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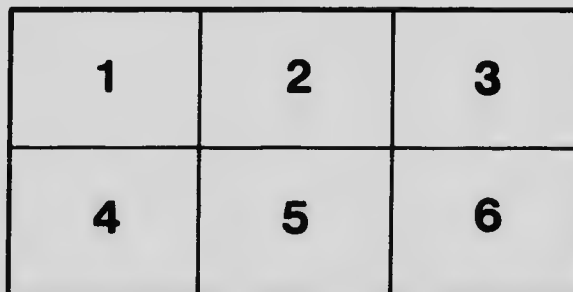
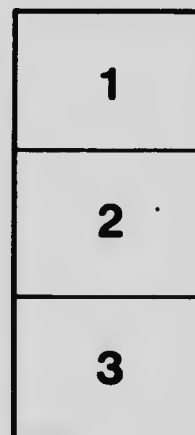
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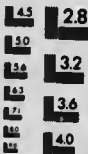
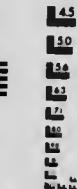
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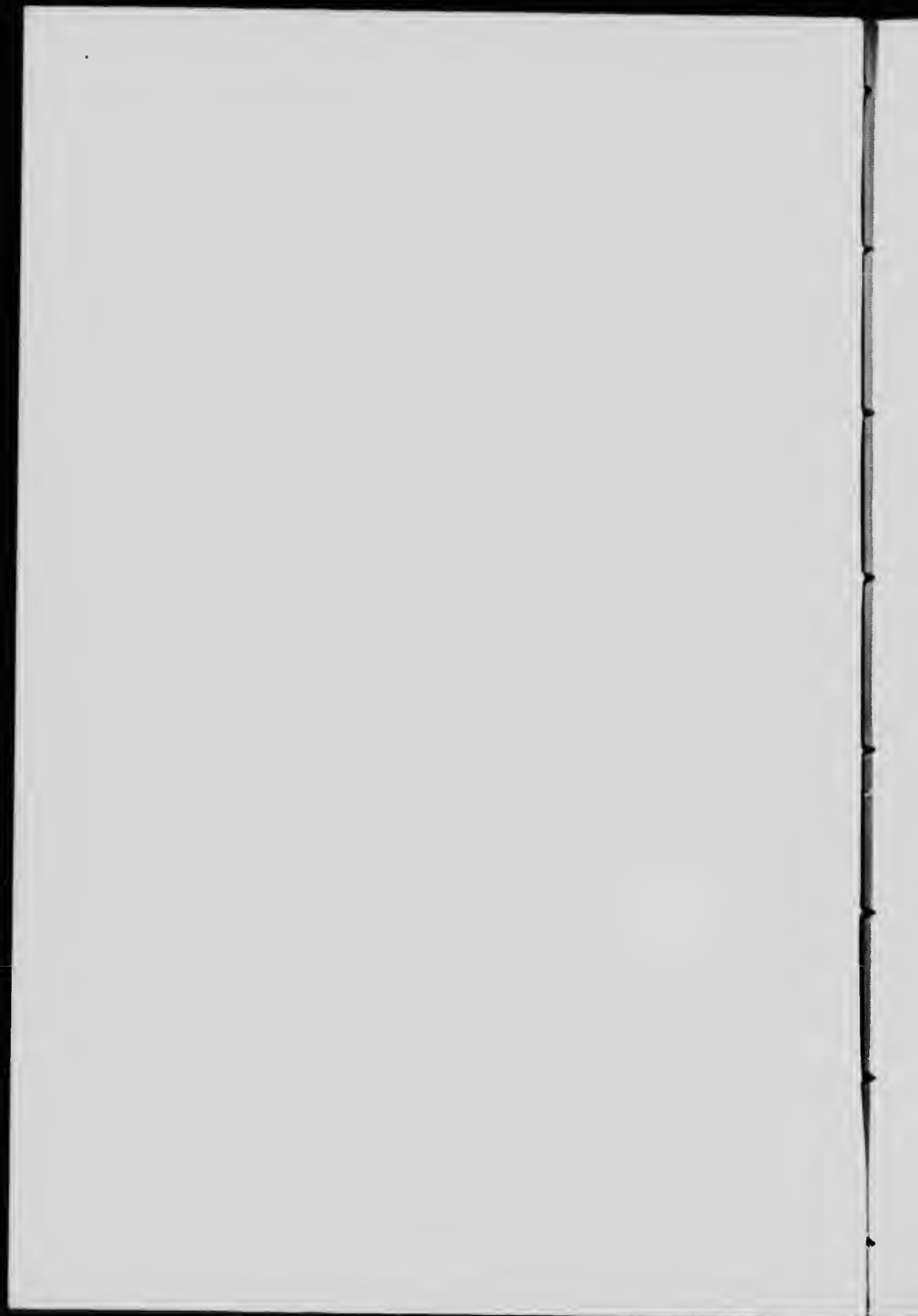
Common Diseases
of the
Digestive Organs of
Horses and Cattle

By

J. HUGO REED, V.S.
Professor of Veterinary Science



TOKONTO, ONTARIO, JULY, 1918



Ontario Department of Agriculture

ONTARIO AGRICULTURAL COLLEGE

Common Diseases of the Digestive Organs of Horses and Cattle

J. HUGO REED, V.S.

It is probable that the owner of live stock who does not attempt to treat any but the more simple cases of disease will have better success than if he attempts home treatment for all, regardless of their nature. While each disease, to a certain extent, presents typical symptoms, yet in the early stages of the disease, in many cases, they simulate each other to such an extent that it is not possible for the amateur, and often very difficult for the veterinarian, to decide the exact nature of the trouble. Hence, there is great danger of a mistake being made, wrong treatment given, and this continued until the disease has reached that stage in which the most skillful treatment would be ineffective. It does not pay for the farmer to attempt to treat dangerous or complicated cases.

In advising treatment for the difficult ailments to be disensed, we shall recommend only such treatment as can be given by the amateur. We shall assume that those who decide to treat their own stock know how to administer medicines in the usual manners.

In a large percentage of cases diseases of the digestive organs are the result of errors in feeding.

The intestines of the horse are more subject to disease than the stomach, while the reverse is the case with the ox. The reason for this is that the stomach of the horse is a comparatively small and simple organ when compared to the volume and length of the intestines. The food is arrested for only a short time in it, soon passing on to the intestines, where the chief part of the process of digestion takes place. In the ox the large and complicated stomach not only digests, but prepares the food for digestion, while the intestines have a much smaller capacity than those of the horse.

THE HORSE

DANGER IN SUDDEN CHANGES OF FEED.

In feeding horses we shall assume that the food given is of good quality. Musty or partially decayed food of any kind should, under no circumstances, be given to a horse. Such food may, to a limited degree, be fed with reasonable impunity to cattle, but it is very dangerous to feed even small quantities to the horse.

In feeding horses, all changes in the kind or nature of the food should be made gradually. For instance, a sudden change from hay to straw, or from straw to hay, from oats to other kinds of grain, or even from whole oats to rolled oats or vice versa, from green food to dry food, or more especially from dry to green food, tends to excite digestive trouble. In fact, any change in the kinds, quality or quantity of food should be gradual.

Acute digestive troubles seldom, if ever, occur from underfeeding, but very frequently from overfeeding.

A very large percentage of horses, especially in country districts, are fed too much bulky food. The average horse will eat too much hay if allowed access to it. In discussing the proper manner of feeding horses we shall consider hay as roughage and oats as the grain ration. Where substitutes for either are used, the feeder should exercise reasonable consideration as to its nature.

It is not possible to lay down hard and fast rules as to the exact amount in weight or bulk of either hay or grain that a horse of a certain weight should be given. As all feeders have observed, horses have their individualities. Hence some require a little more feed than others of apparently the same character and general size.

One pound of hay for every 100 pounds of the animal's weight is supposed to form the proper ration for twenty-four hours. Some horses require a little more, but the excess should, in all cases, be slight. Of this the animal should be given about one-quarter in the morning, one-quarter at noon, and the remaining half in the evening. The smaller meals are given in the morning and at noon, as the horse will be taken out to work soon after eating, and if his stomach is overloaded, it tends to cause digestive trouble. At any rate, if over fed, he does not perform his labor with that comfort to himself and satisfaction to his driver that is desirable, until he has been at work for an hour or two. The large meal is given in the evening, as he will have several hours of idleness in which to digest it.

TOO MUCH HAY INJURES HORSE.

In no case should he be given more food, including both hay and grain, than he will consume in about one and one-half or at most two hours. The too common practice of keeping hay before horses at all times when they are standing in the stable is as harmful as it is wasteful. Whether a horse be performing hard work or light work, or standing idle, the amount of roughage should be about the same. He should have sufficient to satisfy his hunger, but not sufficient to cause engorgement. Most horses are gluttons, and should be treated as such.

As regards feeding grain, the amount given should depend largely upon the nature of the work he is expected to do. Even an idle horse should be given a little grain. As with hay, we may say that under ordinary conditions one pound of oats to every 100 pounds of the animal's weight makes a reasonable ration for a day—we assume that the grain is of standard quality, viz., 34 pounds to the bushel. The grain should be given in equal quantities at each meal. If by reason of the horses having to perform more than ordinary labor we wish to feed more grain, the best results will be obtained by feeding a fourth meal late in the evening. When this is not expedient the extra amount may be divided among the three meals, giving one-quarter of the total quantity in the morning and at noon and the remaining half at night.

Opinions differ greatly as to the better form in which to feed oats. The writer's experience, both in feeding his own horses and in giving professional attention to others, is, that under any conditions rolled or crushed oats give the best results. We have noticed this in our own stable, and noted that in stables of horses used either for light and fast work or for heavy and slow work, the stable that feeds rolled oats has need of the veterinarian much less often than the one in which whole oats are fed.

In addition to hay and oats a horse should be given a feed of bran at least once or twice weekly. Many feeders, especially where whole oats are fed, add to each feed of oats a quantity of bran. This practice gives good results, but we have always favored feeding bran by itself, either as an extra or as a substitute for oats, according to conditions. During the months when no pasture is available, it is good practice to give a horse a couple of carrots or a small mangel or turnip once daily.

WATERING HORSES.

Opinions differ greatly as to the proper method of watering horses. Some claim that horses should be watered only before meals, and never when they are perspiring. The prevalent idea that if a horse be watered after a meal the water will force the food out of the stomach before it has been properly acted upon by the juices of the stomach, has practically no force.

As before stated, the stomach is comparatively small; hence after a meal it is, or should be, practically full. The opening of the gullet into the upper portion of the stomach is somewhat constricted, and the opening at the lower part (called the pylorus) into the small intestine, is quite constricted. The contents of the stomach after a meal consist in small particles of solid matter mixed with the juices of the organ. It is a mechanical fact that fluids introduced into a receptacle containing particles of solid matter will not force the solids out of a small opening, but will percolate through the particles, and when the interstices become full, if the fluid does not escape, no more can enter. Hence, are we not justified in assuming that when a horse with a full stomach drinks water it percolates downwards and fills the intestines, then reaching the pylorus passes through it into the small intestine, and passing through that reaches the first division of the large intestine called the cæcum, a sack-like organ of considerable capacity, where it is stored and taken up by absorption as required? If this theory be correct, it can readily be seen that a horse may be allowed to satisfy his thirst any time without forcing unprepared injecta out of the stomach.

Again, the idea that it is dangerous to allow a horse that is perspiring to drink cold water is too firmly impressed upon the mind of the ordinary teamster. Of course, there are cases in which it would be dangerous to allow a horse from a hot sun to cold water, such as a case where the animal had been subjected to long exertion and very strenuous labor, either fast or slow, and had become excessively heated. The introduction into the system of large quantities of cold water might develop such severe reactions as to cause serious trouble. In such cases a few mouthfuls should be allowed, the horse well rubbed, and in a few minutes a little more water allowed. After the abnormal heat of the body has subsided he may safely be allowed to quench his thirst. Conditions of this kind seldom occur. The fact that in hot weather a horse doing ordinary work will perspire freely is no reason why he should not be allowed to drink as much water as he wants.

The teamster is justified in supposing that his horse's sensation of thirst is as acute as his own. This is frequently impressed upon his mind by the desire the horse exhibits in his haste to reach water when he is thirsty. When the teamster is thirsty he usually finds means of allaying his sensation. When his horse is thirsty he "wants a drink" and, except under exceptional circumstances his desire should be gratified as soon as possible.

Some horses are particularly predisposed to colic and will suffer if given food or water under certain conditions. Such animals should be treated accordingly.

MEDICINES SHOULD BE ON HAND.

The owner or teamster who considers treating cases of illness in his own stock should provide himself with the drugs he is likely to require. These should be kept in as even a temperature as possible, bottles should be kept well corked and plainly labeled, powders and crystals kept carefully wrapped and plainly labeled and all kept in some secure place, out of reach of careless people and children.

He should also provide himself with a graduate for measuring liquids and scales for weighing solids. Where a graduate or other correct means of measuring liquids is not kept some of the ordinary domestic utensils may be used with reasonable accuracy. Common tumblers contain eight to ten fluid ounces; wine glasses about two fluid ounces; table spoons half a fluid ounce; dessert spoons two fluid drams, and teaspoons one fluid dram of sixty minims or drops.

In prescribing we shall use the following abbreviations: lb. for pound, oz. for ounce, dr. for dram, gr. for grain, m. for minims or drops, qt. for quart, and pt. for pint.

CHRONIC INDIGESTION.

This kind of indigestion without engorgement, is caused by improper food, imperfectly masticated food due to the process of dentition, diseases or irregularity of the teeth, viscidious feeding, irregularity in feeding, debility or partial inactivity of the digestive glands.

SYMPTOMS.—A capricious appetite, and often a tendency to eat filth; usually increased thirst; the animal becomes hide-bound, has a dry scurfy skin; irregularity of the bowels; general unthriftiness, dulness and more or less marked inability to perform work. When caused by imperfectly masticated food, the cause can usually be told by the appearance of the feces. Colicky pains are sometimes present an hour or so after feeding.

TREATMENT.—Ascertain and remove the cause if possible. In all cases examine the mouth and teeth. If they require attention and the owner has neither the necessary instrument nor the skill to correct the fault he should take the horse to his veterinarian.

Where the fault is not in the mouth, and the animal be not too weak, give a laxative of 6 to 8 drams of aloes and 1 dram ginger.

(We may here state that in all cases where a laxative or purgative is to be given, and prompt action is not necessary, it is wise to prepare the patient by feeding bran only for 18 to 24 hours. In all cases after the administration, the animal should be given rest, and bran only to eat until purgation commences, which is

usually 20 to 24 hours or longer. When the first dose fails to act, a second should be given in about 48 hours.)

After the bowels have regained their normal condition, mix equal quantities of powdered sulphate of iron, gentian, ginger, nux vomica and bicarbonate of soda, and give a tablespoonful three times daily. Give food of good quality in small quantities, and as digestion improves gradually increase the quantity until the desired amount can be fed.

In speaking of the different forms of digestive troubles in horses modern veterinary writers generally speak of them as different forms of colic. We shall speak of them by their old familiar names, as we think this will be more readily understood by those who may study the information given in this bulletin.

ACUTE INDIGESTION.

This kind of indigestion, with engorgement, may arise from repletion with solid food or from the evolution of gases arising from the fermentation of food. It is often very difficult to determine whether the trouble is confined to the stomach or whether the intestine also is involved. This is not very important, as affections of this nature are concomitant, and require the same treatment as far as treatment by an amateur is concerned. When the trouble is confined to the stomach the modern veterinarian can act directly by the use of the stomach pump.

CAUSES.—The usual causes are: too much food; food swallowed greedily without proper mastication; feeding immediately after severe and long continued exercise; severe exercise too soon after a hearty meal, especially if the horse has been given something to which he is not accustomed; sudden changes of food; and drinking excessive quantities of water too soon after a hearty meal. It is not uncommon to see a well marked case for which no well marked cause can be given.

One of the most frequent causes is what may be called mistaken kindness on the part of the owner. A horse that has been idle for some weeks and has been given no grain is unexpectedly required to go a journey or do a day's work. In order to fortify him for the unusual exertion he is given a full feed of grain, hitched and driven or worked. The stomach is charged with grain to which it is not accustomed, and the horse performing physical work to which he is not accustomed. These two conditions in many cases cause "acute indigestion." When horses under the conditions noted are required for service care should be taken to feed very lightly on grain until after the service has been performed. Then, in order to compensate for the extra labor, they should be fed a moderate allowance of grain for a few days.

Horses whose digestive organs are either congenitally or temporarily weak, or whose organs have become weakened by disease, also those horses which are weak, anæmic, poorly fed and emaciated animals, or very young or very old animals and animals recovering from disease, etc., are especially predisposed to digestive trouble.

Among the direct irritating causes are green food, food and drinks that are hot, or that are frosted, unclean or partially decayed foods, mouldy hay or grain, matters undergoing fermentation or decomposition, as decomposing roots, fruit, grass, or germinating grain.

In cases where no well marked cause can be given we must decide that there is some temporary weakness of the digestive organs, which, while producing no visible symptoms, render the horse in that condition in which indigestion is easily

produced. At the same time, an attack seldom occurs except in horses congenitally predisposed, that cannot be traced to carelessness or ignorance in feeding or usage.

SYMPTOMS.—The symptoms of many diseases of the digestive organs simulate each other so much that it is often difficult to say, in the early stages, just what the disease is. Hence, the advisability, when convenient, of procuring expert attention, as an attack of a serious nature may be mistaken for a simple ailment, and if not energetically and skillfully treated early may reach that stage in which treatment will be of no avail. There are many cases in which the symptoms are not typical.

The first symptoms usually are uneasiness, dulness, stamping of the feet, lying down, probably rolling, rising again, looking toward the flank, lying down again, etc. The pulse at first increases in force and frequency, but if relief be not given in a few hours loses force while still increasing in frequency.

In many cases these symptoms are preceded by a semi-diarrhœa, the horse voiding semi-liquid fæces frequently, but in small quantities.

There is usually more or less well marked fulness (bloating) noticed, more marked on the right side. In some cases, however, the formation of gases is confined to the stomach, when little fulness of the abdomen is apparent. Eructation of gas is not uncommon, and in rare cases there is actual vomition of small quantities of ingesta. Either of these symptoms indicates a very serious case. When relief is not given the symptoms increase in intensity.

In some cases death occurs in one or two hours after the first symptoms are noticed, while in others twenty-four to forty-eight hours, or even longer, may elapse before either recovery or death takes place. In cases that do not yield to treatment the violent symptoms are usually succeeded by dullness and stupor. The pulse becomes weak and very frequent, almost or quite imperceptible at the jaw. The patient will either stand, or walk aimlessly around the stall or paddock, breathing shortly and frequently and often perspiring freely, the visible mucous membranes highly injected, the eyesight evidently impaired. This indicates that inflammation of the stomach, and probably also of the bowels, has resulted and the patient will probably remain standing, or wander around until he falls and expires. In the meantime there is usually little or no passage of fæces, and the intestinal murmur is absent or of a metallic sound.

TREATMENT.—Place in a large, comfortable box-stall or small paddock. Do not force exercise nor prevent him from lying down. Give 2 to 3 oz. of oil of turpentine (according to size of patient) mixed with a pint of raw linseed oil, as a drench. It is good practice to apply to the abdomen cloths wrung out of hot water and give injections of warm soapy water per rectum. If the pain be severe give 1 to 2 oz. of chloral hydrate or 1 to 2 drs. of the solid extract of belladonna, or 1 to 2 oz. of the tincture of belladonna in a pint of water as a drench. Do not give opium in any form, as it checks the action of the bowels, which we want to encourage. Watch him closely and if he becomes stall-cast relieve him. If relief be not obtained in two hours repeat the dose, and it will be wise to get expert attention as soon as possible. If this cannot be done continue treatment, repeating the doses every two hours as required, but after the second dose of turpentine mix it with new milk instead of oil. When bloating is excessive it is good practice to puncture at the most prominent part between the point of the right hip and the last rib, but for this purpose it is necessary to have an instrument called a trocar and canula. It is good practice to administer a purgative of 6 to 9 drs. of aloes and 2 drs. ginger, either moistened, rolled into cylindrical shape and wrapped in tissue paper

and administered as a ball, or mixed with a pint of cold water and given as a drench after the acute symptoms have passed.

The patient should not be exercised until the bowels have regained their normal condition after the administration of the purgative, and he should be very carefully fed and lightly worked for a few days afterwards.

CONSTIPATION.

A partial or complete inaction of the bowels may be looked on more as a symptom than as a disease of itself.

CAUSES.—An absence of laxative food, change from green to dry food, change from hay to straw, a partial inaction of the glands of the intestines, a partial or complete paralysis of the coats of the intestines. The bowels of some horses appear to be naturally torpid.

SYMPTOMS.—A dulness, impaired appetite, passage of small quantities of hard, dry fæces, and in some cases slight colicky pains, an alteration in the nature of the intestinal murmur and sometimes an absence of sound.

TREATMENT.—In many cases a change to more laxative food will correct the fault. If colicky pains be present the administration of 1 to 1½ oz. each of the tincture of belladonna and sweet spirits of nitre in a pint of cold water, as a drench, will usually be effective. Opium in any form must be avoided as it tends to increase constipation. As in mostly all cases there is partial or complete paralysis of the muscular coats of the intestines, active purgatives must be avoided, as they cannot act while the paralysis continues. The paralysis must be overcome by the administration of 1½ to 2 drs. powdered nux vomica three times daily and rectal injections of warm soapy water. When the paralysis is overcome, which can be told by the passage of fæces, even in small quantities, and a return of the normal intestinal murmur, a laxative of 1 to 1½ pints of raw linseed oil should be given and the animal fed on laxative, easily digested food.

Note.—The *intestinal murmur* can be detected by holding the ear to the animal's flank. In order that a person may be able to detect an abnormal sound, or the absence of sound, he must, of course, be familiar with the normal sounds. This familiarity can be gained only by listening to the sounds in the abdomen of a healthy horse.

IMPACTION OF THE COLON.

CAUSES.—Horses over abundantly fed or fed upon food containing large quantities of indigestible or woody fibre, as over-ripe hay of any kind, are liable to suffer from an accumulation of such matter in any part of the large intestine, especially in the large colon. This condition is not uncommon in horses whose ration has been suddenly changed from hay to straw. It may be due to an unexplained weakness of the digestive organs, or partial inactivity of their glands, want of exercise, or any sudden change of food. It is not uncommon in horses that do not thoroughly masticate their food, due to too greedy feeding, irregularities of the teeth, or diseased liver, or, in fact, to any inaction or partial inactive condition of the glands of any portion of the digestive tract.

The same causes largely operate in exciting the various diseases of the digestive organs. It may not be considered out of place to repeat that when horses are intelligently fed and exercised digestive diseases seldom occur. Care must be taken that the quality of the food is good, that the quantity is in accordance with the size of the animal and the amount of work performed, and any change of diet is made gradually.

It may also be wise to remark that all horses over five years old, and often those even younger, would be better if they had their teeth examined, and, if necessary, dressed by a competent man once every year. This statement will probably be considered by some as extravagant, but it is a fact nevertheless, and the horse owner who attends to this matter regularly is amply repaid for the outlay. His horses can then masticate their food more thoroughly and without irritation to tongue or cheeks, and consequently will thrive better, look better, and be less liable to the class of diseases under discussion. Many will say, "My horses' teeth are all right; the animals eat well and keep in good condition." This may be quite true, but it does not follow that because a horse consumes his food without apparent difficulty and without quidding, that his teeth are in first-class condition. If examined, there will, in most cases, be seen or felt, sharp points on the inner margin of the lower molars, and the outer margin of the upper ones. These projections, while probably not materially interfering with mastication, cause more or less irritation to the tongue and cheeks, make mastication more or less unpleasant and warrant the expense of having the cause of irritation removed.

SYMPTOMS.—The symptoms of impaction of the colon are not usually alarming. The conditions may be present for some time without any serious symptoms being noticeable. It may be noticed that for a day or two the animal has not voided his normal quantity of fæces, while that voided has been somewhat dry; also that his appetite, spirits and ambition have not been quite normal. He will probably now begin to show more or less well marked colicky pains, become restless, lie down, get up again, etc., and show more or less general uneasiness, but seldom shows violent symptoms. The pulse, in most cases, is slightly increased in force and frequency, and, as the disease advances, it increases in frequency but decreases in force. The mucous membranes are usually injected. A peculiarity of the symptoms usually shown is a desire to sit upon his haunches, or when standing to press his croup against some stationary object. He resists the introduction of the hand, or injections into the rectum, and, if the ear be placed against the abdomen, an absence of the normal intestinal murmur will be detected—there will be either an absence of sound or sounds of a metallic nature. There will be little or no fæces voided, and a fulness of the abdomen, better marked on the right side, will be more or less evident. When relief is not afforded, the symptoms increase in intensity, gases form and increase the fulness of the abdomen, the pulse becomes more frequent, but weaker—often almost, or quite, imperceptible at the jaw—and the patient either walks aimlessly about or throws himself violently down, rolls and struggles. Rupture of the intestine may now take place (especially in cases where the symptoms are violent) which causes death in a few hours, or inflammation of the bowels results, which is equally as fatal, but not often so quickly.

TREATMENT.—As there is always partial or complete paralysis of the coats of the intestines, the administration of large doses of purgative medicines must be avoided until the paralysis is overcome. It is good practice to administer a laxative, say, 6 drs. of aloes and 2 drs. ginger, or a pint of raw linseed oil to a horse of ordinary size. Follow up with 2 drs. nux vomica every eight hours.

Combat pain by giving 1½ ozs. chloral hydrate, or 2 drs. solid extract of belladonna, or 2 oz. each of tincture of belladonna and sweet spirits nitre in a pint of water as a drench every two or three hours as the symptoms indicate. Do not give opium in any form, as it increases the constipation.

Remove the contents of the rectum by hand and give injections of warm soapy water per rectum every three or four hours. Some recommend the injection of a solution of aloes into the rectum, about 1 oz. to a gallon of water, and when the patient will retain the fluid for a considerable time it may give fair results.

If gases form and the patient becomes bloated, give 2 to 3 ozs. of the oil of turpentine in a pint of raw linseed oil. This may be repeated every two hours, but after the first dose it will be wise to mix the turpentine with new milk instead of oil in order to avoid too much purgative medicine.

Note.—In recommending doses we always mention the proper doses for animals of ordinary size. Very small or very large animals should be given doses in accordance with their size.

SPASMODIC COLIC.

Probably the most common form of indigestion in horses is that form commonly known as "Spasmodic Colic." Some horses are particularly predisposed to it. It consists in a spasmodic contraction of a portion, or portions, of the muscular coat of the intestines, usually of the small intestine. It is not uncommon for the muscular fibres of the neck of the bladder to be involved.

CAUSES.—The disease is usually due to the nature of the food, or improper feeding, sudden changes of diet, exhaustion from overwork, particularly if associated with long fasting. A drink of cold water may cause it, especially if the horse be exhausted by a long journey or several hours hard work. Some horses are particularly predisposed, such as those in which there are concretions of different kinds in the intestines, abscesses in the mesentery, parasites in the intestines, ulcers in the stomach, canker or chronic thickening of the intestinal walls, also those with congenital or acquired weakness of the digestive powers or disease of the digestive glands.

While simple spasmodic colic is a comparatively unimportant disease, which readily yields to treatment in most cases, fatal cases have occurred, the patient dying from exhaustion, and a post mortem revealing no lesions or chronic disease of the digestive tract, the only abnormal conditions being a rigid contraction of small portions of the small intestine. Repeated attacks of colicky pains occurring in a horse without apparent cause, indicate some structural change in the digestive organs, in many cases the presence of concretions or tumors in the intestine. If such be present, and are movable, we are justified in assuming that they occasionally, by change of position, occlude the canal, and thereby check the backward passage of fecal matter, check peristaltic movement, and cause pain. In such cases the violent movements of the animal are liable to dislodge the obstruction, reopen the canal and consequently relieve pain. In other cases the obstruction does not become dislodged, the case does not yield to treatment, and after several hours, inflammation of the bowels results and causes death. A post mortem reveals the presence of a calculus or tumor.

A horse that is predisposed to colic from any cause will probably, sooner or later, suffer from an attack that will cause death. Some horses suffer from colic if allowed water shortly after a meal, others if given even a light change of food,

others if fed certain foods, etc. When such is the case the attacks can usually be prevented by exercising care not to subject the animal to the conditions that cause the attacks.

SYMPTOMS.—These usually appear suddenly and are very violent and alarming. The patient suddenly expresses pain by pawing, kicking at the abdomen, throwing himself down violently, rolling and struggling, jumping suddenly to his feet, probably repeating these actions, and, in other cases, shaking himself, then becoming quiet and commencing to eat as though nothing were wrong. After a variable interval of ease the pains recur, sometimes in an aggravated and sometimes in a modified form. During the attacks the pulse is full and frequent, but during the intervals of ease it is normal. The attacks may occur again and again, the periods of pain and of ease being of various duration, until the patient is relieved by treatment or spontaneous cure or the disease becomes complicated by inflammatory action, which complication usually terminates fatally. At the commencement of the attack feces are often voided frequently and in small quantities and may be either soft or hard, while frequent voiding of small quantities of urine is often noticed. In other cases frequent but ineffectual attempts to urinate are noticed.

These symptoms indicate that the neck of the bladder is involved in the spasms, and as a consequence urine cannot be voided. This leads the uninitiated to conclude that the horse is suffering from disease of the urinary organs. This idea is very common. The owner or driver decides that there is an obstruction in the urinary passage, and proceeds to remove it by giving a dose of sweet spirits of nitre. This is usually followed by relief but it does not act as it is generally supposed to. It will not remove obstructions, but it tends to relieve the spasm of the neck of the bladder, hence allows escape of urine, after which the horse will probably show no more pain. We often hear a man telling that his horse was very sick from "stoppage of his water," that he gave him a dose of sweet nitre, after which the animal urinated and then got all right. The fact is, the nitre relieved the spasm of the neck of the bladder, the horse became "all right"—and then urinated. If there be an occlusion of the urinary passage from other causes than that mentioned, the treatment named would make matters worse, because the drug, as well as being an anti-spasmodic, increases the activity of the kidneys, but does not remove obstruction; hence it causes an increased flow of urine into the bladder, but does not remove the obstruction that prevents its escape from the organ.

During the paroxysms of colic the pulse becomes altered, as stated, the respirations are also accelerated, and in some cases perspiration is profuse. During the intervals of ease these functions become normal. The symptoms, while usually short, are generally more violent and alarming than those of more serious intestinal diseases.

TREATMENT.—In many cases a spontaneous cure takes place without treatment in from a few minutes to an hour or two, but it is wise to administer an anti-spasmodic in all cases. The following is a favorite and effective colic drench: $1\frac{1}{2}$ fluid ozs. each of laudanum, tincture of belladonna, and sweet spirits of nitre, in a pint of cold water. This being the dose for an ordinary sized horse, young, small, or very large animals require less or more according to size. Instead of this we may give 1 or 2 ozs. of chloral hydrate or 2 to 3 fluid drs. of chloroform in a pint of water. The patient should be placed in a roomy, comfortable box-stall or paddock, and carefully watched to prevent him from hurting himself or becoming fast. It is good practice to give a rectal injection of soapy, warm water. If relief be not apparent in an hour the dose should be repeated. If the first mentioned

drench be used the laudanum must be omitted, as it tends to constipation. After this the dose may be repeated every two hours as indicated by the symptoms. If relief be not noticed in at most four hours we may suspect a more serious condition than ordinary spasmodic colic, or that the disease has become complicated. When practicable, the services of a veterinarian should then be procured. If professional assistance is not available, the owner should repeat the doses as noted. If bloating occurs, the patient should be treated as for flatulent colic, a discussion of which will follow.

It is good practice to administer a laxative of 5 to 7 drs. of aloes and 2 drs. ginger or 1 to 1½ pts. of raw linseed oil after the acute symptoms have passed.

FLATULENT COLIC.

A disease commonly called "Flatulent Colic" is quite common in horses. It is a form of indigestion, and in the early stages the symptoms strongly simulate those in acute indigestion.

CAUSES.—This condition is much more serious than spasmodic colic although the causes are much the same, viz., changes of food or water, over-feeding (especially after a long fast or when overheated), food of poor quality, severe exercise too soon after a hearty meal, a weakness, or partial inactivity, of the digestive glands, etc., food that ferments readily, as green clover, turnip tops, etc., especially if wet or frosted is a fertile cause. It sometimes occurs during the progress of other diseases, indicating a very grave condition. This, and in fact, mostly all intestinal diseases, occasionally appear without recognizable cause, due, no doubt, to a non-active state of the digestive glands.

SYMPTOMS.—The symptoms do not generally appear so suddenly, nor yet are they so violent and alarming to the ordinary observer, as those of spasmodic colic. The animal becomes dull, uneasy, stamps his feet, probably kicks at his abdomen, looks around at his flanks, paws, lies down carefully, may roll, rise again and continue to show uneasiness. The pulse is increased in both force and frequency and respiration is often more or less labored. The symptoms of pain are practically constant, but vary in intensity. In a short time after the first symptoms are shown there will be noticed a more or less well-marked fulness of the abdomen (bloating) more marked on the right side just in front of the point of the hip. The visible mucous membranes become injected, the pulse continues to increase in frequency, but usually gradually loses force, and the respiration will be labored in proportion to the degree of distention of the abdomen with gas. The extremities are usually cold, and there is often a twitching of the muscles. If relief be not effected, the symptoms continue to increase in severity, bloating becomes excessive, and death takes place from rupture of the intestine, suffocation or absorption of gases into the circulation.

TREATMENT.—Place in a roomy stall or a paddock. Agents which combine with, or neutralize, the gases are indicated. For this purpose there is probably nothing that can be safely given by the stomach that acts as well as oil of turpentine (commonly called spirits of turpentine) and raw linseed oil, 1 to 3 fluid ozs. of the former in one-half to one pint of the latter (according to the size of the patient). If necessary, the dose may be repeated in an hour, but if given the third time new milk should be substituted for the oil. When this medicine is not quickly obtainable 2 to 3 ozs. of bi-carbonate of soda (baking soda) dissolved

in water should be given. The patient should be well bedded and kept as comfortable as possible. A couple of gallons of warm soapy water should be injected into the rectum occasionally. If the pain be severe it should be combatted by the administration of 1 to 2 ozs. of chloral hydrate dissolved in a little water, or 1½ fluid ozs. each of tincture of belladonna and sweet spirits of nitre in a pint of cold water as a drench. This anodyne may be repeated about every two hours as needed. If bloating becomes excessive, care should be taken to prevent the patient from throwing himself down violently, as there is danger of this causing rupture of the distended intestine. If the bloating becomes so marked that there is imminent danger of suffocation or rupture, the patient should be punctured on the right side at the most prominent part between the point of the hip and the last rib to allow the immediate escape of gas. This operation, if skilfully performed with a trocar and canula (an instrument especially designed for the purpose), has proved successful in most cases, but the use of knives and other crude instruments has not usually been followed by satisfactory results.

In a case of this nature when the administration of the drugs mentioned does not give relief in at most two hours, it is better, where possible, to secure the services of a veterinarian, but where this cannot be done the attendant can only follow the above treatment to the best of his ability.

INTUSSUSCEPTION.

Intussusception is a name given to a form of indigestion which is caused by a portion of the intestine (either small or large) slipping into the portion immediately behind it, like the drawing of a finger of a glove into itself. As a result of this, the normal course of the intestine is interrupted. In consequence nothing can pass through, the action in the bowel is checked and the circulation of the blood through the bowel involved is also checked. While this is practically an incurable condition, it may be wise to draw attention to its occurrence and symptoms. Recovery of cases where this condition has been suspected has occurred, the imprisoned portion (if the condition really existed) having been released during the struggles of the animal, while other cases have recovered by a rapid sloughing of the imprisoned portion, and union taking place between the several ends, the sloughed portion passing off with the fæces.

TREATMENT, other than an operation, has no action in rectifying the trouble, and the veterinarian does not operate in such cases, as it is practically impossible to make a correct diagnosis or to exactly locate the lesion, and, though such were possible he cannot provide surroundings where antiseptic measures can be observed to a sufficient degree to afford probable favorable results.

SYMPTOMS cannot be said to be diagnostic, but are a combination of those observed in other diseases of the digestive organs, particularly resembling those of obstinate constipation. There is a cessation of intestinal murmur, restlessness, pain shown by pawing, wandering about, lying down, endeavoring to lie on the back, sweating, crouching, sitting upon the haunches, pressing the rump against any solid object when standing, anxious expression. The pulse is at first full and frequent, but as the disease advances it decreases in force but increases in frequency, in many cases becoming intermittent and afterwards imperceptible at the jaw. There will be little or no passage of fæces. The mucous membranes become injected and red, respirations are frequent, and apparently labored. The abdomen,

at first of normal appearance, becomes fuller, and in some cases distended with gas. The mouth may be moist and clean, or dry and hot, with an offensive odor. The restlessness continues, the extremities are usually cold. He may rear on his hind legs. After a variable time pain usually ceases, and he will stand quietly, usually covered with a cold sweat, pulse imperceptible at the jaw, breathing frequent, and usually sighing. To the uninitiated these symptoms indicate an improvement, but they really indicate that the inflammation has terminated in mortification and the approach of dissolution. In some cases there is retching and attempts to vomit. He will usually stand thus until he begins to stagger, and at last falls and dies with a few convulsive struggles. In other cases the symptoms of pain endure until the last.

VOLVULUS OR TWISTED BOWEL

Volvulus or twisted bowel consists of a rolling on itself of a portion of intestine (either large or small) until nothing can pass through. A knot practically exists. The symptoms and results are identical with intussusception. The existence of either condition can be suspected only, and treatment should be directed to relieve pain by administering 1 or 2 ozs. of chloral hydrate either in bolus or solution every two or three hours. If gases form give 2 to 3 ozs. oil of turpentine in a pint of raw linseed oil. Keep comfortable, apply to the abdomen cloths wrung out of hot water, and give rectal injections of warm, soapy water. If the pain becomes relieved give a laxative of 5 to 8 drs. of aloes and 2 drs. ginger, and follow up with 1 to 3 drs. of nuxvomica three times daily. Of course, if either of the above-mentioned conditions exist, treatment will be of no avail, and death will take place unless a spontaneous righting of the involved bowel takes place; but if it be a case of constipation without displacement of intestine a recovery will probably take place.

INTESTINAL CONCRETIONS of different kinds occasionally form in the stomach or intestines, probably more frequently in the large intestine than in other parts. Some are composed of phosphates—called phosphatic calculi; these are hard, smooth and polished, having a nucleus, generally a piece of iron or stone, others are composed of beads of grain, hair or other indigestible matter, often mixed with phosphatic salts.

SYMPTOMS.—No reliable diagnostic symptoms are present. Their presence can be suspected only by repeated attacks of colic without appreciable cause. As a calculus is usually movable it is probable that it gets into a position that obstructs the passage, hence causes colicky pains. The violent actions of the patient, doubtless, in many cases change the position of the obstruction, open the passage and relieve the symptoms. At last time comes when, by reason of inflammatory action and swelling, the concretion retains its position and causes death, preceded by symptoms resembling those of the conditions just discussed. In some cases the calculus is situated in the rectum and can be reached by the hand and removed. This teaches the advisability of exploring the rectum in all such cases of a doubtful nature.

TREATMENT.—The treatment indicated is that for colic, viz., the administration of anodynes, as 1 to 2 ozs. chloral hydrate, or 1 to 2 drs. of the solid extract of belladonna or 1 to 2 ozs. each of laudanum, tincture of belladonna, and sweet spirits of nitre, in a pint of cold water as a drench. This dose may be repeated every two or three hours as indicated, but when more than one dose is required it

is wise to omit the laudanum, as it tends to constipate. If a calculus be present, treatment will be of no avail, but as we cannot be certain of its presence we are justified in treating for colic. Horses that are subject to repeated attacks of this nature, whether the cause be calculi or a weakness of the digestive organs, are very undesirable. When the cause is purely digestive weakness the attacks can often be prevented by regularly giving the animal a good stomachic, as a dessert spoonful of ginger and a teaspoonful of gentian in an evening feed of damp grain. This usually tones the digestive glands, thereby aiding digestion and preventing the attacks.

ENTERITIS.

Enteritis, or inflammation of the bowels, is one of the most rapidly fatal inflammatory diseases to which the horse is liable, often causing death in a few hours. Many of the diseases of the digestive organs, some of which have already been discussed, result in enteritis, but we will now discuss it as a primary affection. Any portion of either the large or small intestine is liable to be the seat of the trouble, and in some cases the greater part of each is involved. The inner or mucous coat is usually first attacked, but the inflammation extends and involves the middle or muscular coat, and also the outer coat, and there is often an extravasation of blood into the canal due to rupture of the small blood vessels.

CAUSES.—The principal causes are fatigue, exposure to cold, standing in a cold draft, or drinking large quantities of cold water when overheated, but, like other intestinal diseases, it frequently occurs without well-marked cause.

SYMPTOMS.—The first well-marked symptoms are usually those of abdominal pain, evidenced by uneasiness, stamping of the feet, whisking of the tail, looking around towards the flank, a desire to lie down, etc. These symptoms are, however, usually preceded by some degree of constitutional disturbance (which may pass unnoticed) as shivering, acceleration of the pulse and respirations, repeated evacuation of small quantities of semi-liquid feces, and general depression. The mucous membranes soon become deeply congested, the mouth dry and hot, the tongue contracted, and sometimes of a brownish color; the appetite is, of course, lost; the pulse is hard, strong, wiry, and frequent; the abdomen is tender upon pressure; the abdominal muscles more or less contracted. In some cases slight bloating is noticed. In a variable time the symptoms of dulness and depression give way to those of pain and excitement: the horse stamps with his feet, strikes at his abdomen, lies down—but usually does so very carefully, often making several attempts or feints, and then goes down with great care, and will probably endeavor to lie on his back—looks toward his flank, pants, blows, and perspires freely. There are no sharp paroxysms of pain with periods of ease as in many cases of colic. The pain is constant, distressing and agonizing, but to some extent varies in intensity. The body is usually covered with perspiration. In some cases he will stand for hours with his head in a corner and paw persistently with one or both feet. In other cases he will walk around in the stall or paddock in a circle, apparently almost blind, knocking his head against the wall or fence. The pulse is at first hard, full and frequent, varying from 80 to 120 per minute, but generally decreases in strength and fulness and becomes thready and almost or quite imperceptible at the jaw. He sighs or groans from pain, and perspiration drops from the body. The skin is seldom dry, at one time hot and another cold; the countenance becomes haggard, the eyes expressive of delirium with the pupils dilated.

He may now throw himself about in a dangerous manner, but usually stands as stated or moves aimlessly about, then stand and balance himself as long as possible, when he will fall and expire with a few convulsive struggles.

In other cases the symptoms of pain subside and he will stand quietly, even drink a little water or endeavor to eat, and his breathing becomes more or less tranquil. This often leads the owner to think that recovery is taking place, but the symptoms indicate that mortification is commencing; the haggard expression remains, the pulse continues imperceptible at the jaw, cold sweat bedews the body, the abdomen usually becomes bloated, he trembles, ears and legs become cold, mouth and breath cold and often foul smelling; the lips drop pendulous, the eyes become glassy, and in a variable period he drops and dies. The bowels usually remain inactive to the last. If, however, in three or four hours from the commencement of the attack there is some abatement of the symptoms; if the surface of the body becomes dry, if there be passage of fæces or gas, the pulse becoming softer and less frequent, and the characteristic anxiety of expression disappears, a favorable termination may be looked for.

TREATMENT.—As the mucous tract of the bowels is the primary seat of trouble, treatment must be directed with a view to checking the action of the bowels until the inflammatory action has ceased, and although there is usually an inactive condition of the bowels purgative or laxatives must, on no account, be given. Treatment must tend to relieve pain and check the movement of the intestines. For these purposes opium must be administered in large doses. In the early stages, when the pulse is full and strong, if depression be not well marked it is good practice to give 12 to 15 drops of Fleming's tincture of aconite in a little cold water, or extract 3 to 4 quarts of blood from the jugular vein. From 2 to 3 drs. of powdered opium should be given in a pint of cold water as a drench, and rather smaller doses every two hours until the symptoms are relieved. Cloths wrung out of hot water should be applied to the abdomen continuously for a few hours, and care be taken to clothe the patient well afterwards to prevent too great reaction. If, after abatement of the symptoms, the bowels remain torpid (as they generally do) the removal of this torpidity must not be attempted by the administration of drastic purgatives. Very small doses of raw linseed oil, say 4 to 6 ozs. with 2 drs. nux vomica, may be given about every eight hours, and the contents of the rectum removed by injections of warm soapy water occasionally. When the appetite returns the most easily digested food, as bran and boiled linseed, should be given, and the eating of dry food prevented until the bowels commence to act; and then solid foods should be given in only very small quantities for a few days.

DIARRHŒA.

Diarrhœa is the term applied to all cases of simple purging if the fæces are loose, liquid or semi-liquid, and frequently voided, without co-existing inflammation. Diarrhœa is sometimes a spontaneous effort to discharge from the intestines something which is irritant or obnoxious to them, or to the system generally. It is also induced by a variety of causes, such as indigestible food, food imperfectly masticated, sudden changes in diet, particularly from a dry to a moist one, medicinal agents, parasites in stomach or intestines, derangement of the liver, drinking large quantities of water when overheated, etc. Probably the most frequent cause is the consumption of stagnant or impure water.

Some horses are particularly predisposed to attacks of diarrhoea from trivial causes. Short-ribbed, flat-sided, narrow-joined horses, and those of very nervous temperament are apt to purge without apparent cause. They are commonly called "washy" horses. They will start upon a journey in apparently the best of health, but after being driven a variable distance will commence to purge more or less freely, passing liquid or semi-liquid faeces (often accompanied by flatus) in small quantities and frequently. In some cases feeding exclusively on dry food will prevent the trouble, but in others it will not. Such horses are hard to keep in condition, require the best of food and very careful feeding, and are unpleasant to drive. If used for slow work they usually give fair satisfaction. Some horses become "washy" as the result of swallowing imperfectly masticated feed, due to faulty teeth. Such can be successfully treated by having their teeth attended to. Others may be "washy" only when fed some particular food or watered under certain conditions, and of course these, after the cause has been ascertained, can be successfully treated by removing or avoiding the cause.

ACUTE DIARRHOEA is that condition in which an animal not "washy" from predisposition or acquired conditions, purges freely without suffering acute pain. The faeces are voided freely in liquid or semi-liquid form, often of a dirty brown color, and usually without offensive odor. In other cases the excretions are foul smelling and often of a dirty clay color. In some cases a spontaneous cure results in a few hours, indicating that the trouble was caused by some irritant in the intestine, which was expelled with the excreta, and a rapid recovery took place. In other cases the trouble continues, the animal loses appetite, but thirst is usually excessive, he drinks large quantities of water, regardless of its quality, he fails rapidly in strength, and, if the trouble be not checked he will become unable to stand, and death will soon take place.

TREATMENT.—If possible, ascertain and remove the cause. If this can be done in the early stages it is often all that is required. If it be suspected that the disease is due to some irritant in the intestines, and the patient is not showing weakness and loss of appetite, a laxative of 1 to 1½ pts. of raw linseed oil should be given. This, of course, temporarily increases purgation, and is given with the hope that this increase will cause the removal from the intestine of the irritant that is responsible for the trouble. In fact it is good practice in all cases of acute diarrhoea in which the patient still retains a reasonable appetite and reasonable strength to give a laxative.

After giving the laxative nothing should be given to check the diarrhoea for at least twenty-four hours, as it requires that length of time for the laxative to establish and complete its action. If astringents be given earlier they will counteract the laxation, and there will be practically a negative result from each, hence no good will result. If after this length of time the diarrhoea still continues, means should be taken to check it. Also, if the patient has lost appetite and is becoming dull and weak, even in the early stages, he is not in condition to withstand the still further weakening effects of a laxative, and prompt means of checking the diarrhoea should be taken, even though we suspect the presence of some movable irritant in the intestines.

While, upon general principles, we say that "diarrhoea should not be too quickly checked," experience teaches us that in cases of acute diarrhoea, presenting the symptoms noted, prompt measures to check it are necessary. For a horse of ordinary size we recommend 2 ozs. of tincture of opium, and ½ oz. each of powdered catechu and prepared chalk in a pint of cold water, given as a drench every four hours until diarrhoea ceases. The dose for small or larger animals

should, of course, be in proportion to size. If appetite remain dry food, as oats and hay, should be given. If appetite be lost and weakness well marked the patient should be drenched every few hours with raw eggs and $\frac{1}{2}$ pt. whiskey or 2 ozs. sweet spirits of nitre, or with oatmeal gruel to which has been added the stimulant. If the excretions have an offensive odor the administration of $\frac{1}{2}$ oz. hyposulphite of soda every few hours usually gives good results.

As already stated, the patient is usually very thirsty, and, if allowed will drink excessive quantities of water. It is not wise to allow large quantities of water to be taken at once, but the patient's thirst should be satisfied by allowing small quantities—say a gallon at a time, and given every half hour or even oftener if necessary. To the water add one-quarter of its bulk of lime-water, that is, four parts water and one part lime-water. This, in most cases, gives good results.

We are often impressed with the idea that the lime-water gives more marked results than the drugs. Lime-water is made by slacking a lump of lime, then adding considerable water, stirring well, then allowing to settle. The undissolved lime precipitates and the clear liquid on top is lime-water. It cannot be made too strong, as the water will dissolve and hold in solution only a certain quantity of lime and the remainder precipitates. In other words lime-water is a saturated solution of lime in water, that is, the water contains all the lime that it will hold in solution.

SUPERPURATION.

Superpurgation, or over excitement of the intestines from undue action of purgative medicine, is a condition of the bowels frequently seen. The susceptibility of horses to the action of purgatives and other medicines vary greatly. While in a majority of cases this is governed to a great degree by size and breeding (hot blooded horses being more susceptible than those of cold blood, hence require smaller doses in proportion to age, weight, etc.), we find that horses of like breeding exhibit various degrees of susceptibility. It is not possible to tell with certainty by the general appearance of a horse just how large a dose of aloes or other purgative medicine it will require to give the desired action, which usually is moderate purgation. In some cases where an ordinary dose has been given, one that is in proportion to the size and breeding of the animal, practically no purgative action is produced, while in another case of apparently the same nature, in a horse of apparently similar characteristics, severe purgation may be the result. Hence we can readily understand that the most observant and skilful may be disappointed in the operation of a purgative. Some horses, without showing any indications, are particularly susceptible, while others are the reverse. Then again, the susceptibility of a horse varies at different times, owing largely to the general condition of the digestive tract, which may not in any way be indicated by his general appearance. At the same time in cases where reasonable care and intelligence is exercised in regard to the size of the dose and after treatment it is seldom that serious results occur. It is possible that untoward results may occur in any case. The results of a purgative depend, not only upon the size of the dose and condition of the animal, but largely upon the quality of the drugs and upon the treatment of the animal both before and after administration.

When the necessities of the case permit, the patient should be prepared by not allowing anything but a little bran to eat for twelve to eighteen hours before administration. Afterward no solids but bran should be allowed. Water should

be given often and in small quantities (if the weather be cold the chill should be removed from the water) until purgation commences. After this solid food should be given in small quantities. Gentle exercise the first few hours after administration hastens the action of the purgative, but on no account should the horse be exercised or worked severely, nor should he be given any exercise during the action of the dose. It is customary, and good practice to allow perfect rest after the administration of the dose until the action has ceased and the bowels become normal.

While there are, in most cases, more or less nausea and distress, caused just prior to, and during the visible action of the drugs, these are often so slight as to escape observation. But irrational treatment such as allowing solid food, copious drinks of water, fatiguing exercise, etc., increase the irritation and distress. It is good practice to administer a little ginger with the purgative, especially with aloes, as this tends to prevent griping.

The usual symptoms associated with the actions of a purgative are slightly hurried breathing and impaired appetite (not always noticed), when purging is about to commence, and the patient usually becomes more or less nauseated and suffers from slight griping pains. If the purging, however, does not proceed to an undue extent, these symptoms soon subside, and the nausea is succeeded by a desire for food. Should the patient be constitutionally weak, or be driven or ridden for a considerable distance, or worked while the purging continues or too soon after purgation ceases, or if the dose was too powerful in the first place, or if two or more of these circumstances operate, the purging will probably become excessive and long continued, and the life of the animal will thereby be endangered. While under ordinary conditions purgation should commence in eighteen to twenty-four hours after the administration of the dose, and continue for a like period, it is not unusual for a longer period to elapse before its action is noticed, and its duration may also be extended beyond the normal time. A purgative dose should not be repeated (except in exceptional cases) for at least thirty-six hours, and then only a small dose given when the first has not operated. We are assuming that the drugs given are of good quality, as, of course, no dependence can be placed upon the action of drugs of inferior quality. Purging may continue for a long time, but as long as the patient is kept quiet and the appetite remains good, the pulse normal or nearly so, little or no danger need be apprehended. If, however, the appetite fails, the pulse becomes thready, and the animal weak, prompt treatment is necessary. The symptoms indicating too violent and long continued action of a purgative are: staring, glassy eyes, frequent indistinct or intermittent pulse, voiding foul smelling or bloody feces, distended abdomen, with or without evacuations of gas, well marked loss of appetite, and general weakness. The patient usually stands still, or paws and wanders about, but seldom lies down. Horses suffering from any acute disease of the respiratory organs are particularly susceptible to the action of purgatives, and in such cases even reasonable doses act violently.

TREATMENT.—As stated, when the appetite and strength remain practically unimpaired, even though purgation continue an abnormal length of time, it is not necessary to interfere, but should the serious symptoms noted be observed, means must be taken to check the purgation. This, however, should not be done too quickly. Care should be taken not to allow water to be taken in large quantities at a time, as the thirst is usually great, and the horse will drink inordinately. He should be given water in small quantities and often. The addition to the water of about one-quarter of its bulk of lime-water gives good results. He should be

allowed small quantities of anything he will eat. Dry food, as hay and oats, are preferable. If very weak, stimulants as 4 to 6 ozs. of whiskey or brandy should be given every few hours. If purging continues treat as for diarrhoea, viz., give 1½ to 2 ozs. of laudanum and 4 drs. each of powdered catechu and prepared chalk in a pint of cold water as a drench every four or five hours until purging ceases. Care must be taken to not continue the latter treatment after purging ceases, as there would be danger of causing constipation.

AZOTURIA.

While azoturia is not a disease of the digestive organs it is a dietetic disease and quite a common and serious ailment, hence we may be excused for discussing it in this connection.

It is a disease peculiar to the horse and the mule, especially the former. It is characterized by partial or complete arrest of the power of locomotion caused by partial or complete paralysis of the posterior or anterior limbs (usually the former) with a morbid change in the character of the urine. While in all cases the kidneys become involved it is not primarily a disease of these organs. Some authorities call it a disease of the blood, while others class it as a disease of the nervous system. As it occurs after a period of idleness accompanied by high feeding we feel justified in classifying it as a "Dietetic disease." It would not be wise to discuss the various views as to the nature of the disease here, as a knowledge of this is valuable only from a scientific standpoint. Besides, as opinions of scientists differ we would gain nothing by the discussion. We shall confine our discussion to the conditions under which the disease occurs, the symptoms and treatment, both preventive and curative.

CAUSES.—It is a disease of the well kept horse. It does not appear in poorly kept and neglected animals. The predisposition to the disease is produced by idleness and good food. An attack is always preceded by a period of idleness, the period varying to a considerable extent—some say from two days to two weeks or longer. A few days' idleness is more likely to be followed by an attack than a longer period of rest. We cannot call to mind a case that occurred following a rest of less than three or more than ten days. Just why this is a fact cannot be satisfactorily explained. During a period of complete rest and good feeding the equilibrium between repair and waste is altered or partially suspended and plethora is established. The various excreting organs in some cases become more or less inactive. Certain products of the food which should be eliminated by said organs accumulate in large quantities, but no physical symptoms are noticeable that will lead the attendant to suspect danger until the animal is put in motion. Then these products, which are supposed to be of a nitrogenous nature, are converted into various substances, chiefly uric and hippuric acids, and are thrown upon the kidneys for elimination or excretion. The kidneys being unable to perform the increased function these materials are practically thrown back upon the system, causing a form of blood-poisoning of the muscles. This produces paralysis, either partial or complete of the muscles involved, depending upon the severity of the attack. It is probable, if the period of rest be extended beyond ten days or two weeks, that the system becomes accustomed to this condition. The excretory organs then regain their activity and eliminate the materials which at an earlier stage in the period of idleness would have caused the disease, had the animal been subject to exercise.

We cannot tell why some animals suffer from the disease under conditions to which several have been subjected, and the others go free. Neither can we tell why a horse may be subjected to such conditions many times with impunity and another time be attacked with the disease. We know that such are the facts, but cannot explain them.

We notice that horses accustomed to spasmodic exercise, or, in other words, accustomed to standing idle for a few days at a time and then worked or driven, seldom suffer from azoturia. Most victims are those that are accustomed to regular work and good food, and from some cause spend three days or more in idleness, and receive their usual amount of grain, and are then given exercise. Exercise following rest is necessary to cause the trouble. Cases have been caused by horses becoming halter-cast after a few day's rest, the exertion during the efforts to rise having the same effect as exercise or work. It is seldom that a horse that stands in a box-stall is attacked. In most cases he takes sufficient voluntary exercise to keep the excretory organs active, hence prevents an accumulation of the products noted. As the disease is always serious (especially in heavy horses) and in severe cases often fatal, it is obvious that preventive treatment is advisable. This, of course, consists in giving daily exercise to well-fed horses, even if for only a few minutes. If conditions make this impossible the grain rations should be reduced and largely supplemented by bran, or, if possible, the horse given a roomy box-stall during the period of idleness.

SYMPTOMS.—After a period of rest the horse is hitched and, of course, is usually feeling in higher spirits than usual and anxious to go. After being driven a variable distance, from a few hundred yards to several miles, (the symptoms have been noticed very early in some cases, and in rare cases not for a few hours), he begins to lose ambition, hangs back, suddenly goes stiff or lame, either in a hind or fore leg (usually the former). It is often thought that he has picked up a nail. He perspires freely; the muscles of the loins or croup, or in the fore leg, those of the forearm and shoulder, become enlarged and hardened. The respirations become labored, the expression becomes anxious, the pulse frequent and strong, he trembles, looks around at his sides, apparently suffers pain, and he may lie down, roll and regain his feet. His back becomes arched, he staggers, knuckles at his fetlock joints, he is losing control of his limbs, the whole body shakes, he tries hard to retain the standing position, but eventually falls. He may rise on his forefeet, and rarely regains the standing position, or drag his hind part along upon flexed fetlocks, and fall again. He generally struggles violently, often becomes delirious, and frequently uncontrollable. If he voids urine, or if it be drawn with a catheter, it is noticed to be thick in consistence and very dark in color, very strongly resembling strong, thick coffee in appearance. He is totally unable to rise or stand if lifted by the use of slings or in other ways, but his power to struggle is very well marked, and it is often difficult to prevent him injuring himself and his attendants.

These are the symptoms of a severe case, and, of course, are more or less modified in cases of less severity. In mild cases the patient is able to retain the standing position, but the partial or complete loss of power to control the limbs is noticed. The lassitude, enlargement and hardening of the muscles, anxious expression, and apparent colicky pains, and the marked change in the appearance of the urine, are more or less marked in all cases.

TREATMENT.—In most cases, when the first symptoms appear, if the horse be allowed to stand still for a few hours and is made as comfortable as possible he will recover without treatment. Hence, as soon as the slightest symptoms of the

disease are noticed in a horse that is being driven, ridden, worked or exercised in any manner after a period of idleness, the driver should not attempt to get him home or to a veterinarian, but quietly lead him to the nearest comfortable quarters (if in fine weather a field or fence corner will do) and send for the nearest veterinarian. If the patient has trouble in standing, care should be taken to support him, if possible, for a few hours, when he will probably have regained sufficient power to support himself. It is good practice to administer a purgative of 7 to 10 drs. of aloes (according to the size of the patient) and 2 or 3 drs. of ginger. If the weather is cold, clothe heavily and keep warm. If he can be kept on his feet for a few hours a recovery will take place, and he can be moved to his own or other comfortable stable in twenty-four to forty-eight hours or in some cases sooner; in rare cases it requires a longer period of complete rest. If the patient falls and is unable to rise he should be loaded on a boat or truck and moved to some roomy and comfortable place and made as comfortable as possible.

If the services of a veterinarian can be procured it is always wise to do so in severe cases of this disease, as he will follow treatment that can be given only by a veterinarian who has the proper instruments and understands the use of the drugs that are used in treatment.

When such cannot be procured it is good practice to administer a purgative and follow up with the administration of 1 to 1½ drs. of iodide of potassium every five hours for about twenty-four hours. Injections of warm, soapy water per rectum should be given every few hours to hasten actions of the bowels. The urine should be drawn off with a catheter every six to eight hours, and if the kidneys become inactive ½ oz. of the nitrate of potassium (saltpetre) should be given three times daily. It is necessary for an attendant or two to remain with him, and in some cases it is necessary to hobble his feet to prevent injury to himself or attendants. If the bowels and kidneys can be kept active, and delirium does not increase, there will be reasonable prospect of recovering, but if the symptoms continue to increase in intensity death will result, usually in from two to three days.

When recovery is about to take place and the patient attempts to rise, he should be assisted. In some cases it is wise to use slings to get him on his feet, but if he cannot stand when raised he must be let down again.

During treatment he should be allowed water frequently, but should not be allowed to drink large quantities at a time, and, if he will eat he should be given bran and a little good hay, or grass if it can be procured. At any time during treatment, if colicky pains be shown, it is good practice to give an anodyne as 1 to 2 ozs. tincture of belladonna or 1 to 1½ ozs. chloral hydrate.

As stated, in all, except very mild cases, it is wise to employ a veterinarian, as complications are liable to arise which he will probably be able to combat, and which would not be understood by an amateur.

THE OX

When we use the word "ox" we refer to cattle in general, regardless of sex. The stomach of the ox, being such a complex organ, is more liable to digestive derangement than his intestines. In order that the reader may more readily understand and appreciate the different diseases, their causes, symptoms and treatment, it may be wise to describe the anatomy of the œsophagus and stomach.

The œsophagus or gullet, passing from the posterior portion of the pharynx or cavity posterior to the root of the tongue, is a tube composed of mucous membrane surrounded by muscular fibres. These fibres surround the mucous membrane, and, like other muscular fibre are contractile. When a bolus of food is passing down the tube the fibres expand, and immediately contract after the bolus has passed. The œsophagus, after passing through the thorax or lung cavity, pierces the diaphragm (the division between the thoracic and abdominal cavities) then expands and enters the stomach as a somewhat funnel-shaped dilation; the mucous membrane is plentiful, somewhat folded, and continuous with the mucous membrane of the stomach.

The ox is usually spoken of as having four stomachs, but this is not strictly correct, as there is but one organ; but it is more or less completely divided into four compartments, called for convenience the first, second, third and fourth stomachs. Technically these are called, the rumen, reticulum, omasum and abomasum. The rumen, paunch or first stomach is a very large compartment, occupying about four-fifths of the abdominal cavity, situated principally on the left side, extending well back to the pelvis and having an average capacity of probably about thirty-six gallons. The reticulum or second stomach is situated to the front and right of the rumen. It is a comparatively small compartment and not well divided from the rumen. In fact, the division is so imperfect that it would be difficult to distinguish one from the other if it were not for the arrangement of the mucous membrane; that of the rumen being smooth like that of the œsophagus, while that of the reticulum strongly resembles an empty honey-comb with the top of the cells cut off. On this account the compartment is frequently referred to as "the honey-comb." The omasum or third stomach is to the front and right of the reticulum. It is a small organ with a capacity of about 1 to 1½ gallons. The mucous membrane of this compartment is formed into leaves of different depths. In fact, when it is empty it appears as a compartment of leaves of mucous membrane, on which account it is often referred to as "the many-plies." These leaves are thickly studded on each side with elevated epithelial cells, which grind the food as it passes through. To the right and posterior to this compartment is the abomasum or fourth stomach, which is the true digestive stomach and contains the gastric glands. This is comparatively small, its capacity probably being between three and four gallons. At the posterior portion is a constricted orifice called the pylorus or pyloric orifice, with which the small intestine is continuous.

Digestion in the ox (with the exception of that which takes place in the small intestine) is supposed to be carried on as follows: He eats large quantities of bulky food, eats it rapidly, hence does not take time to masticate it well. It enters the rumen, the muscular coat of which has both transverse and longitudinal fibres, the contraction of which lessens the calibre of the organ in all directions, and, of course, their relaxation correspondingly enlarges it. During the time the animal

is eating this contraction and relaxation is continuous, producing a somewhat churning motion which thoroughly mixes the contents with each other and with the liquids that are present. When the animal has satisfied his desire for food the process of rumination or chewing the cud commences. This is supposed to be performed somewhat as follows: The muscular fibres mentioned contract firmly, this compresses the contents of the organ and forces it forward, the dilated end of the œsophagus closes and, in closing grasps a portion of the ingesta and by a regurgitative or anti-peristaltic action it is returned to the mouth for re-mastication. This process being performed the bolus is swallowed. If there still be any imperfectly masticated portions they are supposed to again enter the rumen, while the finely masticated and the fluid portions pass directly to the omasum by what is known as "the œsophageal canal," which consists of two double leaf-like folds of mucous membrane which extend from the œsophagus (hanging downward) to the omasum. When a bolus of re-masticated food is being swallowed the lower edges of the folds approach each other and when they meet a canal is formed which carries the ingesta to the omasum. Then another bolus is regurgitated, re-masticated and swallowed, and this continues until the process of rumination is completed. It will be seen that the cud is simply a portion of the contents of the rumen returned to the mouth for re-mastication, hence the too-common idea that cattle suffer from a disease known as "loss of the cud" is false. In most cases of digestive troubles the process of rumination ceases, but when the disease is cured it will again be performed.

It must not be thought that all the contents of the rumen undergo this process at any time. Only a limited amount is operated upon at once; hence, in health the rumen always contains a large amount of ingesta.

The re-masticated food having entered the omasum it fills the spaces between the leaves, which press upon it, and, having a slight motion, one upon the other, still further grind it and press the fluids into the abomasum. These gradually pass into the abomasum, where true digestion really commences. It will be seen by the above that the functions of the first three compartments are simply to prepare the food for digestion which takes place in the fourth stomach.

When from any cause any of the functions mentioned are checked, suspended, interrupted or materially altered, digestive derangement will be noticed, the causes, symptoms and treatment of which we will discuss.

TYMPANITIS, BLOATING, HOVEN OR BLOWN.

CAUSES.—This condition known by many names consists of distension of the rumen with gas. The most fruitful cause is a sudden change from dry food to an unlimited supply of green food of any kind, principally to the different varieties of clover, and more particularly when the clover is in flower. It frequently occurs from the voracity with which cattle that have been kept on dry food all winter consume green fodder. Hence, it is more prevalent in the spring than at other seasons. It results from feeding too freely on green food of any kind, especially on that upon which dew or rain is present, and more particularly when frosted; hence is not uncommon in the fall when cattle are allowed to consume clover, rape, turnip tops, etc., when frosted. Any food that readily ferments, if taken in sufficient quantities to temporarily check digestion, will quickly form gases and cause

bloating. It is often a complication in cases of choking, the mechanical impediment being the cause by preventing the escape of gas through the gullet. Sudden changes of diet of any kind may cause the trouble, or insufficient secretion of saliva may have the same effect. While some of the above-mentioned causes usually precede an attack, it is not uncommon to notice a well-marked case for which no well-marked cause can be traced. Such cases are doubtless due to some unsuspected and not well understood temporary derangement of the digestive glands and muscles of the rumen. Any condition that causes torpidity of the rumen may cause bloating, even though no change of food of a dangerous nature has taken place. Torpidity of the rumen occurs in debilitating diseases, in fact in most diseases of the ox, also from the introduction of excessively cold material as frosted fodder, into the organ.

SYMPTOMS.—The patient commences to exhibit signs of uneasiness, lying down and rising frequently, and kicking at the belly. Rumination is suspended and food refused. There is general depression, protrusion of the muzzle, projection and congestion of the eyes, increased flow of saliva, and generally moaning during expiration. The back is arched and there is more or less marked swelling of the abdomen especially marked on the left side, especially between the point of the left hip and the last rib. If this be pressed with the finger it will yield, but at once regain its former condition when pressure is relieved. If tapped with the fingers a resonic, tympanic or drum-like sound will be heard, hence the name "tympanitis." Distension of the rumen causes forward pressure upon the diaphragm (the division between the abdominal and lung cavities), hence lessens the space of the lung cavity and causes difficulty in respiration in proportion to the degree of bloating. In many cases forcible ejection of feces per rectum is noticed. In most cases there are eructations of gases of a special odor. The bowels soon cease to act and breathing becomes more difficult as the tympany increases. The brain frequently becomes involved to some extent, the patient becoming blind, staggering and falling. Death may occur quickly from rupture of the rumen, rupture of the diaphragm, suffocation, or absorption of gases.

TREATMENT.—Preventive treatment consists in avoiding sudden changes of food, especially from a dry to a moist or green ration. All changes should be made gradually. When cattle that have been accustomed to dry fodder are to be turned out on grass, especially any variety of clover, it is good practice to give a moderate meal in the stable then turn on grass for a few minutes, say twenty to thirty minutes. Next day leave on grass for a longer period, say forty to fifty minutes, and continue to gradually increase the period in order that the animals will become less inclined to engorgement and the digestive organs gradually acquire the power to perform their new functions. In a few days it will be reasonably safe to allow the cattle to remain on the pasture. Much greater danger exists at any time in allowing cattle that are not accustomed to green fodder to partake of it when frosted, or damp with either dew or rain. Frosted grass, rape, turnip tops, etc., are very dangerous under any conditions.

CURATIVE treatment must be directed to remove or neutralize the gases that are present and to prevent the formation of more. It will depend upon the severity of the attack and the extent of the distension of the rumen whether it will be wise to attempt the immediate removal of the gases or to administer drugs to neutralize them. When bloating is not excessive, with little danger of death occurring quickly, the administration of any drug that will neutralize the gases may, and should, be effective. For this purpose oil of turpentine (commonly called spirits of turpentine) is probably the best simple remedy. This is g

2 to 4 oz. doses, according to the size of the patient, and the state of distension. It is wise to administer it in some vehicle to prevent irritation of the mucous membrane. The best vehicle is raw linseed oil 1 to 1½ pts. When oil is not on hand melted butter or lard or whole milk answers the purpose well, but turpentine will not mix with water; at the same time when oily vehicles are not readily obtainable it may be given in water if the bottle be constantly shaken. Hyposulphite of soda in 1 to 1½ oz. doses mixed with about a pint of warm water also gives good results. Carbonate of ammonia in 4 to 6 dr. doses, or bicarbonate of soda (baking soda) in 1 to 1½ oz. doses also acts well, but none of these act so well or so promptly as oil of turpentine. The Kentucky Experimental Station highly recommends the administration of about ½ oz. of formalin in a quart of water and cite many cases in which it has given excellent results. The writer has not experimented with this drug in this connection, having had good results from oil of turpentine. At the same time the use of formalin is worthy of a trial, but it must be remembered that it is a very strong astringent and irritant, hence must be diluted with at least a quart of water.

In addition to administering the dose (whatever we select) it is good practice to put a hay rope, a piece of wood or other material about two inches in diameter, into the patient's mouth and fasten it there. This tends to cause a working of the jaws and facilitates the escape of gas through the œsophagus. If the desired results be not obtained in an hour the dose may be repeated.

In cases where bloating is extreme there is danger of death resulting quickly from rupture of the organs mentioned from suffocation or from absorption of gases. In such cases we cannot wait for the action of medicines given by the mouth. Relief must be prompt and the gases must be removed by mechanical or surgical means. In some cases the passing of a rubber tube down the œsophagus to the stomach will give immediate relief. The mouth must be kept open by an ordinary gag, a mouth speculum, a small clevic or some other device; the tube (5 or 6 ft. of ordinary ½-inch garden hose serves the purpose well) is oiled, carefully passed until the end enters the rumen. If that part of the rumen be not blocked by semi-solid contents the gas will immediately escape through the tube, but if it is the gas cannot enter the tube.

In such cases an opening must be made into the rumen on the left side at the most prominent part between the point of the hip and the last rib through the skin, muscles and wall of the rumen through which the gas will escape and give practically immediate relief. The hair should be clipped off and the seat of operation, the instruments, and the hands of the operator thoroughly disinfected with a five per cent. solution of carbolic acid, one of the coal tar antiseptics or other good disinfectant. An instrument called a *trocár* and *canula* is the proper one to use. It consists of a metal tube with a sharp pointed metal rod passing through it, the point of the rod extending some distance longer than the tube. An incision may be made through the skin with a knife or the instrument forced through without an incision. It is forced well into the rumen, the trocár then drawn out, which leaves the canula or tube inserted through which the gas escapes. When this instrument cannot be procured in time an opening may be made with a knife and the lips of the wound held apart to allow escape of the gas. Unless the opening be quite large no after treatment is required other than keeping the wound clean and dressing regularly with an antiseptic. When the proper instrument is used after-treatment of any kind is seldom necessary.

In all cases it is good practice, after bloating has disappeared, to administer a laxative of about 1 lb. of Epsom salt or 1½ pts raw linseed oil, and feed lightly on laxative food for a few days.

IMPACTION OF THE RUMEN.

CAUSE.—Impaction of the rumen is one of the most common diseases of the stomach of the ox. It consists in distension of the rumen with solid matters. It is a pathological condition somewhat similar to tympanitis, but differing in the urgency of its symptoms and the method of treatment. It depends upon introduction of solid matters to such an amount as to partially or wholly paralyze the organ by over distension. Some foods appear more liable to cause the disorder than others, as grain, chaff, or potatoes, but anything particularly palatable to the animal may be consumed in such quantities if opportunity presents itself. Sudden changes of food, especially if the change be to a food particularly palatable, over-feeding on grain without allowing the animal to take exercise, indigestible food such as over-ripe hay, food of poor quality even if consumed in only moderate quantities, may cause the trouble; the animal continuing to eat, but not ruminating sufficiently, the amount of ingesta gradually increases in the rumen. This distends its walls until they become partially paralyzed; hence the normal contraction and relaxation does not take place, and the normal churning motion is absent. We frequently notice a case of impaction without appreciable cause, which, no doubt, is due to a temporary suspension of the action of the walls of the organ, or a failure in action of the glands, for which we can give no cause.

SYMPTOMS.—The animal becomes dull and suffers pain, which is often expressed by stamping of the feet, striking at the abdomen with the hind feet, switching the tail, etc. The pulse is frequent, and respirations usually accelerated. Appetite is lost and rumination suspended. The bowels are usually constipated. The abdomen is enlarged, especially on the left side, but this does not occur so quickly as in tympanitis; neither is it of the same nature. When tapped between the point of the left hip and the last rib a dull sound is produced, and when pressed it has a doughy feel, and the imprints of the fingers do not quickly disappear—it “pits on pressure.” There is often a grunt during expiration, more evident when the animal is lying down—especially if lying upon the left side, a position that is seldom maintained for any considerable time. In the later stages tympanitis often sets in as a complication, when the respiration becomes more labored, the grunt during expiration more pronounced, in some cases resembling a groan rather than a grunt. The patient often grinds his teeth and persists in standing with protruded muzzle and arched back. In some cases inflammation of the rumen results, when there will be well-marked increase of the temperature and the patient will manifest pain if pressure be made on the left side.

The foregoing symptoms are more or less well-marked in severe cases, but in cases of less severity the patient occasionally appears to have periods of ease and expresses a desire for food. If food be allowed he will eat a variable amount with apparent relish, but the symptoms of illness soon become more marked than before. This is of necessity the case, as the walls of the rumen are more or less inactive and the mucous glands also are in a state of partial inactivity: the organ is not performing its proper function and the introduction of a fresh supply of food must intensify the trouble.

TREATMENT must be directed to the removal of some of the impacted food mass and the restoration of activity to the over-distended walls of the rumen. When the distension is not excessive a brisk purgation of 2 drs. Epsom salts, $\frac{1}{2}$ oz. gamboge and 2 ozs. ginger in about $1\frac{1}{2}$ qts. of warm water should be given as a drench. This is a fair dose for an ordinary sized cow, the dose for smaller or larger animals should be in proportion to size. In order that the purgative may act it is necessary that the paralysis of the walls of the organ be overcome. For

this purpose nerve tonics, as nux vomica in 2 dram doses (for an ordinary sized cow) should be given every six or seven hours. It is not wise to allow the patient any solids to eat until there is a free action of the bowels. If he expresses a desire for food a little bran mash may be allowed. If purgation has not commenced in 36 hours more purgative medicine should be given. About 1½ pts. of raw linseed oil should be given and alternated every twelve hours with 1 lb. Epsom salt and 1 oz. ginger, until purgation is established. The administration of nux vomica should be continued in the meantime. The patient should be allowed all the water he will drink. If the weather and surroundings be cold it is well to remove the chill from the water.

It is remarkable how stubborn some cases are, the length of time an animal will suffer and the quantities of purgative medicines it is necessary to administer before an improvement is noticed. If the disease is not yielding to treatment after the second day it is necessary to give the patient something to sustain strength. Probably for this purpose nothing acts as well as boiled flax-seed administered as a drench in about quart doses four or five times daily. This is laxative, soothing and nutritive.

So long as tympanitis does not occur the probability of successful treatment may be looked upon as hopeful. If it occurs the usual treatment for bloating must be followed in addition to that already noted. In cases where the early symptoms of the disease are extreme an operation called "rumenotomy" is necessary. This consists in cutting through the skin, muscles and walls of the rumen and removing a large portion of the contents by hand. The operation can be successfully performed only by a veterinarian.

What is commonly called "Grain Sickness" is simply impaction of the rumen with grain. When an animal is known to have had the opportunity of eating excessive quantities of grain, the usual custom of shutting him in a stable, allowing him neither food nor water, and awaiting developments is absurd. The owner should anticipate trouble by at once administering a brisk purgative, as for impaction. Allow him nothing to eat, but allow all the water he will drink in small quantities and often, in the hopes that purgation will commence before the grain swells and causes paralysis of the walls of the rumen. Of course, in cases of "grain sickness" where the early symptoms are severe, rumenotomy should be performed at once.

FARDEL BOUND.

CAUSES.—Fardel bound is the name given to a pathological condition which consists in impaction of the omasum or third stomach. It is also known as maw bound, vertigo, staggers, etc. The ingesta becomes impacted between the leaves of the organ. It is sometimes followed by inflammation of the stomach. It is a much more serious condition than impaction of the rumen. The contents of the omasum are normally drier than those of any other compartment of the stomach, but when this disease is present they become very dry, so dry that in some post mortems it has been observed that they will burn if lighted with a match. The disease is caused by introduction into the stomach of food of an indigestible character, particularly that of a dry, woody nature, as autumn grass that has been allowed to remain in the field until spring, and is consumed in greater or less quantities by the cattle along with the fresh grass; over-ripe hay, poorly saved hay, straw, coarse and indigestible herbage sometimes found in old pastures, especially where considerable shade is found. Like other diseases of the stomach, it is

often met with when no well-marked cause can be traced. It is difficult to treat and often proves fatal.

SYMPTOMS.—The symptoms of fardel bound are not as typical as those of bloating or impaction of the rumen. In many cases, in the early stages, faeces are passed frequently and in small quantities, in some cases in a fluid or semi-fluid state, and in others quite dry and hard. In either case obstinate constipation soon follows, the appetite becomes impaired or entirely absent, rumination ceases, the secretion of milk is more or less suspended (if the patient be milking), the muzzle becomes dry, and the eyes usually dull but in some cases wild looking. In rare cases delirium is noticed in the early stages, the patient becomes wild, more or less furious, and hard to control. A short grunt is often noticed during expiration, especially when the patient is lying. This symptom is often noticed in cases of impaction of the rumen, but the condition of the abdomen, especially on the left side, is sufficient to enable a man to differentiate between the disease. Respirations are usually frequent and short. The patient often persists in standing, but in some cases lies considerably on his left side with the head turned towards the flank. Pressure on the right side under the false ribs often causes pain. After a variable time there is usually more or less tympanitis, caused by fermentation of the contents of the rumen, in which digestion is also suspended. As stated, delirium may be noticed in the early stages, in other cases it may occur later on, while in still others there is drowsiness and stupor or partial paralysis more or less marked during the whole progress of the disease. The patient suffers acute abdominal pain.

TREATMENT.—Some recommend bleeding. Where the brain appears markedly affected the extraction of 4 to 6 qts. of blood from the jugular vein is good practice, but when the brain symptoms are not well marked blood letting is seldom practised. It must be understood that there is paralysis, either partial or complete, of the muscular walls of the viscus and also of the muscular fibres of the manyplics, and that laxatives or purgatives will not act satisfactorily until this paralysis is overcome. The actions of purgatives are often very peculiar and disappointing. In a reasonable time after the administration of a purgative there generally are two or three slight liquid evacuations and the attendant thinks that free purgation has commenced, but these symptoms are often quickly followed by a return of the constipation. The administration of a brisk, saline purgative (as for impaction of the rumen) at first, is considered good practice by most practitioners. While in a general way the purgative action of aloes is very slightly marked in the ox, it is supposed to have a special action on the contents of the third stomach; hence it is good practice to add 6 to 8 drs. of aloes to the ordinary purgative, all dissolved in water and given as a drench, care must be taken to not use hot water, as it will cause the formation of a waxy mass out of the aloes, which interferes with the administration and also lessens the purgative action of the aloes. Follow up with 2 to 3 drs. of nux vomica three times daily to overcome the muscular paralysis. Also give a stimulant of 2 to 3 ozs. sweet spirits of nitre, or a cupful of whiskey in a pint of cold water as a drench every four or five hours, and allow the patient all the cold water he will drink. If free purgation has not commenced in twenty-four hours give 1½ to 2 pts. of raw linseed oil, continue the administration of nux vomica and stimulants, and about every twelve hours until free purgation is established, give 1 lb. Epsom salt and 1 oz. ginger, and 1 to 1½ pts. raw linseed oil alternately, i.e., give the saline dose and the oil alternately at intervals of twelve hours. If the patient will take a little food, allow reasonable quantities of bran mash with a little linseed meal, but no solid food. If he will not eat, some nourish-

ment must be given after the second day in order to keep up his strength. For this purpose some practitioners recommend ale or stout, some recommend oat meal gruel, and some boiled flaxseed. Probably the last mentioned, given in 1 to 2 qt. doses every six hours, gives the best results. This has a soothing effect upon the irritated and more or less inflamed mucous membrane of the stomach, and also a laxative as well as a nutritive action. Treacle or black strap molasses is highly prized by some for the treatment of this and other diseases of the stomach, and is worthy of a trial. Treatment should be kept up until the patient improves or death results.

CHOKING.

Choking is more of an accident than a disease, but as it is a pathological condition of the digestive organs it may be considered correct to classify it as a disease of the digestive organs. It consists in the blocking or the packing of the œsophagus (the gullet) with some foreign body. Symptoms somewhat similar to those of choking, however, arise from other causes, as injuries to the œsophagus from sharp bodies swallowed, and also from some nervous diseases. Blocking of the tube by foreign bodies frequently occurs in the ox, but not nearly so frequently now as formerly, as most feeders pulp the roots instead of feeding them whole as was once done. Choking is usually caused by the lodgement in some part of the œsophagus of a portion of a turnip or other root or a whole apple, potato, etc., but may be by impaction of other food too greedily swallowed. When stricture of the œsophagus from any cause exists, choking is quite common, the bolus of food or piece of solid matter not being able to pass through the constricted tube, on the other hand, where dilatation of a portion of the tube exists, choking is also common, as the bolus, when being swallowed, lodges in the dilated portion. This is followed by the lodgement of other boluses until the symptoms of choking becomes well marked. When no abnormal condition of the œsophagus exists, and reasonable care be taken to properly prepare solid foods, choking is of rare occurrence. The foreign body that causes the trouble may be lodged in the pharynx (the cavity just behind the root of the tongue) or in the cervical portion of gullet (the region of the neck) or in the thoracic portion (that portion that passes through the thoracic or lung cavity).

SYMPTOMS.—The symptoms are readily recognized. The patient stands with muzzle protruded, makes ineffectual attempts to swallow, coughs, champs his jaws and there is a profuse flow of saliva from the mouth. Appetite and rumination are suspended, but gulping efforts to swallow are made. The eyes project and become bloodshot, the patient is uneasy and in many cases feces and urine are frequently voided in small quantities. When any matter is swallowed, or given as a drench, it is returned through the mouth and nostrils. If the impaction be in the pharynx, coughing is the best marked symptom, and respiration is interfered with; if in the cervical region an enlargement can generally be located by sight or by manipulation on the lower margin of the neck in the channel. This latter may be large or small, hard or soft, movable or immovable, according to the bulk and nature of the material and condition of the œsophagus. If in the thoracic region, of course, the obstruction can be neither seen or felt. If fluid is given it appears to pass to the stomach but it simply fills the passage from the obstruction to the pharynx and is then regurgitated. Bloating is often soon noticed, except in cases in which, on account of the shape of the obstruction, the whole calibre of the tube is not filled, hence liquid or gaseous matter may be able to pass it.

TREATMENT.—This must be directed to the removal of the obstruction, either by the mouth or by causing it to pass downwards to the stomach. If bloating be excessive it should be relieved by puncturing as in a case of ordinary tympanitis. Then, if possible, the seat of the obstruction should be located. If in the pharynx it can usually be removed by hand. The patient's mouth must be kept well open by the use of a mouth speculum, a eleviece or other device, an assistant holds the animal and the operator passes his hand into the pharynx, grasps the object and removes it. If in the cervical region the operator should endeavor to move it by manipulation. If it can be worked a little either upwards or downwards the exercise of a little patience will usually cause it to be swallowed or coughed up. If it be grain, either whole or chopped, or hay or straw too greedily swallowed, the mass may be broken up by manipulation and will pass down to the stomach. If relief cannot be given as above or the obstruction be in the cervical region, efforts must be made to force it down. For this purpose an instrument called a "probang" should be used. The too common habit of using a fork handle, broom handle, whip, harness trace, etc., cannot be too strongly condemned. The opposing surface of the obstruction is usually irregular in shape and as that of the instrument mentioned is either round or oval, the latter is very liable to pass to one side of the former and rupture the œsophagus. In this case it is often thought that the object has been forced to the stomach, but the patient does not get ease, will neither eat nor drink, and in a few hours the neck and throat commence to swell by reason of the gases that the animal may swallow and that are formed in the gullet, filling up the areolar tissue, and the patient usually dies in a few hours longer.

A probang usually is made of about five or six feet of spiral wire, covered with leather or gum elastic, and having attached to each end a metal or horn disk of a cup shape, so that when it meets the obstruction, instead of passing alongside of it, it practically grasps it or encircles it, and when force is applied it is exerted upon the obstruction in the desired way. Many probangs have stillets of whale-bone or cane to strengthen them. When a probang is not procurable a piece of ordinary garden hose answers the purpose fairly well, the hollow in the hose acting as the cup-shaped disk of the probang. The hose can be strengthened by using a whip-handle or other material for a stilet, care being taken that the stilet be not passed quite to the end of the hose.

In order to pass the probang a wooden gag with a hole through the centre or other device is necessary to hold the mouth open. The gag extends a few inches on each side of the mouth and has straps attached to it, which pass over the head and buckle behind the horns to hold the gag in the mouth. The probang should be oiled. An assistant on each side of the animal catches the gag with one hand and the horn on the other, and hold the head in such a position as to make the mouth and œsophagus in as nearly a straight line as possible. The operator then passes the probang through the hole in the gag and gently backwards until it enters the œsophagus through which it passes until the end reaches the obstruction. Then steady pressure should be applied to force the obstruction down into the stomach. In some cases the obstruction is so firmly implanted that it cannot be forced down in this way, in which case, if in the cervical region, an operation called "œsophagotomy" may be performed. This consists in cutting through the skin and walls of the œsophagus and removing the obstruction, then stitching the wound in the œsophagus with carbolized catgut or silk sutures, then stitching the wound in the skin and feeding on sloppy food only for ten to fourteen days. None but a veterinarian should attempt the operation. When the obstruction is in the cervical

region and cannot be forced down all that can be done is leave the animal alone. If necessary to prevent bloating leave the canula in the stomach and await developments. In many cases the animal gets relief after several hours, the obstruction evidently becoming partially cooked and passing to the stomach. As choking is liable to recur if care be not taken, the animal should not be fed on food liable to cause the trouble for a week or ten days after the occurrence, in order to allow time for the inflamed and dilated portion of the œsophagus to regain its normal condition.

COLIC.

CAUSES.—The ox is not nearly so liable to the different forms of colic as the horse, but at the same time cases are not unusual. Colic, defined as "any abdominal pain not due to inflammation" is capable of more exact limitation. It is distinguished by certain symptoms, which are more or less marked in other abdominal disorders, and are known as "colicky pains." While food of poor quality, of an indigestible nature, food improperly prepared, sudden changes in food, etc., usually cause disease of the stomach of the ox, we find that in some cases they cause painful disorders of the intestines, and such attacks are known as "colic."

SYMPTOMS.—The animal ceases to feed and ruminate for a time, the pulse becomes full and bounding; there is moaning grinding of the teeth, striking at the abdomen with the hind feet, extreme restlessness, indicated by frequently lying down and rising, turning the head around and placing the muzzle against the seat of pain; there often is sweating and frequent passing of urine in small quantities, or of portions of small dry faeces. Rupture of various kinds, strangulation of the bowels, impaction of the bowels, as well as certain disorders of the liver, stomach or urinary apparatus, may be cause of symptoms simulating those of colic. In such cases other symptoms are usually present which assist in diagnosis. But, failing these, we may usually attribute the symptoms of disorder to simple or spasmodic colic, spasms of a portion or portions of the small intestine. Then the pains are paroxysmal, that is, a period of pain is followed by a period of ease, during which the patient appears perfectly normal, the pulse becomes normal, all excitement ceases, the patient will eat or ruminate and appear normal in all respects for a variable time. This is again followed by a period of well marked pain, etc. The periods of paroxysm vary in length and severity, but the pain is always well marked. The trouble may be induced by changes in diet, the passage of imperfectly prepared food from the stomach, and some claim, by drinking large quantities of very cold water.

TREATMENT.—As it is a spasmodic disease medicines that relieve spasms (called antispasmodics) should be given promptly, as 2 fluid ozs. each of sweet spirits of nitre and tincture of belladonna and 1 fluid oz. of laudanum for an ordinary sized cow: smaller or larger animals should be given a dose in proportion to their size. The patient should not be allowed to eat anything during the periods of ease, as this is very liable to increase the intensity of the trouble. The dose may be repeated in one and one-half to two hours if necessary, and at like intervals as often as required: but after the second dose it is wise to omit the laudanum as it tends to constipate. On the assumption that the trouble has been caused by the presence of indigestible food or of food imperfectly prepared in the intestine, it is good practice to administer a purgative after the symptoms of colic have disap-

peared in order to remove the cause. For this purpose the ordinary saline purgative of 1 to 2 lbs. Epsom salts and 1 oz. ginger should be given in a quart or more of warm water. It is also good practice to give an injection of warm soapy water per rectum, as this not only removes the contents of the rectum but tends to stimulate the general actions of the bowels, hence hastens the action of the purgative, as in any case after the administration nothing but sloppy food, in small quantities, should be allowed until free purgation commences.

FLATULENT COLIC.

Colic in which there is the formation of gases in the intestines, principally in the large intestine, is known as "flatulent colic." This form may be diagnosed from the spasmodic form by the symptoms being less alarming and violent but of a more persistent character; there are practically no periods of ease. The symptoms of pain are constant, but vary in intensity. Emission of gases per rectum is often noticed, and, particularly if the small intestine be involved, there may be eructations of gases and in reasonably well marked cases a more or less well marked distension of the right side of the abdomen. In such cases treatment should be directed to neutralize the gases or cause their expulsion, and at the same time keep up the heart's action. For this purpose 2 to 3 fluid ozs. each of oil of turpentine and the aromatic spirits of ammonia, in $1\frac{1}{2}$ pts. of raw linseed oil, should be given. If more than one dose be given it is wise to use new milk instead of the oil. Rectal injections as for spasmodic colic should also be given. It is also good practice to force the patient to take walking exercise and to apply friction to the right side of the abdomen. The acute symptoms should be followed by the administration of a saline purgative, as in cases of spasmodic colic, and as the patient already has been given oil the amount of the saline should be less than under other circumstances. In all cases of colic in the ox it is good practice to explore the rectum by hand, remove its contents and follow by injections.

DIARRHŒA.

Diarrhœa is the term applied to that condition in which there is a frequent passage of liquid or semi-liquid fœces without co-existent inflammation. It may be a spontaneous effort to discharge from the intestines something that is obnoxious to them and to the system generally.

CAUSES.—Any irritant in the digestive canal may give rise to the disorder, as coarse or badly saved food, acid plants in the pasture or hay, indigestible food, sudden changes of diet, particularly from a dry to a moist one, medicinal substances, parasites, derangement of the liver, foreign matters in the intestines, etc. Sometimes when an animal is turned out on grass, after being kept in the stable for a considerable time, an attack is noticed. Exposure to cold is also a cause. A fruitful cause is water of poor quality. This is frequently noticed in dry seasons where cattle obtain water out of stagnant pools. Sometimes chronic diarrhœa results from long-continued improper dieting, whereby the mucous membrane of the alimentary canal becomes organically deranged and its secretory functions perverted. Unsanitary surroundings and poor care predispose to the disease. Some animals appear particularly predisposed and will suffer from it from causes

that have little or no effect upon others under the same conditions. This is more marked in horses than in cattle.

SYMPTOMS.—The symptoms cannot readily be mistaken. There is a more or less frequent evacuation of greater or less quantities of liquid or semi-liquid fæces. In the early stages the temperature, pulse and respirations remain practically normal. The appetite usually becomes lessened and rumination irregular. In some cases the appetite becomes capricious. The symptoms vary greatly according to the severity and duration of the attack. In many cases, even though the early symptoms may have been well marked, a spontaneous cure results in a few hours, while in others, acute diarrhœa continues. In the latter cases the appetite becomes greatly diminished or altogether suspended, rumination is materially interfered with, but thirst is usually excessive. The animal loses strength quickly, the pulse becomes weak and frequent, the general debility becomes well marked. In other cases a form of chronic diarrhœa, without alarming symptoms continues for a long time, the patient gradually but surely losing flesh, ambition and strength. The evacuations frequently have a foul odor, but this is not always the case. Cases of long continued chronic diarrhœa sometimes result in a disease known as dysentery, which we will discuss later on.

TREATMENT.—First remove the cause, if possible. In many cases if the cause can be located and removed, and the animal well cared for and carefully fed, no other treatment is necessary and a recovery will take place in a few days. Upon the assumption that all cases are due to an irritant in the intestines, which must be removed before a cure can result, some claim that the first treatment in all cases should be administration of a brisk purgative in order to still further increase the activity of the bowels, and cause the removal of the irritant. Our experience has taught us that in advanced cases where appetite is materially lessened or wholly suspended, and the animal shows well marked signs of weakness, and practically in all cases of acute diarrhœa in quite young or weakly animals, this practice is unwise. It often proves fatal in cases that might have recovered had less heroic treatment been given. In cases where the patient is still strong with a fair appetite, even though diarrhœa be acute, it is good practice to administer a laxative as 1 to 2 pts. of raw linseed oil (according to the size of the patient), but we do not consider it good practice to administer a drastic purgative in any case. When a laxative or purgative is administered no treatment to check the diarrhœa should be given for twenty-four hours in order to allow the medicine already given to establish its action. In cases where it is not considered wise to administer a laxative, or in other cases where one has been given and diarrhœa continues beyond twenty-four hours after its administration, means of checking it should be adopted, as the administration of 1 to 2 fluid ozs. of laudanum and 2 to 4 drs. each of powdered catechu and prepared chalk in a quart of cold water as a drench every four or five hours until diarrhœa ceases. In addition to this add to the drinking water one-quarter of its bulk of lime-water: give a little at a time and often, as a gallon every hour if the patient will take it. The food should be of a dry nature, as hay or grain. In cases where weakness is well marked and appetite gone, stimulants and nutrients as 2 fluid ozs. of sweet spirits of nitre or a cupful of whiskey mixed with milk and a few raw eggs may be given as a drench every few hours.

DYSENTERY.

Dysentery, commonly called "bloody flux," is the inflammation of the lining membrane of the intestines, accompanied by ulceration. It occurs as a sequel to protracted diarrhœa, or may originate as a disease of itself from exposure to cold, feeding on coarse innutritious food, and almost any debilitating influence which acts slowly but persistently. It may occur as an after-effect of poisonous agents.

SYMPTOMS.—In some cases the disease is acute, but is more often chronic. In acute cases there is increase in temperature and more or less well marked abdominal pains in the early stages. The patient stands with arched back and strains almost constantly, passing only a small amount of watery matter tinged with blood. Sometimes little vesicles or blisters may be seen on the mucous membrane of the nostrils. As the disease advances signs of abdominal pain increase in intensity; rapid emaciation takes place and the patient sinks and dies from exhaustion.

In the chronic form the symptoms are those of extreme debility. The patient becomes hide-bound, emaciation is generally soon well marked, the coat is dry and staring, the mucous membranes become pale, eyes sunken, ears pendulous, the anus is relaxed and constantly discharging small quantities of a bloody substance, and the rectum generally protrudes a little. The back is arched, the gait is staggering, and in many cases pressure upon the loins appears to cause pain. When fœces are passed in quantity the odor is highly offensive, and they are glairy, bloody and viscid in consequence of the amount of mucous present. The animal may remain in this state for a long period, with the appetite almost gone but thirst sometimes excessive.

When at length death occurs or the patient is slaughtered, a post mortem often reveals that the stomach as well as the intestines have been involved. The fourth stomach has its lining membrane reddened, with a gelatinous effusion into its substance and into the sub-mucous tissue. The small intestines are sometimes somewhat similarly affected, but not infrequently present only a slight congestion of the mucous membrane. The large intestines are usually the main seat of the disorder. They show highly congested spots, and congestive streaking giving them a bluish color, ulcerations are also generally present, penetrating the mucous coat more or less deeply. The contents have an offensive smell and are tinged with blood.

TREATMENT.—This is often very unsatisfactory, which perhaps is due to the fact that the diseased mucous membrane of the intestines is in such a state that absorption of medicines cannot readily take place. Treatment should be largely that recommended for acute diarrhœa, except that in no case should a purgative or laxative be administered, even in the early stages. Large doses of opium, as 2 drs. of the powdered opium or 2 fluid ozs. of the tincture (laudanum) with 4 drs. each of catechu and prepared chalk, should be given 3 or 4 times daily. It is good practice to give astringent injections per rectum as alum water, 1 oz. of alum to a gallon of warm water. The patient's strength should be kept up and the heart's action stimulated by the administration of nutrients and stimulants, as a quart of boiled flaxseed and 2 fluid ozs. of sweet spirits of nitre or $\frac{1}{2}$ pt. whiskey every few hours. Careful nursing is absolutely necessary though some cases are so tedious that the attendant is liable to become discouraged and inclined to allow matters to take their own course. The food must be of first-class quality, dry and nutritious.

While a large percentage of cases prove fatal, even under the most careful and skilful treatment cases of recovery are not rare, hence efforts to cure should always be adopted.

ENTERITIS.

Enteritis, inflammation of the bowels is not a very common disease in the ox, but is occasionally seen. Either the mucous or muscular coat may be primarily involved, but the inflammation usually extends and involves all the coats of the intestine involved. This disease is more frequently seen in working cattle. Adults in high conditions are most liable.

CAUSES.—It is due to exposure to rough, cold weather, especially if the animal has been subjected to severe exercise of any nature, and is in a state of perspiration. It may be caused by drinking freely of cold water when overheated and by consumption of irritant substances; it also results from the extension of inflammation of other organs, and may result as a sequel to other diseases of the intestines.

SYMPTOMS.—There are general symptoms of disorder with symptoms of pain when pressure is made upon the abdomen or over the loins, frequent passage of small quantities of dry faeces, and in some cases slight abdominal distension or bloating. Acute febrile disturbance soon takes place, the temperature rises a few degrees and the pulse becomes full and frequent. The patient usually stands obstinately in one place, with muzzle protruded and the hind limbs seeming inclined to give way. Thirst is usually excessive, but all inclination for food is lost; the patient groans, grinds his teeth, looks around to the right flank, and flinches if the abdomen be pressed. The pain is continuous, which, with acute fever, serves to distinguish the disease from colicky disorders. In fatal cases, shortly before death, the patient usually becomes unconscious and falls, moaning continuously. The passage of faeces becomes suppressed and a small stream of liquid excrement is often forced through the hardened mass, by which action the rectum becomes distended, and that which is voided has a foetid and putrid odor. Often death is preceded by cessation of pain, but the animal looks anxious, the extremities are cold, the pulse very frequent, weak and often imperceptible at the jaw, and the general temperature gradually falls. This indicates the occurrence of gangrene. While in the early stages the pulse is strong and frequent it soon loses its strength, but increases in frequency, and the rectum, when examined by hand, is evidently much increased in temperature. The torpidity of the bowels is due to cessation of peristaltic action, as an inflamed muscular coat soon loses its power of contraction.

POST MORTEM APPEARANCES.—Soon after death the intestines become filled with gas. The outer covering is congested, inflamed and gangrenous over the parts especially involved. The abdominal cavity contains a considerable quantity of serum. Both small and large intestines are usually involved. The walls of the intestines are thickened and vary in color in different parts, from the redness of a simple congestion to the greenish dark condition of gangrene. There is often effusion and blood extravasation between the muscular fibres, and the contents of the bowels are principally blood and mucous.

TREATMENT.—The animal must be made as comfortable as possible and carefully nursed. Rugs or blankets wrung out of hot water should be kept to the abdomen. The contents of the rectum should be removed by hand and followed by the injection of warm soapy water. Purgatives must be avoided, as the

muscular coats of the intestines have become inactive; hence they will simply irritate, not being able to cause any action. In the early stages, when the pulse is full and strong, the abstraction of 6 to 8 qts. of blood from the jugular vein is good practice, but blood-letting cannot be tolerated after the pulse begins to lose its force.

Large doses of opium should be administered, as 2 to 3 drs. of powdered opium in a pint of cold water as a drench every two or three hours. The thirst should be relieved by giving water with a little saltpetre dissolved in it in small quantities and often.

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