age composition of the chief products of the farm :

COMPOSITION OF FARM PRODUCTS.

Name of product.	Albuminoids.	Fat.	Carbo-hydrates.
Timothy hay.....	5.8	1.4	43.4
Red clover.....	7.6	1.2	38.1
Corn fodder (green)..	1.0	0.3	8.4
Oat " "	1.4	0.2	8.9
Rye " "	1.9	0.4	11.0
Winter wheat straw.	0.8	0 4	35.5
Oat straw.....	1 4	0 6	40.0
Pea "	2.9	0.5	33.4
Turnips.....	1.1	0.1	6.4
Mangels.....	1.1	0.1	9.8
Oats.....	9.0	4.7	43 3
Corn.....	8.4	4 8	60 6
Barley.....	8 0	1.7	58.9
Peas	20.2	1 7	54.4
Wheat bran.....	10.0	3.1	48.5
" middlings ..	8.9	2 6	54.8
Linseed cake.....	27.6	10.4	27.0
" meal (extract)	27.8	2.1	33.9
Flax seed	17.2	35.2	18.9

In the above table the figures are percentage compositions, and the proportions given are all digestible. In looking through the column of albuminoids (flesh-forming substances),it must not be supposed that the highest figures mean that the food they represent is the most highly albuminous, for it may also have more fat and heat-forming substances, represented by the fats and carbo-hydrates. As the fat and carbo-hydrates produce the same effects, except that the former has 2½ times more feeding power than the latter, it can be turned into an equivalent of the carbo-hydrates by multiplying it by 2½, and when their sum is divided by the albuminoids, we get what is called the albuminoid ratio. Take timothy hay, for example, and we get $1.4 \times 2.5 + 43.4 \div 5.8 = 8.1$, and the albuminoid ratio is expressed thus, 1:8.1, meaning that the hay has 8.1 pounds of heat-forming for every one pound of flesh-forming substances. Now any food or combination of foods which has the same albuminoid ratio as hay, viz., 1:8.1, has the same feeding value as hay. But an albuminoid ratio of 1:5 or 1:6 has been ascertained to produce the best results in milk or fat, although Prof. Sanborn, in his lean meat experiments, fed a ratio as high as 1:1.6. It will now be plainly seen how absurd it is to say that any article of food will produce better results than another without first knowing the combination of foods with which it is fed. Certain limits in the albuminoid ratio must be observed, for if the ration is too highly albuminous, the kidneys of the animal will suffer, and if it is too carbonaceous (contains too much fat and carbo-hydrates) the respiratory organs will be overburdened with work, so that moderation must be observed. The above table gives average compositions. If, however, the products mentioned grow on a rich soil and if the crop is harvested in a good condition, the albuminoids and the albuminoid ratio will be higher; while if the reverse is the case, the carbonaceous compounds will preponderate.

But these truths will be of little practical use to the farmer until our stock-show iniquity is abolished, and until he can rightly estimate the extra value of the manure produced under the newly proposed system of feeding. The tendency is a laudable one, but on this very account we cannot expect a boom, especially as it has had a scientific origin. We anxiously await the results of investigation in cattle and sheep as well as hogs.

FEEDING FOR DAIRY PRODUCTS.

Feeding for dairy products is not yet well understood, although the investigators are numerous, able and enthusiastic. Many important facts, however, have been brought to light. Little is known about the source of animal fats, and when this question is settled a flood of light will be shed upon the mysteries of dairy products. It was formerly thought that foods rich in fat would produce milk rich in butter fat, but this theory, within certain limits, has been demolished by countless experiments. The error has been made by mistaking butter for butter fats. Butter contains from 8 to 18 per cent. of water, with variable percentages of cheesy matter. Butter fats, extracted from the milk by chemical analysis, is the pure, unadulterated fat. Besides, in churning a good deal of fat is left in the butter-milk, while by analysis *all* the fat is separated from the milk, and nothing but the fat. The less cheesy matter in the butter, the longer it will keep; but as butter containing 18 per cent. of water will bring as much money as that containing 8 per cent., and as the keeping qualities have little to do with the market price of fresh butter, the practical question is, How shall we get the greatest quantity of *butter*, not of *butter-fat?* On similar principles quantity of milk is what is desired from cheese cows, not the greatest percentage of solid matter in the milk. These facts prove the absurdity of our boomed systems of butter and cheese making.

In butter making, and in the feeding of cows for the production of butter, the following conditions should be carefully observed : Succulent foods—and especially those which are partially fermented, such as ensilage—favor quantity of milk; that is, milk having a higher percentage of water and a lower percentage of fat, but the cream of such milk will churn more quickly and perfectly, leaving less fat in the butter-milk ; in churning thick cream less fat is left in the butter-milk than in churning thin cream. Acid cream makes more butter than sweet cream, but the quality is inferior and is less healthful. Feeding dry, concentrated food produces a smaller quantity of milk, but the percentage of butter fats and other solids is greater. The cream from dry feed will produce more butter fats than butter, while that from succulent foods will produce more butter than butter fats; in feeding a mixture of dry and succulent foods, the quantity of butter will usually be about the same as that of butter fat, and this appears to be the most desirable method of winter feeding. Feeding a high albuminoid ratio, that is, a food or mixture of foods rich in nitrogenous substances, the quantity of milk, within certain limits, will be increased, the fats and other solids will also be increased, but if the ration is too rich, the quantity will usually be somewhat reduced, although the quality will not suffer. High rations produce milk at a greater cost per gallon than low rations, but the extra expense is more than repaid in the extra quality of the milk and the manure. This higher cost is due to the fact that foods rich in albuminoids have usually a higher market price than those containing a large percentage of carbonaceous substances. The same rules will apply to feeding for cheese, providing it is made at home, for the object desired is to obtain the highest possible percentage of solids, or the lowest percentage of water, which is the same thing; but if the milk is sent to the cheese factory, then the farmer who works on this principle would be cheated on all hands by his more reckless neighbors.

It seems inconsistent that high rations should produce lean meat and at the same time produce milk rich in fat. Little being yet known about the formation of fat, this cannot be satisfactorily explained. It is well known, however, that albuminoids contain about 50 per cent. of carbon, so that they may be easily changed by the animal system into fatty substances—possibly more easily into butter fats than into fatty tissue. Possibly the individual characteristics of the animal has most to do with these changes.

FEEDING FOR GROWTH.

Little need be said on this subject; for nature is our best chemist. Milk, the natural food of young animals, is highly albuminous for the purpose of building up the tissues, and as the mineral matters are associated with the albuminoids, it must contain a large proportion of these salts, which are required for the construction of bone as well as muscular tissue (lean meat). Fats have neither nitrogenous nor mineral matter. The food of growing animals should therefore be highly nitrogenous.

GENERAL REMARKS.

Let no mistakes be made in the technical names used. Albuminous, nitrogenous and protein substances have practically the same meaning, being the tissue forming portions of the food. The fat and heat-forming portions are called carbonaceous or non-nitrogenous compounds ; these are divided into fats and carbo-hydrates, all being composed of carbon, hydrogen and oxygen ; but the latter, such as starch, sugar, crude fibre, etc., always have their hydrogen and oxygen in the proportions in which they exist in water, viz., two parts of hydrogen for one of oxygen, while the various fats have these elements in varying proportions.

Practical experience must always go with a knowledge of the principles of cattle feeding ; for the characteristics, including the likes and dislikes of each animal, can only be ascertained by practice, and these sometimes set all principles at defiance. Only general rules can be given either in science or in practice; the good judgment of the stockman must grapple with the exceptions. With a knowledge of these principles any farmer will be able to ascertain for himself the comparative feeding values of any two or more kinds of food. Study the principles and use your judgment.

It is now hinted that the scientific testers who get the enormous butter yields out of Jersey cattle not only feed lavishly, but administer stimulating drugs and tonics to force the milk yield temporarily. A diet of quinine, calisaya bark, nux vomica, gentian, ale and porter might do well enough to brace up an intemperate cow after a prolonged spree, but it would hardly be considered a natural food for the production of a gilt-edged article of butter. It is to be hoped that hypodermic injections of brandy and beef tea, with occasional electric shocks, will not be administered to the cow who next tries for fifty pounds a week. Too much medicine suggests disease.—[Philadelphia Press.