

any other, and will consider that 1,450 grains of carbon and 66 grains of nitrogen are obtained generally for 1d. spent in white bread.

The above has reference to the quality known as households. When a whiter flour is used, if there be no adulteration, the cost is increased, not only because the manufacture of the flour is more costly, but because fine white English or Genesee wheat is used, which is dearer than red wheat; but there is no evidence to show that the nutritive value is increased, except in the case of wheat selected which is grown in hot climates, and which contains somewhat more nitrogen. Taking the increased price of 2d. to 4d. a peck of flour into account, this flour is the dearer food. But it is largely the practice, and particularly in the French flour, to add rice to the very white flour in order to improve the colour, and in so doing a reprehensible adulteration of the flour occurs; for, taking the price of fine flour and rice at 2d. per lb. each, the amount of carbon and nitrogen for 1d. would be:—

	Grains.	Grains.
Flour, carbon.....	1,330	Nitrogen 60
Rice, "	1,380	" 35

so that with a trifling increase in carbon the amount of nitrogen has been reduced nearly half. But in truth the loss is greater, for the value of the rice does not exceed 1d. to 1½d. per lb., and the difference between that and the selling price of the flour is to the gain of the miller and the loss of the consumer. There cannot be a doubt that it ought to be as penal to adulterate flour with rice as to mix chicory with coffee, and the law ought to require from the seller the same affirmation of the admixture in both cases.

Now to turn to the other aspect of the question. What is the effect of retaining in or of adding to the flour the bran as a whole or in part. In this matter there is a fallacy which was originated by chemists; and now that bread companies are doing a large trade, and have medical men upon their direction, who quote and scatter medical opinions, the fallacy is revived, but there is no fallacy on the part of the masses of the people. The use of white wheaten flour is extending as rapidly as possibly in the western world of America (the home of the Maize), and even in the poorer districts of the world the dark-coloured bread is not the brown bread of this country, but barley or rye bread in whole or in part. The millions of this country cast aside the bran, and in doing so follow the dictates of experience, of far greater value than theoretical reasons derived from a single scientific fact, and such assertions as that of Dr. F. W. Headland, in his Medical Handbook: "This is one of the matters in which the world has gone grievously wrong;" and also that of Dr. Mapother, who, in an interesting paper lately read in Dublin, remarked: "We are receding in the art of dietetics in regard to whole-meal bread, for up to some forty years ago it was most generally used in these countries." In these assertions the terms have been inverted; and instead of testing the truth of scientific statements by universal practice they presume to set universal practice at naught, when compared with inductions which themselves can only properly flow from practical experience.

The question then is—Is brown bread cheaper than white bread in the nutrition of the body?

By brown bread is universally understood the admixture of the bran, in its entire composition, with the farina of the flour, and not the exclusion of the outer husk of the bran and the retention of the inner layer. This must be understood, or the statements of persons cannot be compared, neither shall we treat of bread in actual use.

Dr. Dundas Thompson was one of the earliest authorities on this subject, and in lectures now publishing he writes as follows:—

"It is important that we should be able to analyse bran in order to be capable of appreciating the ground upon which it has been long known that this substance is alimentary, and that to remove it from flour is to deprive flour of a large amount not only of nutriment, but of meat-producing principles. It is well known, both by physiological and chemical research, that oatmeal contains more nutritive matter than any other of the cerealia. This may no doubt be in some measure due to the imperfect manner in which the bran is separated from the flour. We may truly consider these infallible physiological results which are obtained in the history of such people as enjoy robust health and longevity with oatmeal as their staple article of food; and when chemical analysis confirms these experiments, our conclusions seem to be deduced from a powerful species of induction."

Again, he writes, "I am not aware that the nutritive superiority of brown to white bread was known upon scientific data prior to the year 1843, when the writer showed that the per-centage of nitrogen in white bread (freed from water) was 2·27=14·8 nitrogenous principle, while that of brown bread containing bran was 2·63=16·43 nitrogenous principle."

Thus because bran contains more gluten and less starch than the inner portion of the wheat, it was assumed that it was more nutritious. This statement has been handed down and copied from book to book up to this day, so that in the book of Dr. Headland just quoted we find:—

"This husk contains more gluten, more nutritious matter, than the whole interior, the proportion being in the husk about 17, in the seed about 12 in 100 parts. White bread is not only more expensive, but is far less nutritious than flour in which the bran is ground. Yet the poor as well as the rich prefer white bread. The former even consider the recommendation to eat brown bread as a sort of insult. This is one of the matters in which the world has gone grievously wrong." Dr. Guy, who quotes this passage, remarks in the text of his paper on dietaries, read before the Statistical Society, "that we can make a considerable addition to the gluten and the oil by adding the bran to the flour; or making the bread of whole meal obtained from the grain either before or after the modern process of decortication." He also adds a table, to show that bran contains 8 per cent. more gluten (which is about 1½ per cent. of nitrogen), and 9 per cent. less starch, &c.

Dr. Johnston, in his "Chemistry of Common Life," also writes, "Bread made from the whole meal is therefore more nutritive;" but he adds another chemical statement to that already mentioned, viz., that "the bran of wheat possesses also the property of dissolving the flour or bread with which it is mixed, and of rendering it more easily"