

## **Historic, archived document**

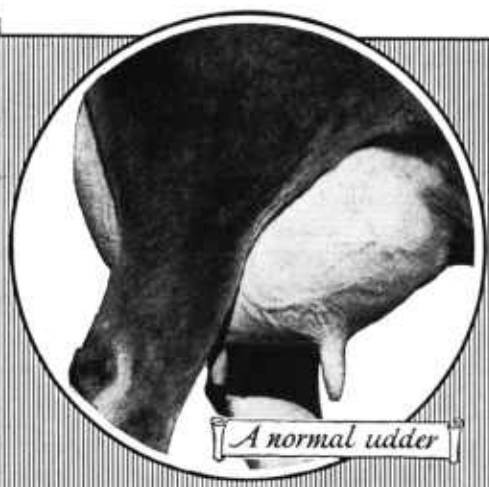
Do not assume content reflects current scientific knowledge, policies, or practices.

Nov. Dec. 1934

# U. S. DEPARTMENT OF AGRICULTURE

FARMERS' BULLETIN No. 1422

## UDDER DISEASES *of* DAIRY COWS



*A normal udder*



**T**HE MAINTENANCE of healthy cows with normal udders is of vital importance to the dairy industry.

A cow that is healthy in every other respect, but has a diseased or nonproducing udder, is worthless in a dairy herd. The prevention and treatment of the diseases which bring about this condition are discussed in this bulletin. The limitations of a bulletin of this kind preclude anything more than a brief discussion of each disease and a suggested line of simple treatment adapted to the means and condition of the average dairyman.

This bulletin is in no sense intended to replace the valuable services of the trained veterinarian, which, if available, should by all means be obtained.

An effort has been made to avoid fine distinctions and technical language in the hope that the information may better supply the widespread need of a practical and popular discussion of the subject.

Washington, D. C.

Issued May, 1924  
Revised December, 1934

# UDDER DISEASES OF DAIRY COWS

By HUBERT BUNYEA, *veterinarian*, and W. T. MILLER, *associate veterinarian*,  
*Pathological Division, Bureau of Animal Industry*

## CONTENTS

	Page		Page
Characteristics of the udder.....	1	Diseases and conditions affecting the udder—	
Prevention of diseases and injuries.....	1	Continued.	
Drying off the cow.....	2	Tumors.....	9
Separation of cow and calf.....	3	Stricture or hard milking.....	10
Vices.....	3	Atresia (blind or imperforate teats).....	10
Diseases and conditions affecting the udder.....	5	Insect stings.....	10
Inflammation (mastitis, garget, caked		Snake bites.....	11
bag).....	5	Wounds.....	11
Periodic mastitis.....	7	Leaky quarter and fistula.....	11
Abscess.....	7	Bad flavors and odors of milk.....	12
Gangrene.....	8	Bloody milk.....	12
Tuberculosis.....	8	Ropy milk.....	13
Cowpox.....	8	Milkstone or calculus.....	13
Chapped teats.....	9	Agalactia or suppression of milk.....	13
Warts.....	9	Milk fever or parturient apoplexy.....	14

## CHARACTERISTICS OF THE UDDER

**A** FUNDAMENTAL axiom of horse husbandry is well expressed in the statement "A horse is no better than his four feet." Translated into terms of dairy husbandry, it would sound much like this: "A dairy cow is no better than her udder."

Implied or expressed, this rule largely governs the desirability of animals considered for a dairy herd or the fitness of any animal to remain in the herd. The attention of the stock judge is focused on the udder conformation as a guide to a cow's excellence, and the dairyman ultimately rates her value to him according to the evidence of the milk sheets and the butterfat test.

The dairy cow's udder (fig. 1) is a highly developed gland, the result of centuries of careful, selective breeding. It is complex in its physiology. Functioning as it does, under high tension, for maximum milk production during most of the adult life of the cow, this marvelous structure is subjected to a very great physical strain, with small opportunity for rest or repair. The extra tax on the udder which is involved in the birth of calves and shortly thereafter often counterbalances the rest allowed between milking periods.

The great development of this organ and its complexity are factors which render most difficult the treatment of abnormal conditions of the udder of the dairy cow. All things considered, it is usually advisable, when a disease or injury is observed, to undertake treatment only under the advice of a veterinarian.

## PREVENTION OF DISEASES AND INJURIES

Many of the udder conditions which occasion pain and peril to the dairy cow are avoidable. Deviation from regular and established practice in the care of the animal is the frequent forerunner of serious

consequences. Lack of care in the use of milking machines, teat dilators, and milking tubes may result in the permanent injury of one or more quarters of the udder. Brier cuts, barbed-wire cuts, and the bruising or crushing of the teats by other cattle stepping on them (often due to bad stall construction) are usually avoidable. These injuries may lead to leaky quarters, fistulous teats, mastitis, and other troubles, and possibly to loss of function. Udder troubles of cows are sometimes directly or indirectly traceable to rough treatment by attendants who in driving the animals to and from pasture, stone them or beat them with sticks, clubs, or whips. Horned animals

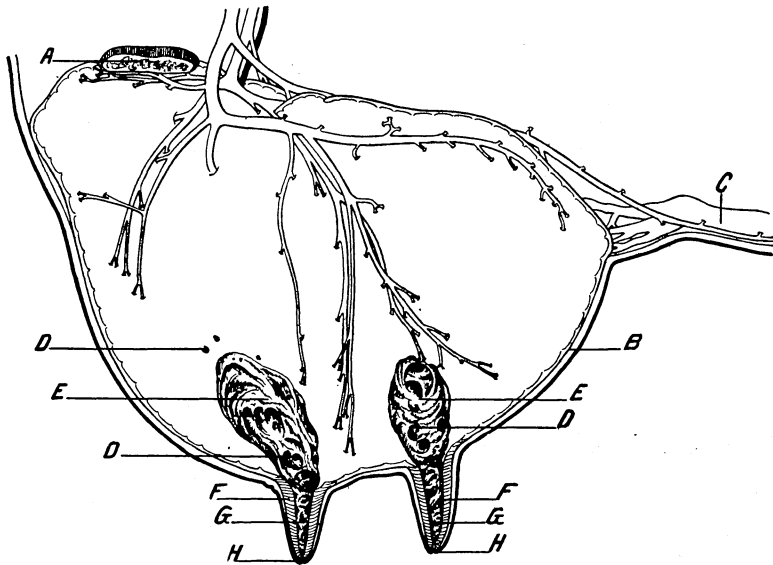


FIGURE 1.—Diagram of one-half of the udder of the cow (adapted from H. C. Wilkie). *A*, supramammary lymph gland (in section); *B*, skin; *C*, subcutaneous abdominal vein (milk vein); *D*, openings of the milk ducts, of which there are a very large number opening into the milk cisterns; *E*, milk cisterns; *F*, walls of the teats; *G*, interior of the teats; *H*, orifice or opening of the teat.

also inflict injury on their fellows, which may involve the udder as well as other parts of their bodies.

#### DRYING OFF THE COW

Long experience has shown that heavy-milking cows are more productive if allowed a resting period of from 6 to 8 weeks before calving.

Damage may result from attempting to dry off a cow too suddenly before calving, especially when the animal is on succulent pasture or a rich, concentrated ration. In some cows the instinct for milk production is so highly developed that the function seems difficult to repress even during advanced pregnancy, and efforts to terminate a milking period forcibly in such animals possibly do more harm than good.

To dry off a cow, it is advisable first to regulate her ration. Allow well-cured hay in place of succulent pasture, silage, or beet pulp. By stages eliminate all concentrates, for at this time they tend to excite a congested condition of the udder as well as to favor the continuance of milk production. Bran may be given alone or with some middlings. For about a week omit every third milking, and then milk once daily for another week, without stripping. Afterward it may suffice to milk only a few streams daily to relieve the tenseness of the udder. When the milk secretion has subsided, no further attention will be required as a rule. This plan may be varied to suit individual cases, and some authorities advise drying off cows that give 20 pounds or less by merely ceasing to milk.

It sometimes happens that just before calving time the udder of the cow becomes greatly distended and may cause the animal some pain owing to pressure, weight, and the stretching of the skin. In exceptional cases it may be necessary to relieve the condition by milking. Ordinarily, however, it is best not to meddle or interfere with this condition, which is a normal one. To milk the udder out at this stage is not desirable for at least two reasons: (1) It robs the calf of the first milk or colostrum, which nature has so wisely provided as a first laxative feed for the newborn offspring; and (2) it tends to predispose the cow to an attack of milk fever.

#### SEPARATION OF COW AND CALF

Although there are excellent reasons for the common practice of promptly removing the new-born calf from its dam, it is sometimes advantageous to leave them together. The cow often comes to her milk more naturally and easily with the calf present. The calf discovering its own appetite and then the maternal fount at which it is to be satisfied, begins punching and bunting the udder in a manner well calculated to stimulate the flow of milk and at the same time to "break up" the congestion of the organ. Possibly many a case of mastitis in fresh cows might have been avoided had the calf been left beside its dam until the udder was well "broken up."

#### VICES

Some calves acquire the habit of sucking the udders of other calves, a prank which should never be tolerated, despite the apparent harmlessness of it. The possibility of damage is twofold. In the first place it tends to the formation of an ill-shaped and pendulous udder, and hence may seriously detract from the beauty and value of the animal in afterlife. Furthermore, there is the danger that the heifer, especially if of well-bred dairy stock, may become stimulated to a virgin milk secretion. In the course of events this milk secretion, the presence of which is not suspected, may be left to dry up of its own accord, without the necessary care on the part of the owner, and a ruined udder may result. To overcome the vice the milk ration of calves may be followed by a handful of grain fed before they are turned out. This tends to remove the desire to nurse.

Cows sometimes acquire the habit of sucking their own teats. While this practice may not harm the cows it is unprofitable for the owner.

There are several more or less effective ways of breaking cows of the habit of sucking their own udders or the udders of other cattle. Some herdsmen have used the common calf weaner (fig. 2), which is a small, bib-like attachment for the nose, or the muzzle-basket type of calf weaner (fig. 3), either of which contrivances is so arranged as not to interfere with eating or drinking, but covers the mouth when the head is slightly elevated. Others have resorted to the use of the spiked halter, which

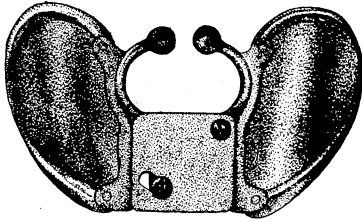


FIGURE 2.—A calf weaner. A device on the market for placing in the animal's nose.

is made by perforating the muzzle strap of an ordinary leather halter at intervals of about 1 inch and passing sharpened wire nails through the holes, from within outward, lastly lining the barbed strap to hold the spikes in place. This method, however, borders on the barbarous and may be attended with danger to the wearer or to other stock in the same pasture. A crib, or rigid collar (fig. 4), is more humane, and may be made by lacing together a number of stout sticks in barrel-stave fashion, and tying them around the animal's neck, thus preventing her from bending sidewise and yet permitting her to graze. This apparatus is mainly effective for animals that rob their own udders. Another type of apparatus (fig. 5), which is effective in preventing a cow from robbing her own udder, consists of a halter, to the chin strap of which a stout stick is attached by means of a short chain. The stick is passed between the forelegs and is fastened at the other end by a large, metal ring to the lowest point of a girdle fitted comfortably around the animal's body.

If mechanical contrivances fail to correct the vice, the culprit may be isolated for a while, or, better still, pastured for a limited time daily under observation or isolation, immediately after milking, and then stanchioned for the rest of the time. After a few weeks of this manner of restraint she should manifest no inclination to return to the habit.

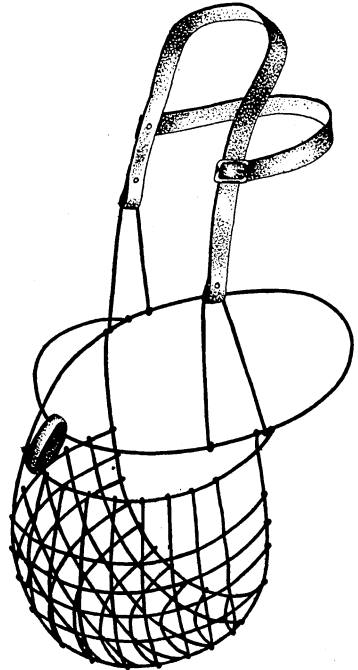


FIGURE 3.—Muzzle-basket type of calf weaner.

DISEASES AND CONDITIONS AFFECTING THE UDDER

INFLAMMATION (MASTITIS, GARGET, CAKED BAG)

Inflammation of the udder is by far the most important and widespread of udder diseases. It is caused by the activities of one or more of several kinds of bacteria which probably enter the udder through the teat canal. The disease may be present in either one of two forms, acute or chronic.

The chronic form is the more common and may exist unsuspected in the herd until the acute form appears, due to the influence of various factors. As a rule chronic mastitis is a mild but persistent inflammatory process, usually caused by one variety of bacteria. The appearance of the milk is not affected except for occasional small flakes or clots seen in the strip cup or strainer. The udder, however, undergoes a change in character which eventually leads to a hardening of parts or all of the tissues and a gradual loss of milk production from the diseased quarter or quarters. In this type of mastitis frequently only one quarter may be affected, but as the animal grows older and the number of lactation periods increases, usually more quarters become involved. In aged cows it is not uncommon to find the disease in all four quarters.

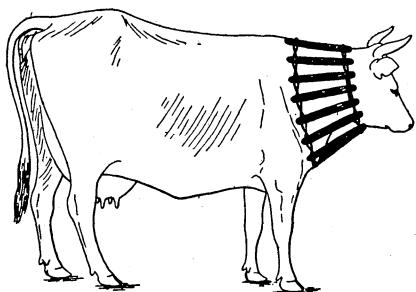


FIGURE 4.—A crib, or rigid collar, as applied to prevent a cow from sucking her udder.

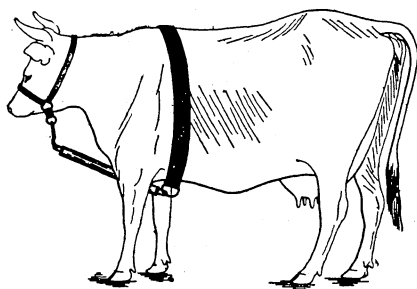


FIGURE 5.—Another form of antisucking apparatus.

The acute form of the disease may be caused by any factors which tend to aggravate the chronic mastitis already present, or it may arise as the result of a recent invasion of the udder by mastitis bacteria. Among the causes or combination of causes which may arouse the chronic condition or favor invasion of the udder by these bacteria are: Exposure to cold or wet weather, sudden change of temperature, blows, kicks, bruises, or abrasions of the udder, feeding heavily for milk production, infrequent, irregular, or incomplete milking, the introduction of contaminated foreign bodies such as teat tubes and pieces of straw into the teat canal, local infection, indigestion, or any serious disturbance of the animal's health. Although the disease occurs most frequently at calving time and toward the end of the lactation period, it may appear whenever the conditions mentioned are present.

Symptoms.—The symptoms of the acute form of mastitis are more or less characteristic. The animal stands in an awkward straddling position and moves about with reluctance and great difficulty owing to the soreness of the udder which will generally be hot and tense,



very hard, and tender. Together with these usual symptoms, there may be general depression, rough coat, dull eyes, loss of appetite, suspended rumination, and possibly constipation. There may or may not be a generalized fever, and there may be a dropsical condition under the skin of the abdomen.

In acute mastitis the secretion of milk is largely or entirely suspended. The secretion itself is lumpy or stringy, and in some cases it may appear as a straw-colored fluid, occasionally tinged with blood, containing yellowish clots. If certain kinds of bacteria are involved in the attack, the secretion may even become purulent and offensive. Very frequently the milk excreted during an attack of this kind at calving time will contain blood from some ruptured small blood vessel in the udder.

Recovery from an attack of acute mastitis is usually only apparent because of the fact that, although the milk has regained its usual appearance and production has increased materially, the bacteria responsible for the trouble are still present in the udder and capable of producing further attacks of the disease under favorable conditions. In this chronic state of the disease, there is little likelihood of complete restoration of function or of complete elimination of the infection. In addition to the establishment of the chronic condition, other unfavorable results may follow, such as the drying up of the affected quarters, the formation of abscesses, or the occurrence of milk fistula or gangrene of the udder.

**Treatment.**—One of the most important points in the treatment of an acute attack of mastitis is frequent milking of the affected quarter or quarters. This should be done every hour or two until the secretion returns to normal and should be accompanied by gentle massage with downward pressure in order to work as much of the diseased material as possible into the milk cistern where it can be removed by gentle stripping. At the same time camphorated oil or a suitable ointment may be rubbed into the skin to facilitate the massage. The secretion should be collected in a bucket containing disinfectant and disposed of in such a manner that other animals cannot have access to it. At the beginning of the attack, applications of cold packs may assist in reducing the condition. If the affected part does not respond readily to this method it is advisable to change to applications as hot as the hand will stand until the inflammation has left the part. The ration should be changed to one consisting principally of roughage with the concentrates such as cottonseed and linseed meal eliminated. No attempt should be made to force an antiseptic fluid into the quarter unless the operation is recommended and performed by a veterinarian. In view of the seriousness of the condition and danger involved to both the animal's life and future usefulness, it is advisable to obtain veterinary assistance at the earliest possible moment.

There are no effective measures available at present for the treatment and cure of chronic mastitis. Vaccination of both affected and healthy animals as a means of prevention and cure has been recommended. Although there is some doubt as to the value of this procedure, it can do no harm and may afford some temporary benefit particularly when an autogenous herd bacterin is used. A veterinarian can arrange to have these bacterins prepared by any biological laboratory, from carefully collected milk samples representing the

more active stage of the disease in the herd. Irrigation of the udder with various germicidal solutions has been attempted, but usually the results have not been satisfactory.

The best method of controlling mastitis when it appears in the herd is to prevent the spread of the disease from the affected to the healthy animals by sanitation rather than to attempt to cure the diseased cows. Such a program necessitates the detection of each infected animal in the herd by tests, which may be applied by a veterinarian, and the separation of the diseased cows in such a manner that they will always be milked after those which are known to be healthy. If a milking machine is used it should be sterilized between milkings.<sup>1</sup> Rigid adherence to such a plan will prevent the spread of mastitis, and thus reduce the number of future cases. As the infected animals are eliminated through lowered productivity or for other causes, the disease should be materially reduced or completely eradicated.

#### PERIODIC MASTITIS

In heavy-producing cows, mastitis is sometimes seen in a mild form which soon passes off, only to recur at more or less regular intervals. This type of udder disturbance, which we have come to know as periodic mastitis, does not appear to be due primarily to any infection of the organ, but mostly to the onset of a period of congestion in the udder and other reproductive organs of the pregnant cow, corresponding to the recurrence of the oestral cycle, or period of "heat", of a nonpregnant cow. This form of mastitis, however, does not occur frequently. The herd owner should, therefore, take every precaution necessary to eliminate the possibility of the infectious type being present, before concluding that the condition is periodic mastitis. Unless the condition should become aggravated by infection, the medicinal treatments recommended elsewhere in this bulletin may not be necessary. Periodic mastitis ordinarily responds to laxatives and modifications of the ration. During the attack the feed should be somewhat less stimulating and more laxative than ordinarily. A reduction of the quantities of corn meal, cottonseed meal, and similar feeds, and an increase in the bran allowance may be sufficient to ward off the attack or lessen its duration or severity. If the periods are sufficiently regular to be anticipated, the cow should receive a dose of Epsom salts (one-half to 1 pound) and 1 ounce of saltpeter, dissolved in 1 quart of warm water, as a preventive.

#### ABSCESS

Abscess is also one of the possible results of infectious mastitis, and is due to infection of the organ by pus-producing germs. The abscess may work toward the surface of the udder, where it can be assisted to a head and lanced by the veterinarian, or it may be ruptured internally so that the liquid pus may be drained through the teat. In the event of both external and internal rupturing of an abscess of the udder there is danger of establishing a milk fistula.

**Treatment.**—The abscess may be hastened to a head by hot fomentations or poultices. It is then ready to be opened and drained. The after-treatment usually consists of simple cleanliness in the general care of the animal and the dressing of the part twice daily with a mild germicidal solution.

<sup>1</sup> See Farmers' Bulletin 1315, Cleaning Milking Machines.

#### GANGRENE

Gangrene is caused by a serious interference with the blood circulation, as in some cases where the inflammatory swelling or distention with milk is so great as to produce intense pressure on the blood vessels of this region. The resulting slow, necrotic process causes the death and sloughing off of the affected quarter or quarters. This condition sometimes leads to fatal consequences, due to blood poisoning.

**Treatment.**—The raw surfaces should be thoroughly and frequently sponged with a mild germicide, such as a 2-percent solution of chloride of zinc. If amputation of the gangrenous area becomes necessary, it should be undertaken only by a veterinarian.

#### TUBERCULOSIS

Usually tuberculous infection of the udder may be distinguished from other udder infections by its gradual onset and chronic course, as well as the fact that it rarely occasions the animal any pain or inconvenience. Tuberculosis of the udder usually commences well up in one or both rear quarters, and may involve the lymph glands situated above and back of the two rear quarters of the udder. The organ itself becomes progressively hard and swollen, sometimes acquiring enormous size. Milk secretion appears normal until the infection has progressed considerably, when the milk becomes thin, watery, and scanty, and contains flaky and stringy material, and possibly blood and pus.

This disease, however, may go on unrecognized for years; meanwhile the animal continues to yield milk containing tubercle bacilli, thus endangering the health of other livestock as well as human lives. In case of mastitis that is considered possibly of tuberculous origin, it is advisable to isolate the individual and have the tuberculin test applied at once.

In the diagnosis of tuberculosis of the udder no single method is completely satisfactory. The tuberculin test may be relied upon to demonstrate the presence of the disease in the animal. There is no known cure for this disease.

Actinomycosis of the udder, caused by the same organism that causes lumpy jaw, is not so common as tuberculosis, but is sometimes mistaken for it. Definite diagnosis requires a bacteriological examination.

#### COWPOX

Cowpox is an acute, contagious disease accompanied by a slight fever and a typical eruption which is usually confined to the teats and udder of the cow. The lesions first appear as small, red papules or nodules, which later resemble blisters and are filled with a clear fluid. The third or pustular stage is marked by the change in the character of this fluid to a puslike appearance and consistency. The fourth stage is that of drying or desiccation of the pustules.

The disease is usually spread by the hands of the milker and may break out on the cow about 7 days after exposure. Cowpox is so mild and so lacking in serious consequences that in many herds its presence is either totally ignored or at least is taken for granted. Nevertheless the presence of the sores on the udders and teats renders milking somewhat painful to the cow. To avoid aggravating and prolonging the condition, therefore, the operation of milking should

be accomplished with great gentleness. The milk should be disinfected and discarded and the utensils cleaned and sterilized before further use.

**Treatment.**—The animal so affected should be isolated and milked last, and antiseptic precautions should be observed that will protect the hands of the milker from the infection. Twice daily the affected area should be bathed with a 3-percent solution of granular hyposulphite of soda. Once every day or two the pustules may be touched with tincture of iodine.

#### CHAPPED TEATS

Chapped teats are caused by any irritation, such as sudden chilling after the sucking of the calf, "wet milking" by the attendant, damp or filthy conditions in the stable, wet bedding, overstocking, exposure of tender skin to sun rays in summer, or freezing in winter. The skin is first rough and inclined to scale, and later wrinkles are formed, which become hard and deep and presently break into raw fissures.

**Treatment.**—Favorable conditions, such as dry quarters and bedding, cleanliness of the udder, and "dry milking" are essential. Wash the udder with warm soapy water and then paint the chapped surface (once daily) with compound tincture of benzoin or a mixture of 1 part of tincture of iodine and 4 parts of glycerin. It may be advisable to anoint the teats with petrolatum before milking, so that the milk may be drawn with the least pain to the animal.

#### WARTS

Warts on the teats and udder form an annoying disfigurement as well as an obstacle to milking. While perhaps harmless themselves, they may lead to abrasions or fissures and thus expose the skin of the animal to the invasion of blowflies or infections.

**Treatment.**—Long warts may be removed by twisting or tying a silk thread tightly about the base of the growth. The wart will eventually slough off.

Repeated applications of glacial acetic acid or other caustic to the body of the wart have been successfully used in the removal of such growths. Care must be observed, however, to restrict this treatment to the objectionable growth, as these chemicals are very injurious to healthy skin. As a precaution, the normal area around each wart may be previously coated with petrolatum or tallow. A safer treatment is to paint the warts with collodion containing salicylic acid. The simple application of castor oil at 2-day intervals is also said to be effective in killing warts.

Some warts require surgery for their removal. In such cases the attending veterinarian will prescribe the aftertreatment.

#### TUMORS

Tumors in the teat or milk cistern may be harmless growths or simple connective-tissue enlargements due to interstitial mastitis or to a degeneration of the gland accompanying age. As a rule these growths are better not interfered with unless they become so large as to obstruct the milk flow or otherwise inconvenience the cow. Sometimes they may be reduced by the persistent external application of tincture of iodine or an iodine ointment. If their surgical removal becomes necessary, it should be undertaken only by one skilled in the

principles of veterinary surgery and not until the cow has been dried off. Under the most favorable circumstances, surgical treatment of the udder involves the danger of a serious infection of the organ.

Tumors within the body of the udder, and sometimes in the milk cistern, may be tuberculous. Such a suspicion may be dispelled only by the animal's failing to react to the tuberculin test. A tuberculous growth in the udder is beyond remedy and constitutes a real menace to the health of persons and livestock. Seek veterinary advice.

#### STRICTURE OR HARD MILKING

Hard milking is due to an obstruction or stricture, sometimes within the milk duct, but usually at the teat orifice. It may be brought about by a tenseness of the teat orifice or by scar formation following an injury of the teat.

**Treatment.**—There are on the market several types of teat dilators, any one of which may be of benefit in correcting this condition. The dilator may be inserted an hour or two before milking, but the instrument should be sterile and the teat thoroughly cleansed before its insertion. After milking, the affected teat should be massaged with belladonna ointment. The alternate use of the ointment and the dilator should be continued until the condition appears to be corrected.

When this treatment fails it may become expedient to resort to surgical measures for the relief of the stricture, but this is done to better advantage after the cow has been dried off, when there is a better prospect of prompt healing and less likelihood of causing a dangerous infection or a leaky teat.

#### ATRESIA (BLIND OR IMPERFORATE TEATS)

Atresia is a defect existing from birth and is seldom, if ever, discovered until after the heifer has freshened. The owner's suspicion is first aroused when one or more quarters become abnormally large, hot, and painful, while the efforts of the calf to obtain nourishment are evidently unsuccessful. Examination usually reveals the fact that the teat orifice is wanting but there will be seen a distinct ring surrounding the slight depression where the teat orifice should be.

**Treatment.**—Treatment is obviously surgical and calls for the services of a veterinarian.

To prevent closure by healing, it is advisable to insert a milk tube, with usual precautions as to sterilization, at milking time, and to replace it between milkings with a sterile teat dilator, or even a strand of antiseptic tape, to act as a seton.

Healing may be promoted by the application of an ointment of the balsam of Tolu, or the fluid extract of belladonna, and glycerin. Should the opening become sealed during the healing process, it will become necessary to repeat the surgical operation.

#### INSECT STINGS

Cattle are more or less apt to be stung by bees, wasps, or hornets while grazing among clover, alfalfa, or other blossoms. The udder is a frequent point of attack because it is not so well protected by hair as other parts of the body, and, on account of its pendulous position, is more readily accessible to the aroused insect. The sting injects beneath the victim's skin an actively poisonous secretion which is

highly irritating and which may eventually prove detrimental to the health and life of the skin. Insect stings, when inflicted in sufficient numbers, have been known to produce a severe nervous depression, or even the death of the victim.

**Treatment.**—The injured area should be bathed in a 4-percent solution of ammonia or a potassium permanganate solution. An internal stimulant may be administered in the form of strong coffee.

#### SNAKE BITES

The symptoms of snake bites are local swelling and inflammation, suppression of milk, fang wounds, systemic weakness, depression, blue membranes, and later coma or convulsions, and possibly death. In the event of survival, abscess formation or sloughing of tissue at the point of injury may develop later.

**Treatment.**—Thoroughly cleanse the wound with dilute ammonia or a 1-percent potassium permanganate solution. Endeavor to prevent the absorption of venom by the excision of the wound, cauterizing it, or painting it freely with tincture of iodine. The effect of the toxin on the system should be combated with internal administrations of alcohol, coffee, or aromatic spirits of ammonia. An antitoxin for the counteraction of snake bites has been placed on the market.

#### WOUNDS

Wounds of the udder may be caused by barbed-wire cuts, brier cuts, nail snags, long and jagged finger nails of milkers, bites of dogs, the trampling of teats under the hoofs of other cattle, high barn doorsills, fence jumping, goring, etc.

**Treatment.**—Cleanse the wound and keep it clean. If the skin is laid open the underlying tissue should be thoroughly cleansed with a mild germicidal solution, the hair should be shaved or clipped from around the injury, and the lips of the wound should be brought together and held in position by means of strips of adhesive tape. In case of gaping wounds where sutures are needed or where drainage should be provided on account of pus formation, the services of a veterinarian are advisable as a mistake in treating such cases may result in the infection of one or more quarters, with disastrous consequences.

#### LEAKY QUARTER AND FISTULA

When a heavy-milking cow comes up to the barn with milk dripping or streaming from one or more of her distended quarters, the wise keeper will arrange for the animal to be milked three or even four times daily instead of twice. Cows of only moderate production may likewise leak milk at times if their milking is long delayed or their capacity of retention is otherwise abnormally taxed. Persistent loss of milk through teat leakage, however, is not only annoying but very unprofitable for the owner.

Chronic leaking is probably due in most cases to weakness of the teat orifice, to a fistula of the teat, or to the effects of a previous operation for the relief of stricture or other teat obstruction.

Weakness of the teat orifice may be overcome sometimes by the local application of tincture of iodine or saturated alum solution twice daily. The common practice of stopping a leaky teat with a rubber

band or tape, or inserting a plug between milkings, is inadvisable, as it only tends to aggravate the weakness of the part or to increase the size of the opening. Flexible collodion, into which has been incorporated 1 or 2 percent of metallic iodine, may be used to seal the teat orifice twice daily, or immediately after milking.

Teat fistula, due to injuries, constitutes a common and annoying form of teat leakage. Efforts to reduce a teat fistula, however, had better be postponed, if possible, until the milking period of the animal has been terminated. The procedure, which is a surgical one, consists in scarifying the edges of the fistulous opening, bringing the lips together, and suturing them into place to establish a closure of the aperture by healing. This operation should not be attempted by one unfamiliar with the principles of surgery, however, as skill and surgical cleanliness are absolutely necessary, while at the best there always remains the danger of establishing a serious infection of the gland. The aftercare consists in bathing the wound several times daily with a sterile 1-percent solution of table salt or a mild antiseptic solution.

If a cow in full flow of milk should receive a barbed-wire cut or other injury to the teat which would probably develop into a fistula, the correct procedure would be to have your veterinarian suture the wound immediately rather than to await the drying off of the animal and risk the consequences of a leaky quarter. The milking tube under these circumstances should always be inserted before attempting to draw milk from an injured teat.

Rudimentary extra teats should never be removed unless for a compelling reason, as such an operation is a very common cause of leaky quarters.

#### BAD FLAVORS AND ODORS OF MILK

Bad flavors and odors of milk are usually due to feed or bacterial contamination. The feed flavors may be due to the nature of the feed or to the time of feeding. Cattle on impoverished pasture may yield bitter milk, as a result of consuming quantities of some weed. In case the milk of all the cows is off flavor, the probability is that the feed is the cause, and correction of the condition can be made by either changing the feed or time of feeding.

Bacterial contamination causing off flavors and odors may come from utensils, feed, water, or udder conditions. If the cause is an udder condition, the animal should be removed from the herd and treated for the trouble. If contamination is caused by utensils, feed, or water, such causes should be removed and all utensils thoroughly cleaned and disinfected or sterilized.

#### BLOODY MILK

Bloody milk is a symptom of any of the following conditions: Mastitis, mechanical injury to the udder, or tuberculous infection of the udder. The operation of milking also may aggravate a tendency to hemorrhage if the udder is injured or inflamed.

Treatment consists in determining the cause, if possible, and in applying the remedial measures found elsewhere in this bulletin. The application of the following general treatment may be sufficient to afford relief in mild cases:

Milk out the udder completely at least four times daily, at regular intervals; bathe the udder with cold water, then dry and apply camphorated oil to the quarter with gentle massage; avoid an excessively rich diet; encourage the animal to utilize as bulky a ration as is consistent with her milk production; administer an occasional dose of epsom salts (about 1 pound) as needed, also a half ounce of saltpeter once daily. Should the hemorrhage persist, internal treatment of the udder by a veterinarian is advisable.

Redness of milk which does not appear until several hours after milking is probably due to contamination of the milk with some one of the chromogenic (color-producing) organisms. The thorough sterilization of utensils and the proper care and cleanliness in handling the milk should effectively prevent this occurrence.<sup>2</sup>

#### ROPY MILK

Milk is sometimes ropy, stringy, or slimy. What is known as "ropy milk" is due to bacterial infection after the milk is drawn. To eliminate this condition the cause should be found and removed and all utensils cleaned and sterilized to prevent further contamination.

At times stringy or slimy milk is procured from the udder and is usually caused by either injury or mastitis. Such milk should be boiled or treated so as to kill any bacteria present and then discarded. Likewise, the utensils into which the milk is drawn should be thoroughly cleaned and disinfected or sterilized. The animals should also be treated.

#### MILKSTONE OR CALCULUS

Milkstone or calculus is a term loosely applied to concretions in the udder. Some stones are formed by coagulated casein and may be an indirect result of udder inflammation, while others are simply accumulations of lime salts from the milk which may sometimes be distinguished by the occasional discovery of gritty particles in the bottom of the milk pail or on the strainer cloth.

Treatment.—After a prolonged, gentle massaging of the teat extremity with a belladonna ointment, the concretions, if not very large, may be passed with the aid of a sterile spring teat dilator. In case the stones cannot be removed in this way it may be necessary to remove them by means of an opening in the side of the teat. This operation should not be undertaken by the inexperienced layman, as the danger of seriously infecting the udder by insanitary procedure cannot be overestimated, as well as the extreme likelihood of leaving a fistulous, leaky teat. Unless the concretions are sufficiently large to constitute an obstruction, their surgical removal, even by a veterinarian, had far better be postponed until the cow has been dried off.

#### AGALACTIA OR SUPPRESSION OF MILK

The disease known as agalactia or suppression of milk is not infectious in cattle, as it is in sheep and goats. Neither is it so common. Occurring, as it usually does, at calving time, agalactia seems to be unfavorably influenced by such predisposing causes as indigestion, loss of appetite, mastitis, insufficient or unsuitable feed, plant poisoning, severe insect stings on the udder, thirst, enforced driving, fear or excitement, or the removal of the calf. Incidentally, agalactia is a symptom often seen in rabies in the cow.

<sup>2</sup> See Farmers' Bulletin 1675, Care of Milk Utensils on the Farm.



**Treatment.**—The animal, if a heifer, should first be examined for the possibility of atresia, or imperforation of the teats. Eliminating this possibility, the attention should be directed toward determining, if possible, the contributing cause or causes, which should receive prompt attention.

The animal should be surrounded with an environment most conducive to her comfort and complete satisfaction. She should be supplied with an abundance of fresh, clean, drinking water, and have a generous allowance of a ration, preferably in the form of a warm mash, calculated to stimulate milk secretion. Milk secretion may be assisted by internal medical treatment. Massaging the udder with lard or an ointment containing extract of belladonna leaves may assist in bringing her to her milk. Efforts should be made to milk her twice daily, at regular milking time, even though the efforts are unrewarded. If the calf is brought to her side shortly before milking time, this additional appeal to her maternal instinct may exert a favorable influence.

#### MILK FEVER OR PARTURIENT APOPLEXY

The condition known as "milk fever" occurs, as a rule, immediately after calving and usually appears in the best-producing cows in the

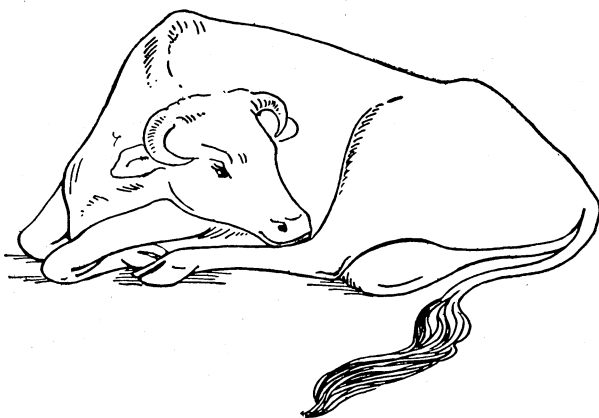


FIGURE 6.—Characteristic attitude of a cow with milk fever.

herd at the time when they have reached their full production of milk, between the ages of 5 and 9 years. It is characterized by its sudden appearance and acute course. The animal becomes paralyzed and passes into a semiconscious or unconscious condition which may terminate in death.

The exact reasons that this condition develops in some cows and not in others are not definitely known. However, it is known that as a result of the onset of the disease there is a marked fall in the calcium or lime content of the blood and that by increasing the amount of calcium circulating in the blood a cure can be effected. Apparently such factors as heavy milk production, excessive feeding, and lack of exercise predispose the animal to such an attack.

The symptoms of milk fever are characteristic and easily recognized. Soon after, or in a few cases immediately before calving, the cow may show signs of excitement and anxiety followed by constipation and colicky symptoms. The owner may notice a staggering gait and weakness especially of the hind quarters. Eventually the cow, no longer able to maintain the standing position, goes down and assumes the posture so characteristic of this disease (fig. 6) with the hind legs extended forward and the head thrown back toward the

flank. A comatose condition may follow, during which there is danger in attempting to administer medicine by the mouth as the throat muscles are temporarily paralyzed and the material may pass into the windpipe and lungs and cause pneumonia. Pulse and respiration are weak, and the temperature is more frequently subnormal than otherwise. Unless prompt remedial measures are undertaken, death will follow within 3 days. Although the symptoms given are found in a majority of milk-fever cases, an occasional case may occur in which the usual symptoms are missing, and in addition the case may be complicated by the presence of other conditions. Veterinary advice should be obtained, therefore, in all cases of milk fever.

**Treatment.**—Two methods of treatment are available and appear to be equally efficient. They both accomplish the same purpose—the restoration of calcium to the blood. The newer method consists in administering calcium salts, dissolved in sterile water, to the animal either by way of a vein or under the skin. Either calcium gluconate or calcium chloride may be used, but the former is preferable, especially for injection under the skin as it is much less irritating and less

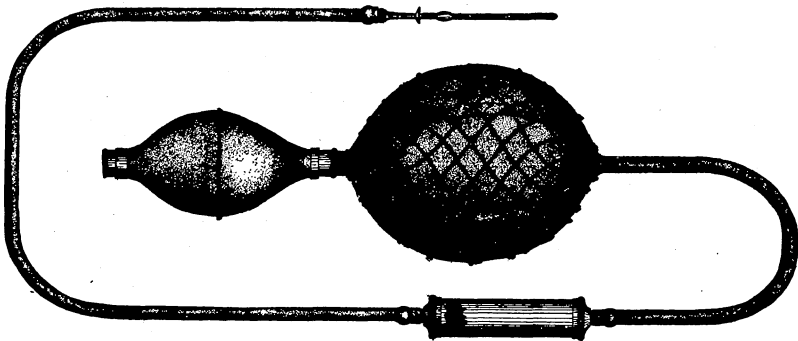


FIGURE 7.—Apparatus, used in treatment of milk fever, for injecting sterile air into the udder.

apt to cause abscess formation and sloughing. As the dosage of either of these salts depends upon the method of administration and also upon the size of the animal, the remedy should be used only by a veterinarian. In some cases it may be necessary to repeat the treatment a second and even a third time before permanent recovery is attained. The principal advantage of this method is that no manipulation of the teats and udder is necessary, and consequently there is no danger of introducing infection into the quarters and thus causing mastitis.

The other method of treatment consists in inflating the quarters of the udder with sterile air and tying the teats with broad tapes. The udder is allowed to remain inflated for several hours after the cow has regained her feet. The treatment must be performed with the utmost regard to cleanliness. A clean cloth should be laid beneath the udder which is then washed clean and disinfected with 5-percent carbolic acid solution.

The apparatus used for inflating the udder (fig. 7) consists of a rubber-bellows arrangement attached to a rubber tubing, which in turn is connected with a hollow metal cylinder containing sterile cotton

for the filtration of air. Another rubber tube is attached to the other end of the metal cylinder, and at the other end of this rubber tube is the metal teat catheter. The last tube and metal catheter should be thoroughly sterilized by boiling, and the hollow metal cylinder should be loosely packed with sterile cotton.

The catheter is then inserted into one of the teats of the previously cleaned udder, and the rubber bulb is operated by repeated compressions until the quarter is well inflated. Massage of the quarter during inflation will assist in filling the recesses of the gland with sterile air. The catheter is then withdrawn and the teat tied with broad tape. After inflating all four of the quarters the veterinarian will have an opportunity to attend to any complications or to administer stimulants if necessary. Medicinal treatment is usually superfluous, however, in uncomplicated cases of milk fever. Following the sterile-air treatment alone, it is no uncommon experience to find the cow on her feet in from 30 to 60 minutes and eating as though there had been no disturbance of her normal condition.

Should the first sterile-air treatment fail to give relief, the procedure should be repeated, as the air previously injected may have escaped or been absorbed. The tapes may be removed in about 5 hours, or soon after the cow regains her feet. The air should remain in the udder for about 24 hours, after which time it should be completely extracted by the manipulation used in milking. It is then safe to permit the calf to suck. An occasional case of milk fever is found which fails to respond to this method but is immediately relieved by the use of the calcium salts. On the other hand, a few cases are not benefited by the injection of these agents but do very well following the inflation of the udder.

**Prevention.**—Although it is impossible to foretell which animals may suffer from milk fever at the time of calving, there are some general measures which may be used that are believed to be of assistance in warding off such an attack. When the cow is dried off prior to calving she should be placed on a light ration of bran and a little ground oats, supplemented with suitable hay and possibly some succulent roots or an occasional feed of silage or beet pulp. She should be housed in a dry, comfortable, well-ventilated stable with sanitary surroundings, properly bedded, and given sufficient and regular exercise daily up to the time of calving. Several days prior to calving she should receive a full dose of epsom salts. Cows which are known to have had milk fever at previous calvings may be given a dose of calcium salts, in the manner previously described, immediately before calving as a possible precautionary measure.

**ORGANIZATION OF THE UNITED STATES DEPARTMENT OF AGRICULTURE  
WHEN THIS PUBLICATION WAS LAST PRINTED**

---

<i>Secretary of Agriculture</i> -----	HENRY A. WALLACE.
<i>Under Secretary</i> -----	M. L. WILSON.
<i>Assistant Secretary</i> -----	HARRY L. BROWN.
<i>Director of Extension Work</i> -----	C. W. WARBURTON.
<i>Director of Finance</i> -----	W. A. JUMP.
<i>Director of Information</i> -----	M. S. EISENHOWER.
<i>Director of Personnel</i> -----	W. W. STOCKBERGER.
<i>Director of Research</i> -----	JAMES T. JARDINE.
<i>Solicitor</i> -----	MASTIN G. WHITE.
<i>Agricultural Adjustment Administration</i> ----	H. R. TOLLEY, <i>Administrator</i> .
<i>Bureau of Agricultural Economics</i> -----	A. G. BLACK, <i>Chief</i> .
<i>Bureau of Agricultural Engineering</i> -----	S. H. MCCRORY, <i>Chief</i> .
<i>Bureau of Animal Industry</i> -----	JOHN R. MOHLER, <i>Chief</i> .
<i>Bureau of Biological Survey</i> -----	IRA N. GABRIELSON, <i>Chief</i> .
<i>Bureau of Chemistry and Soils</i> -----	HENRY G. KNIGHT, <i>Chief</i> .
<i>Commodity Exchange Administration</i> -----	J. W. T. DUVEL, <i>Chief</i> .
<i>Bureau of Dairy Industry</i> -----	O. E. REED, <i>Chief</i> .
<i>Bureau of Entomology and Plant Quarantine</i> ----	LEE A. STRONG, <i>Chief</i> .
<i>Office of Experiment Stations</i> -----	JAMES T. JARDINE, <i>Chief</i> .
<i>Food and Drug Administration</i> -----	WALTER G. CAMPBELL, <i>Chief</i> .
<i>Forest Service</i> -----	FERDINAND A. SILCOX, <i>Chief</i> .
<i>Bureau of Home Economics</i> -----	LOUISE STANLEY, <i>Chief</i> .
<i>Library</i> -----	CLARIBEL R. BARNETT, <i>Librarian</i> .
<i>Bureau of Plant Industry</i> -----	FREDERICK D. RICHEY, <i>Chief</i> .
<i>Bureau of Public Roads</i> -----	THOMAS H. MACDONALD, <i>Chief</i> .
<i>Resettlement Administration</i> -----	W. W. ALEXANDER, <i>Administrator</i> .
<i>Soil Conservation Service</i> -----	H. H. BENNETT, <i>Chief</i> .
<i>Weather Bureau</i> -----	WILLIS R. GREGG, <i>Chief</i> .