SPECIAL REPORT

OF THE

Kansas State Board of Agriculture,

ON

INDIGESTION IN CATTLE.

FOR THE

INFORMATION OF FARMERS AND STOCK FEEDERS.

COPIES WILL BE FURNISHED UPON APPLICATION TO

WM. SIMS, SECRETARY,
TOPEKA, KANSAS.

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STATE VETERINARIAN'S OFFICE,
TOPEKA, KAS., Nov. 29, 1886.

HON. WM. SIMS, *Secretary State Board of Agriculture, Topeka, Kas.:*

DEAR SIR—I have the honor to transmit herewith a special report on Indigestion in Cattle, with request that it be published for distribution in the State. I do so for the reason that the losses from this trouble are so widespread that the demands for my services in investigating the numerous outbreaks cannot be met.

I am, sir, your most obedient servant,

A. A. HOLCOMBE,
State Veterinarian.

Copies will be furnished on application to WM. SIMS,
Secretary State Board of Agriculture,
TOPEKA, KAS.

INDIGESTION IN CATTLE.

SYNONYMS:—*Dry Murrain; Bloody Murrain; Impaction of the Stomachs; Stomach Staggers; Maw-Bound; Enteritis.*

DEFINITION.

Under the head of *indigestion*, I propose to treat of all those derangements of the digestive organs which are so common to cattle in this State. While the lesions produced by these complaints differ very materially, the symptoms of all are so closely grouped together, and the causes so nearly related, that to treat of each one separately would only serve to confound the readers for whom this report is intended. The object sought in presenting this article to the public is to direct the attention of stock raisers to causes which produce these complaints, and the means and measures necessary to prevent them.

Dry murrain is used to designate that condition in which marked constipation exists, without any organic disease of the digestive organs. When the discharges from the bowels are bloody, and they may be either hard or soft, the trouble is called *bloody murrain.*

When the first stomach, or rumen, is packed with undigested food, the complaint is called *impaction of the rumen* (paunch). When this condition is found in the third stomach it is called *impaction of the manyply.* (The second and fourth stomachs are never impacted.) Whenever from over-distension of the first or third stomachs, the functions of the brain are so deranged that the animal staggers in his gait, turns in a circle, or stumbles as he walks, the disease is known as *stomach staggers.*

Maw-bound means simply that the contents of the maw, or first stomach, are prevented from passing onward in the process of digestion; in other words, it is impaction of the rumen.

Enteritis, in the broad sense, is used to designate inflammation of the bowels, of the stomachs, or of both.

GENERAL PREVALENCE OF THE DISEASE.

The losses of cattle in this State, resulting from derangement of the digestive organs, undoubtedly exceed the losses produced by all other causes combined. While the disease is occasionally seen during the spring and summer months, it is most common during the autumn and winter; and while no part of the State is free from the complaint, it is most common in the great corn-raising counties. The general prevalence of the disease, and consequently of the mortality, is determined largely by the character of our seasons; for upon these seasons the quality of our cattle-food greatly depends.

CAUSES.

The one great cause of indigestion in cattle, is the use of much dry and innutritious food throughout a great part of the year. An occasional case of acute indigestion, or of enteritis, will be found in animals kept on rich food; but these are exceptional cases, and the cause therefor is not always to be found in the nature of the food.

Unfortunately, it is the custom in this State to feed stock cattle largely upon corn stalks which have been left to ripen in the fields, and upon grass which has been deprived of most of its nutritious qualities by reaching maturity before being made into hay. As is well known, when grass, wheat, rye, millet and corn are allowed to ripen on the ground, the stalk contains but little nutritious matter, being composed almost entirely of indigestible cellulose and woody fiber. Even the buffalo grass, which in times gone by was considered a superior article of winter food for cattle, has of late years lost much of its vaunted reputation, owing to the late autumn rains washing out the most of its nutritious elements. Such food, poor in heat-producing elements, is not adapted to the proper maintenance of the functions of life. Not only is it deficient in quality, but by reason of its poverty it imposes an extra tax upon the digestive organs, in that they may extract from the mass the little nutriment which it may contain. Too often this expenditure of force in the process of digestion is greater than can be replaced by the small percentage of matter utilized. The greater the supply of such food, the sooner does the digestive machine wear out. In other words, the ore is too poor to pay for the crushing.

True it is that many cattle do manage to maintain an existence on such food until the spring grasses insure a new lease upon life, but surely there is no economy in such a poverty of condition.

Another cause of indigestion is to be found in musty hay, straw, and fodder. Of these three, musty straw, and particularly oat straw, is the most common. Musty fodder is rather rare, for the reasons that but little corn is cut up, and when it is it is so ripe that little curing is required. Rotten corn when left in the fields at the time of gathering may prove productive of serious digestive derangements to cattle turned into the stalks to pasture. The small percentage, however, of such grain, gathered with the crop, is not likely to do any harm. But the refuse from cribs in which corn has been stored should never be used for food, since it is exceedingly dangerous, particularly to horses and cattle.

As to whether the smut of corn is dangerous when eaten by cattle, seems to be an open question. The majority of the writers on the subject imagine that it is; and yet, in so far as I can learn, all experiments made in feeding it, even in very large quantities for many days at a time, have been unattended by any serious results. From my own observations, I am led to the conclusion that it is not poisonous, and that if it has any unfavorable influence on the animal eating it, this influence is limited solely to the tendency it may have to produce impaction.

But a deficiency in the quantity and quality of the food supply, stands not alone as the cause of an excessive mortality among our stock cattle; want of shelter and poor water lend helping hands in this waste of wealth. Want of shelter is simply a waste of fuel, for the animal temperature must be maintained at the normal standard of 100°. If it falls much below this, the animal dies. To sustain this temperature requires the constant conversion of food into heat. If food is not supplied from without, the animal must fall back on his own store house of fat. Anything which increases the loss of body heat increases the demand for food. Exposure to bleak winds and low temperatures tend to exhaust the heat of the body, and this in turn proves dangerous by impairing all life functions, particularly that of digestion. These reasons in part account for the increased mortality among cattle which attends all our cold spells of winter.

Want of water is not less dangerous than want of food and shelter. About seventy pounds of water per day are required by a steer weighing a thousand pounds while kept on good food. Very rich food may be digested with a lesser quantity. The more dry and innutritious the food, the greater must be the supply of water. Corn stalks and poor prairie hay require the consumption of from ninety to one hundred pounds of water per day for each animal of a thousand pounds. This immense amount of water must be raised to the temperature of the animal before it becomes a part of himself in the intricate processes of life. This can only be done by the expenditure of animal heat, which must be replaced primarily by the process of digestion. It follows, then, that the colder this supply of water, the greater is the task of heating it to the normal temperature of the body. In other words, very cold water for cattle in winter weather is a waste of food. And not only is it a waste of food, but it is also detrimental to digestion, for it largely arrests this function until the water has reached the temperature of the body. Instinctively the unsheltered brute drinks sparingly of very cold water in winter weather—a precaution not always unattended by danger, for it may excite a fatal impaction of one or both the stomachs.

A deficient supply of water is detrimental for still another reason; for without an ample quantity the nutritive elements cannot be extracted from the food, and as a consequence they are wasted by passing out of the body unused. At the same time, a stint in the water supply makes the process of chewing the cud slow, laborious, and often incomplete.

That the water supply, then, should be pure, plentiful, accessible, and not too cold in winter, must be apparent to all who give the matter thought.

Lastly, in this connection, it would seem that no argument should be necessary to prove that the owner is amply compensated for the care which he may give his animals; and yet there is so much wealth lost each year in cattle that die for the want of proper food and shelter, one is forced to the conclusion that too many owners are imbued with the idea that the border line of starvation is the economical high road to success in raising stock. From this belief, or at least from this practice, I emphatically dissent. It

is not right, it is not just to the dumb brute, and it is not economical, to meanly care for the animal, which by virtue of its circumstances is deprived of the opportunity to care for itself.

SYMPTOMS.

The symptoms of deranged digestion in cattle are most characteristic. They vary of course within certain limits, according to the organ most affected, and the nature of the derangement. No one case will present all of the symptoms here enumerated, but the presence of several of the more prominent ones will enable anyone who is closely observant to make a diagnosis. The greatest losses occur from turning cattle into stalk fields, and the symptoms in these cases generally appear within a few hours after the animals have gratified their appetites. It is quite common to find one or more of a bunch dead the next morning after their first experience in the stalks. At other times no sick ones are seen for two or three days, and even a week or ten days may elapse before the last will sicken from a single meal made in the stalk fields. In one outbreak which I saw this fall, of 27 animals turned in the stalks one afternoon 14 were dead within 26 hours. In another, 6 died during the first night; in another, 14 died in 10 days, and three were sick; in another, 11 out of 23 died within two weeks; and in still another, 23 out of 47 died within four weeks. These are by no means exceptional examples.

When an animal has been kept for a long time on poor, coarse food, the symptoms are more slowly developed and death not so sudden. In these cases the animal grows poor, the bones stick out, the flanks tuck up, the back is arched, the coat is rough and wiry; the limbs are weak, and exposure causes a severe fit of shivering. An attack of indigestion is now ushered in by a loss of appetite, a failure to chew the cud, a dull, sunken, staring appearance of the eyes, a more or less discharge of saliva from the mouth, grinding of the teeth, trembling of the muscles — particularly in the flank — knuckling of the hind fetlocks, stumbling over slight inequalities of the ground, unsteadiness of the hind parts when walking, straining to pass manure, which is hard, dark colored, and generally covered with shreds of mucus, and often spots of blood; the frequent passage of small quantities of urine, complete paralysis, and death. In some cases, the first thing noticed is that the animal leaves the herd and stands by himself, refusing to eat or drink. In others, he stands with head erect, the eyes glaring, ready to run at anything which comes near him. In others, he stands and bawls at frequent intervals. Or he may have repeated spasms, in which he falls to the ground, where he remains until the fit has passed, when he arises as if nothing had happened. In other cases, the first symptom seen is a wild rubbing of the head or hind quarters against a post or tree. The itching is so intense in many of these cases, that the hair is rubbed off and the skin lacerated, until the blood flows freely. For some unknown reason, the right side of the head at the base of the horn or root of the ear, is the part most

often injured in this manner. In some cases the hind fetlock joints are torn with the teeth. In some the animal has spells of complete blindness, during which he stumbles around and over objects like a drunken man. In many instances they persist in turning around in a small circle. Some hunt for water, and while they rarely drink much, often die in the stream or on its banks. Some will wander aimlessly around or stray miles away and die. Some have rigid contractions of the muscles of the neck and back, so that they cannot place the head to the ground. Some seem to improve after two or three days' illness, then relapse and die. Many die in from two to ten hours' time, while others live for as many days. Some bloat before or shortly after death, while many never bloat at all. While the majority of cases have the most marked constipation, with more or less colicky pains, some have diarrhœa. The young as well as the aged are alike susceptible. As a rule, the heartiest eaters are the first to sicken and die. The mortality is very great, as but few recover from an attack.

POST-MORTEM APPEARANCES.

When a number of animals have been turned into stalk fields, and the next morning from one to ten per cent are found dead, a post-mortem will show the first stomach filled with a great mass of fodder which is only slightly masticated. The third stomach is filled with dry food, often so dry that it will crumble like ashes. This, in many instances, is all that can be found. In cases which live longer, and in which dry fodder has been the only food for some time, the first stomach often contains a great mass of fodder, corn husks, coarse grass, etc., so entangled that it can scarcely be torn apart. This condition of the food of course prevents it from being raised in the form of a cud for rechewing, and as a consequence it remains in the stomach as a foreign body which cannot escape, until it causes death. In other instances the condition of the first stomach will be found normal, with the exception of patches of congested mucous membrane. The third stomach may then be found packed with very dry food, or it too may be in apparent healthy condition. In these cases the fourth or true stomach is found with a uniformly reddened mucous membrane, or with great patches congested and inflamed. If this stomach is healthy in appearance the intestines are the seat of inflammatory changes. They may present dark-red or purple patches confined to the lining membrane, or the whole substance of the intestine may be discolored and blackened. The liver is often spotted and very easily torn, while in nearly all cases where impaction is present the gall bladder will be found distended with a thick fluid. This distension may be so great that all the tissues seem to be discolored with the brownish-yellow pigment of the bile. The kidneys are often congested. The lower bowels generally contain dry masses of manure coated with mucus and blood. The lung on the side next to the ground at the time of death is always black from engorgement with blood. The other lung is often spotted with congested patches. The windpipe may be filled with a frothy mucus. The

heart is often bloodshot on the outer as well as on the inner surface. The heart sac often contains an excess of fluid varying from one to sixteen ounces in quantity. Occasionally this fluid contains a mass of coagulated febrin. Quantities of fluid of the same character may be found in the chest. The cavities of the heart sometimes contain a dense clot of blood which is whitish in color near the center. The bladder is often distended to its utmost with urine.

My post-mortem examinations of the brain and spinal cord have not been extensive enough to warrant a conclusion as to the changes which may generally be found in these organs. In those cases, however, where the patient has been wild and viciously disposed, followed later by complete loss of sensibility, I have found the brain congested. Where the hind parts first showed loss of power, the spinal cord in the lumbar region showed slight congestion and some effusion of a clear fluid into the canal. In old cases where the disease has lasted for several days, and where the cause was to be attributed to the long-continued use of coarse, innutritious food, the post-mortem appearances have been most interesting. In these cases the subject may have carried a fair amount of flesh, but the post-mortem reveals an entire absence of fat among the muscles, around the heart, kidneys, on the intestines, and in the bones. In place of fat, however, is found an amber-colored, gelatinous matter, which is clearly transparent. The bones were brittle, and could easily be cut to pieces with a knife. The bone cells or cavities were filled with the peculiar gelatinous matter. On opening the spinal canal the spinal cord, in those cases where paralysis of the hind parts was marked, was atrophied and white, and surrounded in the lumbar region by the same gelatinous matter as found in other parts.

That paralysis of the digestive organs happens in many of the cases of indigestion, particularly where the rumen and manyply are packed with food, I believe is true. It seems to me that this only will explain the cause of many of the early deaths in some outbreaks. If derangement of the organs of digestion can so readily produce paralysis of the hind limbs, it is fair to presume that this paralysis might begin at the seat of the primary trouble. The cause and nature of the lesions of the nervous system, however, deserve a further investigation and study.

TREATMENT.

The treatment of but few diseases is attended with such unsatisfactory results as this one. No matter what measures are resorted to but few of these cases recover. The indications for treatment, however, demand that the digestive organs shall be relieved of all indigestible matter, and for this purpose a full dose of physic is administered, consisting of—

Epsom salts, 1½ lbs.	Ginger, 2 oz.
Nux vomica, 2 drachms.	Warm water, ½ gallon.

Four hours afterward give 1½ pints of raw linseed oil. To stimulate

the stomachs to a performance of their functions, give every two or three hours—

Aromatic spirits of ammonia, 2 oz.	Cayenne pepper, ½ oz.
Salt, 1 oz.	Water, 1 quart.

If the animal will not drink freely, he should be drenched with tepid water every four hours. The food should consist of oat meal, corn meal, or bran slops. The bowels should be relieved by frequent injections of warm water. If the first stomach is filled with food, a veterinary surgeon should be called in to remove the matter by opening the flank. If the stomach is extended with gas, it should be tapped upon the left side with a trocar. If the abdominal pains are severe, they may be relieved by 2-oz. doses of laudanum, repeated every four hours. If the patient is on full feed, and the attack is acute, the oil only should be used as a physic, and the stimulants may be omitted from the treatment. Diarrhœa may be present, and yet the stomachs may be impacted so that the diarrhœa alone is not a contra-indication for the use of full doses of physic.

In this, as in all diseases, the main object sought should be the *prevention of cases.* Coarse, dry, innutritious food should never constitute the exclusive diet of cattle. If the hay is poor, corn, bran, sorghum, or millet should be added. Sorghum is not only palatable, but by reason of the large percentage of juice which it contains tends to overcome any disposition to constipation. If corn stalks are to be used, they should be cut before they are ripe, and cured in the shock. If they are to be pastured in the field, see to it that the cattle are not turned in until they are well filled with other food and water. A hungry animal should never be turned into a stalk field. Let the cattle have daily access to a mixture of salt, Epsom salts, and saltpetre, mixed in the proportion of 45, 45, and 10, respectively.

A. A. HOLCOMBE, *State Veterinarian.*