

appetite, and leave nothing of his proper measure of food in the manger. His excretions should be regular and normal in appearance. The attendant should know what is normal dung and urine, and immediately note any departure from this standard. How many times does a horse unload the rectum in the twenty-four hours, and how many times does he relieve the bladder? The answer is about ten times and four times. Slimy mucus or coated dung-balls on the one hand, or hard, small balls and very shiny, are signs of laxity which may amount to irritation, or to constipation, which may end in colic, stoppage, or other troubles.

The skin should have a nice, soft feel, and be easily lifted between finger and thumb, and the coat or hair should lie in the right direction. The opposite of these conditions is known as hidebound and pin-feathered. The body generally, including the ears, should be comfortably warm to the touch, but the feet should be cool.

The visible mucous membranes indicate almost as much to the veterinary surgeon as complexion and facial expression to the medical man. To look at the conjunctiva, or eye-lining, one should press the thumb on the lower lid rather hard, and push the upper one with the forefinger. Horses resent this less than opening the nostrils, unless the eye is already inflamed. A delicate salmon tint, or that of a pale red rose in its outer petals, should mark the eye of a healthy horse. The membrane of the nostril may be a little paler if the animal is standing in the stable, slightly flushed after exercise. Do not rely on the membrane of one eye alone, or one nostril alone. As an example, after a desert march over sand, a horse was reported ill. The eyelid was turned up and it was intensely inflamed, and a fever drink was prescribed. Next morning the horse was quite well, but that off eye was just as much inflamed as ever. It was a chronic inflammation from an incurable cause, and the groom knew it quite well. The "lightning diagnosis" was fashionable in those far off days, but horsemen have learned to corroborate the testimony of the one-eyed witness. A glance at both the eyes or a nostril would have corrected the diagnosis. Neither the eyes nor the nostrils alone should be allowed to decide us, because the one or the other may be inflamed from purely local causes. The horse that has just cleared up from a bad cold may have both membranes flushed, but he is far more likely to have one more colored than the other, for the convalescence from catarrh is seldom equal on both sides.

If, then, you are considering whether a horse that has been laid up with a cold is fit or not to go to work, you will not decide by the appearance of one nostril, or both, but will confirm or refute your opinion by consulting the conjunctival membrane of the eye. One eye or one nostril may be inflamed from local causes. A constitutional condition will not be indicated by one eye or nostril, but the visible membranes will all be in sympathy. The temperature, taken per rectum, will be a check upon your other observations.

The pulse was the chief means of diagnosis in former times, but many persons who have learned the use of the thermometer have neglected the pulse, and thereby lost much of the value of the instrument with which they should have been familiar. The visible membranes suffer straining in certain diseases, such as jaundice. The breath unpleasant when indigestion or decayed teeth are present. The mouth should therefore be opened when ill-health is suspected.

The pulse may be taken at many parts, and whatever artery is chosen the object of feeling it is to gauge the force or impulse of the heart's contractions by the waves sent through the vessels. The most easily available artery in the horse—one running near the surface and offering a standing position of safety to the person or the examiner—is on the ridge of the lower jaw. It is called the submaxillary artery, and passes round the bone together with the duct of the parotid gland, in a groove more or less easily felt in a blood horse, but needing a little practice in thick-skinned and coarse animals. Something like thick string should be felt when pressing the fingers against the artery and the bone, but the string is alive, and imparts the impression rather of a large and active garden worm, if it is a full, round, healthy pulse. By keeping the fingers gently compressed one learns to measure the force of the pulse. The veterinary surgeon does not take out his watch, as the number of beats is of less diagnostic value than the

fullness of the vessel, the hardness, softness, forcefulness or feebleness or failure to find the impetus of the heart at all. As, however, the learner always attaches the first importance to the number and learns the value later, it may be stated here that a horse at rest and in health should have from 36 to 40 beats per minute.

A horse found suffering from abdominal pain, pawing the ground, and looking round at the flank, may be suffering only from pinching pains of colic, or from inflammation of the bowels, and the farmer wishes to know which it is and whether to send for a veterinary surgeon or give some recognized colic drench. He takes the temperature and feels the pulse. If it is colic uncomplicated, the temperature will not have changed materially—perhaps not in the least; the pulse will be only about forty. If the colicky pain is due to inflammation of the bowels or other organs of the body the temperature will have risen several degrees, and the pulse will be quick and irritable. The pulse takes a great deal of learning, and temperatures need checking by it and other signs of discomfort or disease.—Farmer and Stock-Breeder.

LIVE STOCK.

Computing the Value of Feeds.

EDITOR "THE FARMER'S ADVOCATE":

I have studied with great interest the table given on page 1883, of November 16th issue and wish to thank you for compiling such useful information for your readers. I must confess, however, that I cannot study the table as intelligently as I should like without further information concerning it. We are enabled by it to obtain a properly balanced ration and this perhaps is its sole purpose, but we should like at the same time to form a close estimate at least of the relative values of feeds. How can we do this? Can it be estimated by the amount of dry matter coupled with the nutritive ratio, or how? For instance, if I want to know the relative feeding value of 1 cwt. of carrots as compared with 1 cwt. of potatoes, I see the dry matter is about twice as great in the latter, the protein slightly higher, the carbohydrates nearly double, but the fat only one half. The nutritive ratio is 1:10 for carrots as compared with 1:14.5 for potatoes. Please state which is the more valuable feed per cwt. and why, that we may be able to intelligently compare other feeds. Could you give the feeding value, or nearly so, per pound of the three digestible nutrients respectively? Would you also state what is meant by totals given in the fifth column of the table? YOUNG FARMER.

Our correspondent has brought up a question that has bothered scientists and practical investigators for years. Nevertheless it is an interesting one, and a brief discussion of it at this time may be opportune. Such information as "Young Farmer" desires was omitted from the article appearing in the issue of November 16, for the simple reason that no definite rule is known whereby one can accurately value feeding stuffs for all kinds of live stock according to any unit, or the constituents of the feeds under consideration.

There are "starch equivalents," "heat units" and such, that afford some foundation for comparison, and these are valuable in so far as they furnish the basis for tabulations and charts, but when we get down to the actual feeding of horses, cattle, sheep and swine on the farm we require a practical knowledge of feeds and their effects on the animal system. We have no desire to belittle the work of scientists and the information they have given us, for all modern practices in the feed lot and economical feeding are based on the work they have done. "Equivalents," "units," "feeding standards" etc., should be used as guides only, but in this regard they are of inestimable value. Let us illustrate. Kellner, one of the highest scientific authorities on feeding, compiled a long table showing the starch equivalents of all the different ingredients of feeds. Digestible protein, nitrogen-free extract and fibre, as well as fat, were proved by him to individually have a value equivalent to a certain and definite amount of starch. He translated these different constituents

in feeds into terms of starch, and by adding the results together he derived the starch equivalent of the total nutrient in 100 pounds of our common feeding stuffs. Some book farmers in the past have adopted this without limitations, and have considered that by dividing the "starch equivalent" of 100 pounds of certain feeds into the price of same per cwt. they could ascertain their relative values. In some cases this chart may hold good, but usually there are so many things to consider, factors both technical and practical, that, after all, what we need most to know is, what the feeds contain, what effect they have on the system of the animal to which they will be fed, and how to combine them into a fairly well-balanced ration for the live stock under consideration. Professor Henry, senior author of "Feeds and Feeding", and one of the best authorities on feeding in America, writes: "With Kellner, we must therefore conclude that, despite the vast amount of study given to the subject, there are still many gaps in our knowledge of the actual net value of the different feeding stuffs."

The same writer in other paragraphs answers as satisfactorily as possible the question raised by our correspondent:

"Many attempts have been made to assign a definite money value to one pound of digestible, crude protein, digestible carbohydrates and digestible fat, and then compute the value of different feeds on the basis of the amount of these nutrients they contain, the same as is commonly done in arriving at the money value of fertilizer. While such a system of valuation may be of some limited value for a short period of time and when applied to a small district where the systems of farming do not vary widely, no such set of values has general application to the United States. As has been emphasized before, the value of any given feed to the stockman depends on the nature and composition of the other feeds he has at hand. If his chief roughage is alfalfa hay, protein-rich concentrates are often worth less to him than those rich in carbohydrates. On the other hand, if the cheapest roughage he can provide is corn or sorghum silage, low in protein, then concentrates rich in protein will be of higher value to him than those carbonaceous in character."

"In determining which feeds furnish total nutrients at the lowest price, the comparison may be made on the basis of the cost per therm of net energy, per feed unit, or per pound of total digestible nutrients. For the reasons pointed out in preceding articles, the authors believe that the most convenient system for American farmers is on the basis of the cost per pound of total digestible nutrients. In comparing roughages with concentrates, this system gives roughages somewhat too high a relative value, for one pound of total digestible nutrients in a roughage is lower in net energy value than one pound of net energy in concentrates. However, in most cases the desire will be, not to compare roughages with concentrates but instead to determine which one of several concentrates is the cheapest source of total nutrients, or which of the different available roughages is the most economical feed. To determine which feeds are the cheapest supplements to balance a ration low in protein, it will be found convenient to compute the cost of the different feeds per pound of digestible crude protein."

After all is said and done the most accurate way to determine the value of the feed is to find out by actual feeding experiments how many pounds of meal, or hay, 100 pounds of the feed will replace. By comparing concentrates with concentrates, or roughages with roughages, in this way, we can arrive at results that will bear application to actual farm conditions.

The meaning of totals contained in the fifth column of the table published in the issue of November 16, is simply the total digestible nutrients in 100 pounds of the feed, with fat expressed in the terms of carbohydrates and added thereto. In the case of dent corn, the total digestible nutrients are listed as 85.7, this is arrived at in the following manner. Fat must be multiplied by $2\frac{1}{4}$ to make it equivalent to carbohydrates, as explained in the article accompanying that table. The carbohydrates and its equivalent in fat are added, which total is again added to the crude protein, making in all 85.7 pounds of total digestible nutrients in 100 pounds, with the carbohydrates and fats expressed in the same terms.

Light Horses, Sheep, Swine and Grain at Guelph Winter Fair.

Light Horses and Ponies.

The judging of the diminutive ponies, the high-stepping Hackneys, full blooded Thoroughbreds and fine mettled standard-breds, during the evenings, drew large crowds to the ring side. The classes were all well filled with animals of the first quality. Judging from the enthusiasm of the spectators the light horse is still popular. The performance of representatives of the various light breeds was well worth watching. Thoroughbreds were particularly strong this year. In the aged-mare class were eleven entries. Ten entries appeared in the aged-stallion class of Standard-breds in which Peter Wilton won first and championship. Judges, Dr. Rutledge, Lambeth, and Dr. Sinclair, Cannington.

Standard Breeds.—Exhibitors.—F. J. Steffler; Mildmay; Chas. Finnegan, Stratford; Crow and Murray, Toronto; A. C. McMillan, Erin; T. H. Hassard, Markham; Ashley Stock Farm, Foxboro; Chas. Sewers, Greenock; C. McKeigan, Strathroy; F. E. Hedden, Erin; Patterson Bros., Agincourt.

Awards.—Stallion, aged: 1, Hassard, on Peter Wilton; 2, Crow and Murray, on Burt Axworthy; 3,

Finnegan, on Bryson McKinney; 4, Steffler, on Dansie; 5, McMillan, on Alnared. Stallion, foaled on or after Jan. 1, 1914: 1, Hedden, on The Moose; 2, Patterson Bros., on Bob McKerron; 3 and 4, Ashley Stock Farm on Jack Rayner and Winkle Boy. Mare, aged: 1, Patterson Bros., on Ideal Princess; 2, and 3, Ashley Stock Farm, on Phillywinkle and Noble Lottie. Mare, foaled on or after Jan. 1, 1914: 1, 2 and 3, Ashley Stock Farm, on Ella Blecker, Clara Gay and Winkle Girl. Three, get of sire: 1 and 2, Ashley Stock Farm. Mare, two of her progeny: 1 and 2, Ashley Stock Farm. Champion stallion, Hassard, on Peter Wilton. Champion mare, Patterson Bros., on Ideal Princess.

Hackneys.—Exhibitors: Jas. Tilt, Brampton; Crow and Murray, Toronto; H. A. Mason, Scarboro; Wm. Carnegie, Paris; Jos. Telfer, Milton West; R. C. Rogerson, Fergus; N. H. Wilson, Rockwood; J. F. Husband, Eden Mills; G. M. Anderson, Guelph; W. F. Batty, Brooklin.

Awards.—Stallion, aged: 1, Crow and Murray, on Prickwillow Connaught; 2, Tilt, on Spartan; 3, Mason, on De Wilton. Stallion, foaled 1915: Carnegie, on Adolton Premier. Brood mare: 1, Tilt, on Miss Derwent. Yeld mare: 1, Telfer, on Princess Eudora;

2, Rogerson, on Dante Model; 3, Husband, on Princess Winyard. Mare, foaled 1913: 1, Telfer, on Model's Queen; 2, Mason on Island Lilly; 3, Batty, on Madge; 4, Tilt, on Minnie Derwent. Mare, foaled after Jan. 1, 1914: 1, Husband, on Brookfield Princess; 2, Tilt, on Dainty Spartan; 3, Wilson, on Brookfield Kitty; 4, Mason, on Misty Morn. Three, get of sire: 1, Husband; 2, Tilt.

Thoroughbreds.—Exhibitors.—Jas. Bovaird and Sons, Brampton; F. D. Parsons, Guelph; D. A. Campbell, Guelph; E. B. Clancey, Guelph; S. and A. E. Dymont; D. J. Arthurs, Brampton.

Awards.—Stallion, aged: 1, Bovaird, on Rosturtum; 2, Campbell, on Gay Boy; 3, Parsons, on Yoritomo. Stallion, foaled on or after Jan. 1, 1914: 1, Clancey, on Master Fox; 2 and 3, Campbell, on Gay Breeze and Ability. Mare, aged: 1 and 3, Clancey, on Carillon and Miss Morgan; 2, Dymont, on Foxlet; 4, Campbell, on Gyptis. Mare, foaled on or after Jan. 1, 1914: 1, Clancey on Latest News; 2 and 3, Campbell, on Gay Life and Gay Gown. Three, get of sire: 1, Arthurs; 2 and 3, Campbell. Mare, two of progeny: 1, Clancey; 2, Campbell.

Ponies.—Exhibitors.—R. Ballagh, Guelph; S. Duck-

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