carbohydrates and fats serve nearly the same purpose in the animal body, they may, for convenience, be grouped together. Experiments, however, have shown that fat, as a food, is about two and one-fourth times as effective, weight for weight, as are the carbohydrates. That is, one pound of fat will produce about as much heat or energy as two and one-fourth pounds of carbohydrates.

PROTEIN.—The protein of foods, like that of the animal body is characterized by containing nitrogen. It is, therefore, included in what is termed "nitrogenous matter." The function of protein in the food is first of all to build up new tissue and repair the working machinery of the body, and to supply material for the production of milk, wool, muscle, and repair of organs. No other food constituent can fulfill this function.

Since the animal body and all animal products are composed of the same group of substances as food-stuffs contain, we have a basis on which to begin the feeding of animals. Rational feeding of animals is to supply these different elements in sufficient quantity and in the proper proportions for the needs of the animal's body. This is what is known as a balanced ration. We should not, or cannot, expect an animal to grow and develop as it ought unless we supply it with the proper amounts of the different substances its body needs. There is no one hog feed, excepting milk, that supplies all of the necessary nutriments in the correct ratio. It is necessary, therefore, to use a mixture of two or more feeds to get the best results.

In selecting and combining feeds it is not only necessary to take into consideration their composition, but also their digestibility and palatability. It is worse than useless to give an animal a food that cannot be digested, and one that is not palatable will not be eaten in sufficient quantity.

HOW TO CALCULATE RATIONS

From the table which gives the percentage of digestible nutrients in the various feeds we can easily work out a balanced ration. For example, suppose we are feeding flint corn 12 pounds, sweet potatoes 12, cottonseed meal 1.75, and cowpeas 5 pounds per day. To find the amount of protein in 12 pounds of corn, we divide the amount in 100 pounds (the percentage) by 100, and multiply by 12, and so on. We will thus get the following results: