digestible nutrients in food articles vary in amount and quality and some breeds of chickens return a greater profit in eggs for the food consumed than others. This article, however, is confined to the subject of rations which must be prepared with due regard to the purposes for which the chickens are kept. Thus if we desire to produce flesh we must feed a ration richer in flesh-forming ingredients than if we were feeding for eggs which require nitrogenous materials. Reports of digestion experiments with fowls are seldom met with, presumably because they are not often undertaken. The public should take an interest in the matter and demand of those expert in the determination of feeding problems the solution of this question.

It is assumed that the nutritive ratio for the laying hen and the milch cow should be approximately the same. Their products closely resemble each other, but their relative actual cost makes milk usually much the cheaper food article for man, especially in the larger cities. The German feeding standard for a milch cow calls for 15.4 lbs. total nutritive substance in the digestible portion of her food, these nutritive substances to be proportioned as follows: Protein, 2.5 lbs.; carbohydrates, 12.5 lbs. and ether extract, or fat, 0.4 lb. This gives a nutritive ratio of 1:5.4. In other words, to every pound of protein there are 5.4 lbs. of nitrogenous materials.

The nutritive ratio may be determined by multiplying the ether extract by 2.2, adding to this product the carbohydrates and dividing by the protein. Each pound of fat or ether extract is assumed to have a feeding equivalent of 2.2 pounds carbohydrates. The author has been unable to find the reports of any experiments determining the amounts of these materials necessary for fowls. For want of definite information on several points he is unable to do the subject justice, but, with many apologies and a few misgivings, he will attempt to formulate a ration which shall be practicable for the farmer.

It is usual to feed a ration of soft foods in the morning, with a whole grain ration at night. We will suppose we have our choice of the following feeding stuffs: Bran, cornmeal, ground oats, oil cake, cottonseed meal, beef and blood meal, red clover hay, skim-milk, with oats, rye, wheat, and corn for a whole grain ration. The following table gives the digestible nutrients found in 100 pounds of each of these and a few other articles.

PERCENTAGE DIGESTIBLE MATTER IN AMERICAN FEEDING STUFFS.

| FEEDING STUFF. | CRUDE PROTEIN. | CARBOHYDRATES. | ETHER EXTRACT. |
|---|---|---|---|
| | Per Cent. | Per Cent. | Per Cent. |
| Red clover hay | 6.5 | 34.9 | 1.6 |
| Alfalfa hay | 7.6 | 37.8 | 1.3 |
| Cowpea hay | 8.1 | 37.3 | 1.7 |
| Potatoes | 1.4 | 16.1 | 0.0 |
| Corn, average for all varieties | 7.1 | 62.7 | 4.2 |
| Wheat, average for all varieties | 9.3 | 55.8 | 1.8 |
| Rye | 8.3 | 65.5 | 1.2 |
| Oats | 9.1 | 44.7 | 4.1 |
| Bran | 12.6 | 44.1 | 2.9 |
| Middlings | 12.2 | 47.2 | 2.9 |
| Cottonseed meal | 36.0 | 31.1 | 12.3 |
| Linseed meal | 27.2 | 31.8 | 2.7 |
| Dried blood | 19.1 | 0.0 | 2.3 |
| Meat scraps | 68.4 | 0.3 | 13.5 |
| Skim milk | 3.1 | 4.7 | 0.8 |

For convenience we will mix 250 pounds of soft food at a time, selecting as an experimental ration 100 pounds bran, 50 pounds cornmeal, 50 pounds ground oats, 25 pounds cotton seed meal, 25 pounds beef and blood meal (assuming the latter to be composed of equal parts of blood and meat scraps). These quantities, by reference to the foregoing table, are seen to contain the following amounts of digestible nutrients; Protein, 45.34 pounds; carbohydrates, 121.90 pounds; ether extract of fat, 11.51 pounds. The nutritive ratio we find is 1:2.8, while the German standard for a milch cow is 1:5.4. Therefore, to balance the ratio, we must select some material rich in carbohydrates and fat In selecting clover hay, we secure a high percentage of carbohydrates, and, at the same time, by properly preparing and mixing the clover with the morning mash, we are able to furnish what closely approximates green food. Fifty pounds of red clover hay, added to our ration, raise the nutritive ratio to about 1:3.00.

When skim milk is at hand a very profitable use can be made of it by mixing the soft food with it. A quart of skim-milk weighs about two and a-half pounds. By adding in the feeding period an aggregate of one hundred pounds of milk we make it very palatable, but lower the nutritive ratio to 1:2.76. This we will accept for our morning mash, feeding what each fowl will clean up quickly. For our whole grain ration we may select corn, wheat, or rye, as they are all relatively rich in nitrogenous materials and will help balance the ration. We will select corn to scatter in the litter in the evening. If we use two hundred pounds in connection with the two hundred and fifty pounds soft feed, our nutritive ratio will stand 1:4.3—still somewhat narrower than the standard but very practicable.

The relative amount of grain and soft food used varies with different individuals, some using more and others less. The nutritive ratio, however, should conform more closely to the standard than the average ration does if best results are desired The experimental ration outlined above is not intended as a criterion but simply to show how the different factors are obtained. Theoretically it would be better for the growing chick than the laying hen.

## Fitting Horses for Market

In reply to the question: "What is the ration and course of feeding used in fattening and fitting horses for market by Western farmers?" propounded by an Eddytown, N.Y., reader, Prof. C. F. Curtiss, of the Iowa Experiment Station, says in the *Breeders' Gazette:* The methods of feeding and fitting horses for market appear to vary as widely as the methods of fitting cattle for market. I spent half a day last spring at the stables of an extensive horse-feeder near here. This man has barn room for 80 to 100 head, and stocks up in the fall and begins selling and replacing with fresh horses as soon as any are ready for market. Every horse's mouth is carefully examined on arrival and his teeth properly dressed by a competent veterinarian. This is regarded as a very essential matter, as a large majority of the unthrifty horses that farmers are unable to fatten are found to have defective teeth. Horses properly conditioned usually put on flesh very rapidly This man seldom feeds over 100 days, and generally makes from 300 to 400 lbs. gain in that time. Some of the horses are not kept more than thirty to sixty days, and a proportional or even greater gain is made. They are forced on a heavy ration and fed to make the greatest weight, and, at the same time, finish in sound and saleable condition. Horses purchased from farmers that are considered finished and ready for market are frequently made to take on 200 or 300 lbs. of flesh in a comparatively short time, during which the market value of the horse is generally about doubled. The hay is used liberally. One attendant feeds eighty head at precisely the same time for each feed. Both grain and hay are fed from the floor above. This man sells to local shippers, as he says that the shipping is a trade of itself and he prefers to take no chances on the city markets.

Some time ago I visited another farmer in the southwestern part of the state who makes it a practice during the latter part of the summer to pick up one or two carloads of good, saleable horses and fatten and finish them for market. He buys from neighboring farmers and claims that there is more money in it than in feeding steers. These horses are grazed in the meadows and stalkfields, supplemented with corn fodder, until December or January. They have but little, if any, shelter until that time and make good gains. They are then given thirty to sixty days of feeding and fitting in the stable, during which time they are groomed and put in the best condition for market. This man employs a horse dealer to help him in buying.