year.

SUBJECT XL.

MARINE BUTTER COLOR.

This color is composed of the following, and in the proportions given :

Take.....	1 oz. Saffron.
“	6 “ Curcuma.
“	5 “ Annottaine.
“	5 lbs. Butter.
“	1 pint of Lard Oil.
“	1 grain Carbonate of Soda.
“	3 grains Saltpetre.

First, the saffron is made into $\frac{1}{2}$ pint of tincture, and the butter is melted and strained through a cloth. The butter, curcuma, and saffron are next added together and boiled for 15 minutes, and then strain through a cloth and re-boil for 15 minutes longer, then add the lard oil and annottaine and stir until cool. This is enough color for 6,000 lbs. of butter.

ANOTHER.—Butter is frequently colored with the yolk of eggs, but I have rejected it on account of its transmitting a part of the color to cloths and the like that the butter may be wrapped in, besides its albumen tends to early rancidity, but may be used in short trade.

SUBJECT XLI.

TO MAKE BUTTER FROM MILK BEFORE CREAMING.

Take four ozs. pulverized alum, one-half oz. pulverized gum-arabic, and fifty grains pepsin. Place all in a bottle for use as required. A teaspoonful of this added to one gallon of new milk will, upon churning, make one pound of butter.

PERFECTION AT LAST.

The celebrated "DEFIANCE CHURN" is just what its name implies. The many reasons why it is defiantly superior to all other makes is perfectly apparent for the following reasons :

REASON I.—Its manner of construction is so simple, having no paddles working on the inside, which is by all conceded to be a source of annoyance and trouble.

REASON II.—Having no paddles to beat the butter globules into a salvy-like mass, thereby not only destroying its aroma, but laying the foundation for its early rancidity.

REASON III.—The revolving of the churn and its contents, and with such ease, entirely prevents any possibility of eddies being formed, putting every drop of cream in motion at once.

REASON IV.—Every drop of cream being in motion at once from the commencement of churning, of course causes every drop of cream to granulate together, and the volume of butter thus formed to float freely and undisturbed by paddles in the buttermilk whey.

REASON V.—The breakers being so artistically arranged and secured to the sides of the churn body, keep them entirely out of the way while cleaning and handling the butter.

REASON VI.—The glass eye, opening at all times a view, enables the operator to see at a glance the exact progress of his work and precludes the necessity of removing the lid.

REASON VII.—The churn is so arranged that no dashers are to be continually rinsed down by water, and the proper churning temperature (55 degrees to 60 degrees,) of the cream disturbed.

REASON VIII.—The all-important and conveniently arranged Air and Gas Ventilating Tube is a necessary convenience, rarely if ever before met with in a churn where its need is perfectly essential.

REASON IX.—The amount of gain of butter by the use of this churn over all others is, by actual test, $5\frac{1}{8}$ ozs. for every gallon of good cream; every particle of cream being in motion at once and continually, leaving no eddies and cream unchurned, is its apparent cause.

REASON X.—For quality, quantity and ease, enabling a child of eight or nine years of age to do the churning, sets this churn far in advance of all other makes.

REASON XI.—Considering the per cent. of its gain in butter over all others, the ease by which the churning is done, “the glass eye opening,” ease of cleaning the churn, and its strength, durability, and small cost, makes it unquestionably one of the greatest paying and labor saving articles the farmer can possess.

REASON XII.—The average amount of cream per week of one good cow is four gallons, and the gain in butter is five ounces per gallon (by the use of this churn) makes twenty ounces per week, eighty

ounces or five pounds per month, then consider the amount of loss or gain to the person having and making butter from one to half dozen cows. It is wonderfully surprising to consider the amount of butter cast out in the shape of good, rich buttermilk; all for the want of proper churning. Putting the butter at the low price of 20 cents per lb. saves to the producer \$1.00 per month or \$12.00 per year—an amount equal to 6 per cent. on \$200.00 per year, or the interest on five good cows at \$40.00 apiece. This is no wild exaggeration but solid facts.

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