To Prevent Harness Galls.

A correspondent of the *Indiana Farmer* thus writes on this ever-important subject: The first thing necessary before one can work a horse or team is to have a good set of harness, and the next is to keep them in good order. The harness should fit the form of the horse, the collars especially requiring very careful attention. The collars should be neither too large nor too small, for in either case the horse will be seriously injured. Galls and bruises are always caused by ill-fitting, neglected harness. Before the busy work begins in the spring, the harness should be taken apart and washed well with soap and warm water. When partially dry they should be well oiled, with about all the oil they will absorb. Now with a little care in the beginning any farmer will be able to do a big summer's work without skinning his horses. At least three-fifths of the sores are found on the horses' necks and shoulders. By a little attention these may be avoided. The horses should do about half work the first week and their shoulders washed in hot water twice a day, at noon and night, until they are thoroughly toughened. They will then stand any amount of work without injury. A wash of alcohol and water is also good for this purpose. To prevent sore necks, use zinc neck-pads all the time, sore or well. But very frequently a farmer trades for a horse with a sore on his neck or shoulder. In this case we must have some remedies to assist nature in the healing process. If the sore is on the shoulder, a place should be cut in the collar a little larger than the sore and the filling removed, and as there is now no pressure on the sore it will heal of itself. Commonly the hair pads that a great many farmers use are a nuisance, as they scald the horses' shoulders worse than the naked collar; but in this case, if one does not wish to spoil a good collar, he may cut a space out of the pad to fit over the sore, or if it is very large use two pads, removing a space from a pad. A good ointment for collar sores, and especially for sore necks, is made from white oak bark. Place a quantity of the bark in a vessel, cover with rain water and boil until the liquid is about as thick as thin sorghum molasses, and then apply with a swab. Well-fitting, well-oiled harness, a little care on the part of the owner, and there will be very few bruises to require attention.

The Influence of Food on Animal Increase.

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The question of animal nutrition is not yet thoroughly understood by the scientist, and investigations are still being energetically pushed forward. But while there is still much to be learned, there is also much that is known, and he would be foolish indeed who would refuse to avail himself of the knowledge which science has placed at his disposal simply because there are still some things which remain hidden. The object of this paper is to indicate as briefly as possible some of the leading principles underlying animal nutrition, and, if possible, to draw a few lessons therefrom.

In the first place, it must be understood that vegetable matter contains substances very similar in composition to the substances which comprise the animal body. Animals eat vegetable matter, digest a portion of it, and use the digested portion in building up the different parts of their bodies, in producing progeny or milk, or in producing heat and energy. Thus, some of these food substances form bone; some form muscle, blood, milk, wool, hair, horn, etc.; some form fat; and others are burned (though there is no blaze) to produce heat in the body, which is necessary to sustain animal life and energy. The undigested part of the food is voided by the animal as solid excrement.

The substances contained in the food of animals may be grouped under five heads, as follows:

1. Water.
2. Ash, or mineral matter.
3. Protein (sometimes spoken of as "proteids," or albuminoids).
4. Carbohydrates (also called "nitrogen free extract").
5. Fat (usually called "ether extract" by chemists).

Water in foods is counted by some to have no more value than the water which an animal drinks; but it is well known to feeders that the use of some fodders containing a considerable amount of water, such as roots or ensilage, seems to have a beneficial influence in keeping animals healthy and in stimulating their appetites. Some overestimate and others underestimate the value of succulent fodders.

Ash, or Mineral Matter, goes to build up the bony structure of the animal, hence this is a very important part of the food of young growing animals.

Protein comprises several substances more or less similar in general character, and serves many purposes in the animal body. It contains nitrogen, and hence is concerned in the formation of those animal products containing nitrogen, such as lean meat, the nitrogenous part of milk, and many other substances. It is affirmed by some scientists, and denied by others, that protein may, under some circumstances, form fat. At best, however, this can be but a minor function of protein.

Carbohydrates, of which starch and sugar are good examples, contain no nitrogen. One of their functions is to supply the animal with heat and energy, and another is to form animal fat.

Fat also contains no nitrogen, and, like the carbohydrates, it produces animal heat and fat.

From a practical standpoint, these substances may be grouped into three classes: 1. *Ash*, to furnish bone for the growing animal; 2. *Protein*, to produce muscle, lean meat, etc.; 3. *Carbohydrates* and *fat*, to form fat and supply energy.

All fodders contain a certain amount of ash, but some contain more than others. For animals that are nearing maturity, ash may be left out of consideration in the selection of fodders, but in feeding growing animals it should not be forgotten. Below is given a rough classification of some leading concentrated fodders on the basis of their ash constituents. The classification is possibly not perfect, but it may prove helpful to some. The fodders in each column are arranged in order of their percentage of ash, the richest heading the column and the poorer ones following in order.

CLASSIFICATION OF FODDERS ON BASIS OF ASH CONSTITUENTS.

Very rich in Ash. (5 per cent. and over.)	Rich in Ash. (3 to 5 per cent.)	Medium in Ash. (2 to 3 per cent.)	Poor in Ash. (Below 2 per cent.)
Cottonseed meal.	1. Wheat shorts.	1. Pea meal.	1. Rye.
Oat dust.	2. Wheat middlings.	2. Barley.	2. Wheat.
Malt sprouts.	3. Oats.	3. Low grade flour.	3. Corn.
Oil cake.		4. Buckwheat.	4. Gluten meal.
Wheat bran.			5. Gluten feed.
{ Buckwheat shorts.			
{ Buckwheat middlings.			

A glance over this classification will furnish one reason why such foods as oil cake, bran, shorts, middlings, and oats have long been popular for feeding young animals. Much more might be said regarding bone-forming constituents, but space will not permit.

Regarding the protein, carbohydrates and fat, nature has so constituted animals that they must receive a certain amount of all these in their food. Generally speaking, those fodders rich in protein or fat cost more per pound than those low in these constituents and rich in carbohydrates. As a result, there is a tendency to feed rations which are rich in carbohydrates. It is true that animals require a much larger percentage of carbohydrates than of protein in their food, but there is a limit beyond which the feeder cannot profitably go, because the animal requires a certain amount of protein in order to make the best use of the carbohydrates which it receives. When a ration contains just the right proportions of protein, carbohydrates and fat to meet the requirements of the animal, it is said to be a *balanced ration*. A ration may be out of balance as regards ash constituents, though ash is not taken into consideration in the term balanced ration. If a young animal is fed a ration poor in ash, the result is weak bone and stunted growth. If the ration is poor in protein and is made up almost entirely of carbohydrates, the effect will be to produce an animal deficient in muscle and lean meat, but abounding in fat. Stunted growth is also likely to result from too small a supply of protein. On the other hand, no advantage is gained by feeding an excessive amount of protein, and the ration will be an expensive one. If extreme protein feeding is carried too far, deranged digestive organs will be the result. These are not theories, but facts which have been demonstrated by actual tests.

It is not practicable to feed with mathematical exactness, and fodders, especially the coarse ones, vary in digestibility according to their condition, so that many allowances must be made. It is practicable, however, for a feeder to have a general idea of the characteristic qualities of the fodders he is using, whether they are rich or poor in bone, flesh or fat forming constituents, and so it is practicable for him to mix those poor in protein with those rich in protein, thus producing an approximately balanced ration. In order to simplify the matter, the fodders which were previously classified on the basis of ash constituents, are here classified on the basis of digestible protein, the fodders being arranged in each column in the order of their percentages of digestible protein, the highest percentage at the top of the column, and so forth.

CLASSIFICATION OF FODDERS ON THE BASIS OF PERCENTAGE OF DIGESTIBLE PROTEIN.

Very rich in digestible Protein. (Above 30 per cent.)	Rich in digestible Protein. (Between 20 & 30 per cent.)	Fairly rich in digestible Protein. (Between 10 & 20 per cent.)	Poor in Protein. (Below 10 per cent.)
Cottonseed meal.	1. Gluten meal.	1. Malt sprouts.	1. Barley.
	2. Oil cake.	2. Gluten feed.	2. Wheat.
	3. Buckwheat middlings	3. Pea meal.	3. Oats.
	4. Buckwheat shorts.	4. Dried brewers' grains.	4. Oat dust.
		5. Low grade flour.	5. Rye.
		6. Wheat bran.	6. Buckwheat.
		7. Wheat middlings.	7. Corn.
		8. Wheat shorts.	

It is unnecessary to classify these fodders on the basis of percentage of carbohydrates, because the feeder will know that if he is feeding a ration poor in protein it must of necessity be rich in carbohydrates. It would be of interest to discuss the utility of the different fodders and methods of combining them, but this cannot be entered into here, and the reader is asked to study the two classifications for himself. However, one exception must be made. So much has be written regarding corn, that it is of more than passing interest to notice its position in the two classifications given. It will be seen that it is the lowest in protein of all the fodders mentioned, and nearly the lowest in ash. These two facts stamp it as entirely unsuitable as an exclusive ration, or as the main part of a ration for growing animals, since it is very deficient in both bone and muscle forming constituents. It is essentially a fat-former, and for this purpose it is, perhaps, unexcelled by any other single grain.

It is very true that many successful feeders know practically nothing of the composition of fodders, but long years of experience have taught them how to combine the fodders they are accustomed to use so as to produce a balanced ration, though they may never have heard the term. But when a man is forced to change his methods or to deal with fodders which are new to him, then surely a general idea of the characteristics of the fodders he is called upon to use, and an intelligent conception of the requirements of the animal body, would be of service to him in obtaining satisfactory results, provided, of course, that wisdom accompanies knowledge. Science is not a substitute for common sense, but is its powerful ally.

Great is the influence of food upon the character of the animal body, and much may be done by judicious selection of foods to improve the quality of meat produced by the animal. But he who claims that food is all-important in influencing quality of meat, takes a position quite as unreasonable, if not more unreasonable than he who claims that food has nothing to do with it. What would be thought of the dairyman who entirely ignored selection? Here are two steers receiving exactly the same kind of food, yet one gains rapidly in weight, while the other is a source of loss to his owner, and the longer he is fed the greater the loss? One more example must suffice. Among the pure-bred hogs sent from the Experimental Department of the College to the Wm. Davies Co. last fall there were three, numbered 10, 11 and 12, regarding which Mr. Flavelle wrote as follows: "Hogs 11 and 12: lean; fat even down the back; thick bellies; . . . . . generally desirable. Number 10 is quite too fat on the back for the best side; . . . . . this is a good pig spoiled by too rapid feeding and too much of it." Now, these three hogs were all of the same breed and ate out of the same trough. What is it, then, that enables one cow to produce more milk than another from the same kind and quantity of food; that makes one steer profitable and another unprofitable, though accorded exactly the same treatment; and that causes one hog to form more fat than another, though fed from the same trough? It is simply that mysterious something which is known as *individuality*. Food can influence and modify individuality, but it cannot overcome it. Food can do much, but its influence is limited, and intelligent feeding must be accompanied by intelligent selection if progress would be made.