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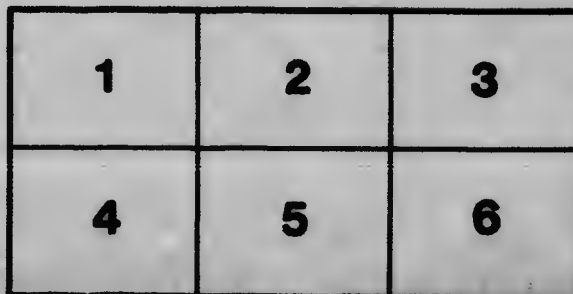
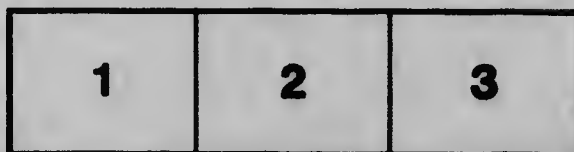
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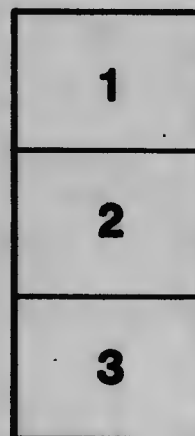
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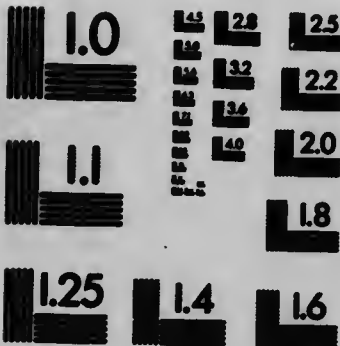
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DEPARTMENT OF AGRICULTURE
LIVE STOCK BRANCH

FOOT AND MOUTH DISEASE

Its Nature, Cause, and Treatment

Compiled by J. C. Smith, B.S.A., Live Stock Commissioner.

This disease is also known as aphthous fever or epizootic apthia. It is an acute, highly communicable disease which attacks practically all domestic animals. Of these, cattle, sheep, swine and goats are most susceptible; the greatest losses being most commonly caused amongst cattle. Human beings may also be affected.



Cow affected with Foot and Mouth Disease, showing the manner in which the saliva runs from blistered mouth.

SERIOUS NATURE OF DISEASE.

It has been recognised as a separate disease in Europe since 1839, and has caused incalculable losses in different European countries where outbreaks are still fairly frequent, notwithstanding the most stringent regulations in regard to stamping it out. On the American continent it has fortunately been of rare occurrence, appearing in Canada in 1870, 1875 and 1884, and in the United States in 1870, 1880, 1884, 1902-3, 1908 and 1914-15. In this latest outbreak the total amount of loss borne by the State of Illinois alone up to March 3,

1915, was \$1,187,471, with twice that amount of actual loss. Between October, 1914, and January, 1915, the United States Government paid farmers over \$3,000,000 compensation in endeavouring to eradicate the disease.

The amount of loss caused by interference with the movement of market stock is incalculable. When stock yards like those at Chicago, with a daily handling average of from 30,000 to 50,000 head of all classes of stock are closed down, some idea may be had of the effect of this disease on the live stock business of a country. Besides this we have to consider the loss and inconvenience to breeders of pure bred stock. All movement of stock ceases, sales cannot be made and animals already sold cannot be delivered.

EFFECT ON ANIMALS.

Affected animals suffer severely. With blistered mouths and feet, burning fever, raw, swollen tongues hanging out between infected lips, sore feet and swollen ankles, they present a piteous appearance.

In milch cattle the flow of milk becomes greatly decreased or ceases altogether. Pregnant females frequently abort. In sheep and swine we frequently have entire separation of the horny and fleshy portions of the feet. Little wonder then, that, even though the mortality is not great, this is a dread disease.

NATURE.

Foot and mouth disease is an acute fever of a specific nature characterised by the breaking out of vesicles or blisters in the mouth, around the coronets of the feet and between the toes. These also appear on the mucous membranes and tenderer portions of the body, such as the udder and teats of cows, etc.

It is very highly contagious but, contrary to general belief, does not cause great mortality, although the financial loss involved by its appearance is tremendous.

In the present outbreak in the United States, in Illinois alone, up to March 3, 1915, 22,177 cattle, 30,842 hogs and 1,022 sheep have been slaughtered. The appraised value of these animals was \$1,800,000, of which \$900,000 is paid by the State and \$900,000 by the Federal Government. Seven hundred and five farms were infected and the cost of cleaning and disinfecting these and burying the slaughtered animals was \$202,000.

CAUSE OF THE DISEASE.

Despite all up-to-date scientific effort, the causative agent of this disease has not as yet been isolated. It is generally agreed, however, that it is due to a specific virus of a class of disease-producing material known as "filtrable viruses," on account of the fact that they are so infinitely small as to be capable of passing through the pores of a bacterial filter, probably too small to be seen even with the aid of the highest powers of the microscope.

ANIMALS SUSCEPTIBLE.

As stated, it attacks practically all domestic animals, though some classes are far less susceptible than others. Cattle are generally considered most susceptible; but sheep, swine and goats are also readily infected, the disease spreading rapidly in the case of all these. Human beings may contract it from coming in contact with diseased animals, from contact with those attending such or from drinking milk from infected animals in which the germs have not been destroyed. In some instances horses, dogs and cats have been known to contract the disease, but such cases are not common. As in other diseases, certain animals of the same species seem more resistant than others.

PERIOD OF INCUBATION AND SYMPTOMS.

The period of incubation or the time elapsing between the exposure of the animal to infection and the appearance of the disease varies from forty-eight hours to ten days.

Early symptoms are dullness, loss of appetite, shivering, staring coat, arched back, stiffness of movement and a decided rise in temperature. The temperature may rise from normal (in cattle from 100 deg. to 102 deg. Fahr.) to 105 deg. or 106 deg. Fahr., and sometimes higher, but this rise is not always accompanied by an increase in the pulse.

These premonitory general symptoms are usually followed by the more localised conditions which characterise the disease. These include definite lameness, salivation or slavering at the mouth accompanied (in cattle) by a smacking or sucking sound. Saliva becomes more ropy and viscid as disease progresses. Within 24 hours of the appearance of general symptoms vesicles or blisters appear on the mucous membranes, especially those of the mouth, on the pad, inside the lips, and on the tongue. In the feet they appear at the junction of the skin with the hoof, on the soft tissue between the digits, and around the coronet. They are commonly found on the teats in females, and less commonly on other tender portions of the body. These vesicles or blisters vary in size and shape from the size of a small pea to a hazel nut, being from one-fifth of an inch to an inch in diameter. They are soft and watery, but, at first, are not usually accompanied by inflammation of the surrounding tissue. Those on the tongue are usually larger and less easily ruptured than those on the pad and lips. These vesicles are easily ruptured. If not ruptured by the animal's efforts to eat, they burst spontaneously on reaching maturity. When ruptured a limpid, yellowish fluid exudes which grows denser and more opaque as the disease advances. This fluid is intensely infective. The mucous membrane over the newly ruptured vesicle looks like the skin over an ordinary blister and separates easily from its attachment. The under surface is a red, angry, raw and painful sore, gradually changing to a reddish-yellow colour. The vesicles on the feet are similar to those on the mouth except that the covering is thicker. These erosions are extremely painful, and even under favourable conditions, heal slowly.

IMMEDIATE EFFECTS.

Animals at pasture show very rapid loss of flesh as, owing to pain of mouth and feet, they are unable to obtain sufficient nourishment. In some cases the horny portion of the feet may become separated from the flesh in the later stages of the disease; this is especially the case with sheep and pigs. In milch cows the milk yield decreases greatly or ceases entirely. The teats and udder are usually affected and, in deep milkers or newly calved cows, the lesions may become extensive and injury of a serious and permanent nature may result. The milk in all cases is unfit for use. It not only becomes thick and yellow, with an offensive odour, but is fatal to young animals, producing death either by inflammation of the bowels or by direct poisoning.

Cattle in the early stages may be seen to shake the affected foot or feet as if trying to dislodge some foreign body from between the digits. Within twenty-four hours of the appearance of lameness, vesicles characteristic of the disease may be seen around the feet, generally at the openings of the inter-digital space. These are preceded by pain, heat and swelling and, in white or light coloured cattle, by redness around the coronet.

In sheep, the disease is generally confined to the feet, mouth lesions not being common in the majority of cases. The vesicles are usually situated at the heels or directly on the coronet, often in the more malignant type of the disease causing a gradual casting and renewal of the hoof accompanied by extreme pain.

In pigs the mouth symptoms are slightly different from those shown in cattle and sheep, besides being more generally in evidence on the snout and lips than on the tongue and inside the cheeks. In this class of stock the mammary glands are frequently involved.

EASE OF INFECTION.

Probably the most serious aspect of this disease is the ease with which infection is transmitted. It is probably the most contagious disease in existence. So contagious is it that when one animal in a herd becomes affected the remainder almost inevitably contract the disease also. Not only may it be transmitted by diseased animals themselves but by persons in attendance on them. The contents of the vesicles or blisters are infective, and thus it follows that all material infected thereby, such as saliva, hides, foodstuffs, litter, manure and milk will also be infective. Horses, dogs, cats and birds, especially pigeons, have all been known to carry infection, and it is stated that persons whose clothes are infected can transmit the infection to the clothes of others from whence it again may infect stock; this is known as "mediate contagion."

The virus enters the body through the mucous membranes and probably the commonest mode of infection is by the digestive tract. A very small amount of the material from the vesicles (1-250th of a drop) has been found sufficient to cause infection.

Unlike many other diseases, one attack of foot and mouth disease does not render an animal definitely immune—thus one animal may be subject to several attacks. Animals may become infected directly, as by licking—and in calves, by sucking; or indirectly, by infected manure, hay, litter of any kind, stable utensils, drinking troughs, railway cars, market or stock yard pens, barn yards and pastures.

DIAGNOSIS—HOW TO RECOGNISE THE DISEASE.

The recognition of this disease is not usually difficult. The combination of high fever, vesicular inflammation of the mouth, and hot, painful, swollen condition of the feet, followed usually in twenty-four to forty-eight hours by the appearance of numerous small vesicles varying in size from that of a pea to a hazel nut in the mouth and on the udder and feet, should prevent any serious error.

The only diseases that at all resemble foot and mouth disease are cowpox, foul foot or ground itch, inflammation of the lining membrane of the mouth (mycotic stomatitis) or ergotism, and none of these combine the vesicular eruption of the mucous membranes and tender skin around the feet, with a marked rise in temperature, salivation, and a rapid infective spread from animal to animal.

HOW TO PREVENT THE DISEASE.

Foot and mouth disease is probably the most highly infective disease known. This fact should be remembered when dealing with it. The first step to take if its appearance is even reasonably suspected is to notify either the Dominion Health of Animals Branch, Regina, or the Live Stock Branch, Department of Agriculture, Regina, by wire.

Completely isolate all suspected animals and permit no one to examine them or work around them. A special attendant should be appointed who should have nothing whatever to do with the remainder of the stock on the farm, of any kind, and who should carefully disinfect his clothing before mingling with other people. The best way is to use certain clothes for the work and to change these immediately on leaving the isolation stable. Dogs, cats or poultry can carry the disease, so it is imperative to have sick animals completely isolated until the arrival of the veterinarian.

If the disease is suspected on another farm let *no one from that farm* come on to the premises, especially any owner, attendant or other person connected with stock. Do not visit suspected premises or stock yards. It may be dearly bought experience if you carry the disease home. Milk should not be allowed to leave the premises nor should it be fed to other animals.

TREATMENT.

As stated, the disease is not generally fatal, but it is usual to slaughter all affected animals. Curative treatment may alleviate suffering but will not stop the course of the disease nor prevent infection spreading. Any measures are better than the spread of the disease.

Affected animals should be isolated and slaughtered as soon as the diagnosis is certain, or at the earliest possible moment. The carcasses of these animals should be totally destroyed, preferably by thorough cremation, otherwise by burying them in a trench at least six feet deep and covering the carcasses with air-slaked lime.

DISINFECTION.

Infected stables should be disinfected by thorough cleaning. Floors should be scrubbed with hot water. All loose dust should be brushed from walls. All partly decayed woodwork should be torn down. The whole interior of the stable should be covered with a good coat of limewash containing 1 part of a 40 per cent. solution of formaldehyde



Burial of Foot and Mouth carcasses in deep trench to prevent further spread of disease.

(formalin) to 30 parts of limewash, or 16 ounces (1 fluid pound) of formalin to every 4 gallons of limewash.

Another efficient wash for this purpose may be prepared by adding 6 ounces of chloride of lime to each gallon of limewash. All stable utensils should be thoroughly cleaned and disinfected by the application of a solution containing 4 ounces of formalin to a gallon of water or 6 ounces crude carbolic acid to each gallon of water. The manure should be burned. No other cattle, sheep, hogs or goats should be placed on previously infected premises for from thirty to fifty days after complete disinfection has been carried out.

POINTS TO ESPECIALLY REMEMBER.

If foot and mouth disease is suspected:

1. Isolate the sick animal completely, indoors;
2. Notify the Dominion Health of Animals Branch or the Department of Agriculture, Regina, by wire;
3. Get your local veterinarian as soon as possible;
4. Have a separate attendant for sick animals, whose clothes must be disinfected or changed immediately after leaving isolation stable;
5. Let nobody see affected animals till you are sure disease is not foot and mouth;
6. The duty of an owner is to suspect the disease—an ounce of prevention is worth several pounds of cure;
7. Do not visit farms or places where there are suspected cases.

Department of Agriculture,
Regina, April 1, 1915.

Note.—Companion Bulletins dealing with Hog Cholera and Black-leg respectively may be had free of charge by addressing a postal request to the Live Stock Commissioner, Department of Agriculture, Regina.

