The diet employed during the first two months was a mixture of two parts of starch and one of rye bran, the diet during the last four months consisted of boiled potatoes. The percentage composition of the foods in the dry state was as follows :—

	Rye bran.	Starch.	Potatoes.
Albuminoids	17.27	1.33	9.81
Fat	3.34	..	.56
Fibre	6.39	..	2.82
Non-nitrogenous extractive matter	67.05	98.19	82.80
Ash	5.05	.48	4.61

On this low diet the pig was quite healthy, and gained steadily but slowly in weight. In the whole of the experiment (184 days) the increase in live weight amounted to 38.1 lb., which was at the rate of 1 lb. increase for 9.252 lb. of dry food consumed.

From time to time the fæces were collected, weighed, and analysed; from the data thus afforded the amount of digested food was determined. The digestion of the potatoes was very complete. The following table shows the proportion digested for 100 of each constituent of the food consumed, in the first two and last two months of the potatoe feeding :—

	Total Dry Substance.	Albuminoids.	Crude Fat.	Fibre.	Extractive Matter.	Ash.
Period I. ..	94.4	81.5	24.1	59.7	98.6	62.5
Period II. ..	96.5	88.1	35.6	83.2	99.2	81.0

At the end of six months' feeding the pig was killed, and its body analysed; it contained 7.0138 kilos. of fat. The fat in the pig before feeding commenced was, according to the two well agreeing determinations, on similar pigs, .8740 kilo.; there had been stored up, therefore, during feeding, 6.1398 kilos. of fat. The fat furnished to the animal by the digested food was .5748 kilo.; the quantity of fat actually produced in the animal was, therefore, 5.5650 kilos. The digested albumin was 14.3244 kilos.; of this, 1.2425 kilo. had been deposited on the body, leaving 13.0819 kilos. available for the formation of fat. Reckoning 100 of albumin as capable of yielding 51.4 of fat, the available albumin would be sufficient to produce 6.7241 kilos. of fat; only 5.5650 kilos. were, however, produced in the body; experimenters therefore conclude that no proof of the conversion of carbo-hydrates into fat was afforded by the experiment.

There is one source of error in the calculation just described which must not be passed unnoticed; it is that the whole of the nitrogen in the food is assumed to exist in the form of albuminoids. That the whole, or almost the whole, of the nitrogen in cereal grains exists in the form of albuminoids is probably true, but in the case of all green produce, whether roots or fodder, it has been long known that more or less of the nitrogen present is in the form of nitrates and other innutritious compounds. Church, and Schulze, and Urich, have lately shown that 30—77 per cent. of the nitrogen of roots (turnips, swedes, mangels), does not exist as albuminoids. Professor Church, who is at present investigating the subject, has informed the writer that in an analysis of potatoes he found that only 52.08 per cent. of the nitrogen existed as albuminoids. What may have been the proportion of true albuminoids in the potato tubers used by Weiske and Wildt it is impossible to say, if the proportion of nitrogen exisiting as albuminoids was the same as in the tubers examined by Professor Church, it is clear that the albumin present was quite insufficient to account for the fat produced, and that in fact 2.3691 kilos. of fat must have been formed out of the carbo hydrates. It is quite plain that only the albuminoids actually existing as such should be reckoned in these calculations.

Lawes and Gilbert published in 1852 an experiment on pigs conducted in a similar manner. Two pigs, of the same litter and of similar weight, were taken, one slaughtered and analysed, the other fed for 10 weeks and then slaughtered and analysed The pigs in all the experiments of Lawes and Gilbert were older than those taken by Weiske; the pig taken in the present instance for fattening weighed 103lb, and was about four months old. The pig was fed on a mixed food consisting one half of barley meal, the other half being equal parts of bean meal, lentil meal, and bran; the food was thus tolerably rich in nitrogen. The increase or wieght in 10 weeks was 88lb, or at the rate of 1lb for 4.78 of dry food consumed; the rate of increase was thus nearly twice as great as in Weiske's experiments. In Lawes and Gilbert's experiments the fæces were not analysed (no results have at least been published), and the percentage of food digested was, therefore, not known. In the calculations which follow it is assumed that the whole of the food was digested, which was, of course, not actually the case. The analysis of the bodies of the pigs showed that 100lb of increase contained 63.1lb of fat; to produce this amount of increase there would be consumed in the food 15.6lb of fat, leaving 49.5lb of fat as the quantity formed in the animal The amount of albuminoids consumed to produce 100lb of increase was just 100lb, of which 7.8lb was stored up in the animal, leaving 92.2lb available for the formation of fat. If we reckon with Henneberg, and other German physiologists, that 100 of albumin will yield 51.4 of fat, then 47.4lb is the whole amount of fat the albumin could yield. The amount of fat formed in the animal we have already seen to be 47.5 lb. When we recollect that the whole of the fat and albuminoids of the food were certainly not digested and taken up by the animal, it is evident that the fat and albumin of the food do not, in this case, fully account for the fat produced, but that there is here a small margin for the production of fat from carbo-hydrates. The experiment just described was not designed as a test of the fat-producing power of carbo-hydrates; had this been the case a less nitrogenous food would doubtless have been employed.

The above is the only experiment of Lawes and Gilbert, in which the bodies of the animals were analysed, and the fat produced accurately determined. If we assume in the other feeding experiments with pigs, that the animals when put up for feeding had the same composition as the store pig already analysed, and that the animals when fat had the same composition as the fat pig already analysed, it would then appear that a large proportion of the fat produced must have been derived from the carbohydrates of the food. It is clearly dangerous to found important conclusions on data involving such assumptions; we will, however, give the results of two feeding experiments, in which the weights of the pigs at starting, the length of the period of fattening, and the rate of increase obtained, were quite similar to the corresponding conditions of the experiment in which the bodies were actually analysed.

Three pigs of an average weight of 95lb were fed for 10 weeks on a limited quantity of lentil meal and bran, with as much sugar as they liked to consume; their average increase in live weight was 83lb; 1lb of increase was yielded by 4.27lb of dry food. Assuming that the bodies of the pigs had the same composition as in the first mentioned experiment, 100lb of increase would contain 74.1lb of fat, deducting from which the ready formed fat in the food, we have 56.2lb as formed in the animal. The albuminoids in the food producing this amount of increase were 81lb; deducting 7.5lb stored up, we have 73.5lb available for the formation of fat; this quantity is equivalent to 37.8lb of fat, leaving 18.4lb of fat to be formed from the carbohydrates, or about one-third of the whole fat produced.

Three pigs of similar weight, and fed on the same diet as above, but starch substituted for sugar, yielded almost precisely the same rate of increase. The amount of fat formed in the body was 56lb for 100 of increase; of this 37.7lb