

the formation of starch and sugar, easily digested forms of carbohydrates.

The digestibility of foods is influenced in various ways. Perhaps the two most important factors are the individual character of the animal and the quality of the food.

When two animals are supplied with the same kind of food, one will often persistently digest a larger proportion than the other. This is a constitutional difference, over which the feeder has no control. The digestive power of young animals is apparently equal to that of animals of full age, but, of course, the power to digest coarse foods must decrease when the animal becomes so old that the teeth are affected. Ruminating animals possess an extensive digestive apparatus, through which the food takes considerable time to pass. Animals of this class are specially adapted for the digestion of bulky foods containing much fibre. Experiments with oxen, cows, sheep and goats show that the power of these different classes of animals for digesting food is very similar. The following table gives the average percentage digestibility of the main constituents of some of the most common cattle foods. Some of the figures are taken from our own experiments and some from Warington's Chemistry of the Farm. All the experiments were carried out with ruminating animals.

AMOUNT DIGESTED PER 100 OF EACH CONSTITUENT SUPPLIED.

FOOD.	Total Organic Matter.	Crude Protein.	Fat.	Soluble Carbohydrates.	Crude Fibre.
Pasture grass.....	74	74	64	77	69
Mixed hay (best).....	67	65	57	68	63
Mixed hay (medium).....	61	57	53	64	60
Mixed hay (poor).....	56	50	49	59	56
Clover hay (best).....	61	62	60	70	47
Clover hay (medium).....	57	55	51	65	45
Lucerne (alfalfa) hay bloom beginning.....	62	77	39	70	43
Lucerne (alfalfa) hay (full bloom).....	56	70	39	63	42
Corn silage.....	—	59	62	74	75
Oat straw.....	48	30	33	44	54
Barley straw.....	53	20	42	54	56
Wheat straw.....	43	11	31	38	52
Cotton cake (hulled).....	81	87	95	76	—
Linseed cake.....	80	86	90	80	50
Peas.....	90	89	75	93	66
Oats.....	71	78	83	77	26
Barley.....	86	70	89	92	—
Corn.....	91	76	86	93	58
Wheat bran.....	71	78	72	76	30
Corn bran.....	—	52	67	68	26
Pea bran.....	—	67	78	76	69
Barley dust.....	—	60	60	57	33
Oat hulls.....	—	51	—	84	59
Brewers' grains.....	62	70	82	63	39
Potatoes.....	88	66	—	93	—
Mangels.....	88	77	—	96	—
Turnips.....	88	62	—	99	—

Notice that in the case of ordinary mixed meadow hay and clover, the total dry matter digested is about 55 to 60 per cent. of that supplied, while with hay of good quality the proportion digested may rise to 67 or even 70 per cent. With straw only 45 to 55 per cent. of the dry matter is digested, the minimum occurring with wheat straw.

A point worthy of mention is that the digestibility of the nitrogenous matter, or protein, in hay and straw increases as its proportion rises. For example, a wheat straw experimented with contained only 4.8 per cent. of protein, of which only one-fifth, or 20 per cent., was digested, while good alfalfa hay, with 19.3 per cent. of protein, had 76 per cent. of this in a digestible form.

Of the fibre in hay and straw, about 45 to 60 per cent. is digested by ruminating animals. The fibre of leguminous hay and straw (clover, alfalfa, pea straw, etc.) is less digestible than the fibre of similar graminaceous foods (timothy hay, oat and wheat straw).

The concentrated foods, as the grains and better classes of by-products, are more thoroughly digested than is the case with hay and straw. When of good quality, 80 to 90 per cent. of the organic matter of these foods will be assimilated by the animal. The proteids and fats in these foods have especially a greater digestibility than the same ingredients in hay and straw.

The digestive powers of the horse and sheep were accurately compared in some German experiments. The figures indicate that the horse digests grass and hay less perfectly than the sheep, and the difference between them is separately as great when the food is young grass as when ordinary hay is employed. There is little difference in the proportion of proteids assimilated by the two animals, but the divergence becomes considerable when we come to the soluble carbohydrates, fibre and fat. Of the carbohydrates,

the horse digests 7 to 10 per cent.; of fibre, 21 per cent.; and of fat, 24 to 52 per cent. less than the sheep. On the whole, the horse digests about 12 per cent. less of the dry matter of grass or mixed hay than the sheep. With red clover the results with the horse are better. With alfalfa hay of good quality the digestion by the horse is still better, and practically equals that of the sheep. The smaller digestive power of the horse for vegetable fibre is plainly connected with the fact that the horse is not, like the sheep, a ruminant animal. With grain the digestion of the horse is apparently quite equal to that of the sheep. A possible exception is uncrushed oats, where a part will escape digestion.

The digestive powers of the pig have not been very fully studied, but it is generally considered that in cases admitting of comparison the pig is able to digest as great a proportion of the nutrients as the ruminant animals. The pig is also capable of digesting vegetable fibre when this is presented in a favorable condition. An experiment is on record where two pigs fed on green oats and vetches digested 48.9 per cent. of the fibre supplied. The digestive apparatus of a pig is not, however, adapted for dealing with bulky foods.

Comparatively few digestion experiments have been conducted with fowl. They have, apparently, no power of digesting vegetable fibre; the food passes too quickly through the system for fibre to be attacked.

The cooking of foods is generally of doubtful advantage. Generally speaking, cooked foods are eaten too quickly, and, in addition, the proteids are coagulated by the heat and are rendered less digestible. Barley, corn and pea meal have been found more nourishing when fed dry than when cooked.

The influence of one food on the digestion of another is a point upon which we have comparatively little data. It has, however, been demonstrated that if a pure proteid, as wheat gluten, be added to a ration of hay or straw, the added food is entirely digested without the rate of the digestion of the original food being altered. An addition of oil to the same ration can also be made without diminishing the rate of digestion. But if starch or sugar is added, the digestibility of the original diet is seriously diminished. The valuable proteid substances suffer the greatest loss in digestibility under these circumstances; the fibre also suffers in digestibility if the amount of carbohydrates added is considerable.

These facts are of considerable practical importance. Such nitrogenous foods as oil cake, gluten meal, pea meal, etc., may be given with hay and straw without affecting their digestibility; but foods rich in carbohydrates, as potatoes and mangels, cannot be given in greater proportion than 15 per cent. of the fodder (on basis of dry matter) without more or less diminishing the digestibility of the fodders. This decrease in digestibility may, of course, be offset by supplying along with the starchy materials some nitrogenous food. The cereal grains are rich in starch, but contain also a fair amount of proteids, and may be added to dry fodders without seriously affecting their digestibility.

Beef-making in Nova Scotia.

Editor "The Farmer's Advocate":

In reply to yours of a recent date, regarding the cost of raising a beef-grade steer suitable for feeding, I have to say my experience here in Nova Scotia, where all kinds of meal feeds and hay are from 20% to 25% dearer than in Quebec and Ontario, is that with careful buying in the fall the fattening of steers in the winter has always given a profit, although sometimes very small, after allowing the labor to be offset by the manure made. The raising of steers for feeding (where a reasonable charge was made for all food consumed) was not by any means so sure to be done with a profit; on the other hand, many who raise steers to the feeding stage have a considerable amount of food, both summer and winter, that could not well be turned into money otherwise, and, consequently, do not make much of a charge for those feeds (pasture on rough land, broadleaf hay, etc.).

The most profitable age to have good grade steers ready for feeding is from 24 to 30 months. In rearing the calves, feed two-thirds whole milk and one-third skim milk for one month, reducing the proportion of whole milk gradually, until at the age of three months all the milk used would be skim milk, adding oil-meal porridge, as substitute for fat in the whole milk. For the next two months skim milk should be continued, if available, with crushed oats, wheat bran and oil cake, mixed together and fed dry, at the rate of about one-half pound per day. From this on for the next six months (if winter), turnips, about 20 pounds; meal, one-half to one pound per day, and clover hay (if summer); meal, one pound per day for first month, and good pasture. The following year allow good pasture in summer, with turnips and clover hay in winter.

The cost at one week in age of a grade beef-bred calf from good dual-purpose cow will be:

Service fee	\$ 1.50
Feed (milk).....	.50
	\$ 2.00

With a dual-purpose cow nothing should be charged to the calf for depreciation of value in cow nor interest.

Fall calf, first winter, 6 months.....	\$ 9.00
Fall calf, first summer, 5 months, meal one month and pasture	5.00
Second winter, 7 months	11.00
Second summer, 5 months	5.00
First cost	2.00
	\$32.00

The steer should weigh from 900 lbs. to 950 lbs. at 24 months.

Taking a spring calf:	
First summer, 5 months.....	\$ 8.50
First winter, 7 months	8.50
Second summer, 5 months	5.00
Second winter, 7 months	12.00
Third summer, 5 months	6.00
First cost	2.00
	\$42.00

This steer should weigh from 1,000 to 1,050 pounds at 30 months.

If from special-purpose beef-bred cow, add \$4.00 to first cost of calf, and expect 50 to 100 lbs. more weight at those ages.

The manure should be worth just about the value of the labor. R. ROBERTSON, Superintendent Maritime Experimental Farm, Nappan, N. S.

Young cattle should not be tied in the stable. They require exercise in order to have them develop into big strong animals. It is best to keep them over winter loose in box stalls, and outside when conditions are favorable. J. E. DYER, Dufferin Co., Ont.

In wintering store cattle, I feed light rations of meal on roots twice a day. Once a day I throw a handful of salt on before the meal is given. If salt is left in the yard, some cattle get at it and others do not. JOHN WILSON, Wellington Co., Ont.

THE FARM.

What "Dry Farming" Means.

What is called "Dry Farming" is a system of cultivation in those Western areas where the rainfall is not sufficient, with ordinary practice, to insure crops. It means deep plowing and packing to hold the little water that does fall; then a surface mulch to prevent evaporation, and growing a crop every other year, as in summer-fallowing. In other words, cultivating two years and cropping one—a costly process. The Senior Editor of Wallace's Farmer, when West on the Roosevelt Country Life Commission, says: "The advocates of dry-farming brought up this question by asking the Commission to recommend to the President the extension and modification of the homestead laws, so that the dry-farmer could homestead 320 acres, instead of 160. We asked for the reason for this request, and they told us that it was not possible for the ordinary farmer to make a living on 160 acres; that he must necessarily engage in live-stock farming, and use dry-farming to grow a cash grain crop and to grow forage as winter feed for his live stock. They told us that the dry-farmers who had been consulted in this matter thought about 500 acres were required; and, furthermore, that the dry-farmer, in addition to his land, should have a capital of \$2,000. Farmers buying land in the West should understand these facts as given by the enthusiastic advocates of dry-farming themselves. On the high land around North Platte it requires ten acres to keep a steer during the summer months. The rainfall decreases as you go West, and it requires more acres. Now, if farmers will just stop and think over these admitted facts, they will get rid of the dreams which fill their minds when reading these stories about dry-farming in the West."

100 Bushels of Corn Per Acre?

Professor C. M. Evans says: "In an acre of corn planted in check rows, planted three feet six inches each way, there are 3,556 hills. Three stalks per hill is usually considered a perfect stand. This would make 10,668 stalks per acre. It is not unreasonable so expect each stalk, if properly cultivated, to produce one eleven-ounce ear. In this case, we would have a yield of 104½ bushels per acre."

We should like to receive reports from some of our Canadian corn specialists who have grown 100 bushels or over per acre in this or previous years, with particulars as to how it was done.