

The question next arises, how does the food, in the process of its decomposition, develop motive power? This is a question more easily asked than answered. We know that the grouping of atoms of matter into the organized forms, to which the terms starch, sugar, caseine, &c., have been given, was effected by plants, under the influence of sunlight. Substances, there is reason to believe, should not be regarded merely as "consolidated masses of the atmosphere and water," but also as accumulations of force. When these substances are disorganized in the mechanisms of animals, the force which was previously pent up in them is set free; part of it takes the form of heat, a portion of it, occasionally (perhaps always) is resolved into electricity, and part is recognized as muscular power (animal motive power). The heat set free by the disorganization of food in the animal economy differs in no respect from that developed by the combustion of fuel in our furnaces; and by means of the electricity procurable from the torpedo every phenomenon peculiar to that variety of force can be exhibited. Now the enquiry presents itself here, are we to infer from these well-ascertained facts that vital action is the result of the conjoint influence of the ordinary physical (including chemical) agencies, modified by the peculiar state of aggregation of the atoms of matter on which they act; or that, in addition to the physical forces set free by the destruction of the animal mechanism and by the decomposition of the food, there is developed a peculiar force correlated to the physical forces, but differing in its manifestations from each of them in the same way that electricity differs from magnetism, or light from heat? To the latter view we are disposed to incline. We believe that all the forces of nature are but modified manifestations of the one all-pervading ætherial fluid (in a state of motion), and that the modifications arise, in most instances, from the differences in the nature of the ponderable matter on which this universal force acts.

It is generally to be regretted that a staple food of a large portion of the people of this country (England) is deficient in flavor and too bulky to be nutritious. We have long been of opinion that, in this country, at least, the best agricultural laborer is he who is best fed. Let us see what facts we can call upon in support of this opinion.

Oatmeal is the staple article of the food of the Scotch laborers, and of those of the northern parts of England, and its great superiority of the potato is strikingly manifest, when we compare the physical development of the consumers of the two alimental substances.

In the counties of York, Lancaster, Northumberland and Cumberland, the *physique* of the laborer is superior to that of the worker of any other part of England. But the northern laborer is not merely more powerful than his southern *confre*, for he excels him in the exercise of his intellectual faculties. This is so well known to the farmers from the north of England, who have settled in other parts of that country, that they offer higher wages to the laborers from their own part of the kingdom; knowing well, from further experience of their habits, that they will not only do more but better work than the laborers of the south.

The cause of the superior intelligence, and

greater physical powers of the common people of the north of England, as compared with those elsewhere, may in part be found in ethnological differences. But granting this, their maintenance would be impossible, were the food of the people of this district similar to that of the laborers of the English midland counties.

In the north of England and in Scotland, although potatoes are extensively consumed, yet buttermilk, which the people by no means despise is also largely made use of; and oatcake is far from being a stranger on the poor man's board. In the south of England, oatmeal, whether served up in the semi-fluid form of porridge, or in the solid condition of cake, is almost unknown.

It requires no argument to prove that the people of the north of England are better agricultural laborers than those of the south, and are themselves excelled by their neighbors north of the Tweed. Although there is but little ethnological difference between the agricultural laborers of the south of Scotland and those of the north of England, it appears to me that the former possess more brains and muscles than the latter; they are stronger and more skillful workmen. We think, however, that no such difference is observable between the artisans of Glasgow and those of Newcastle or Carlisle. In the case of the rural workmen this may appear anomalous, but it is not really so. The artisans of both countries are well paid, and can, therefore, afford to use a generous diet, composed chiefly of animal food; but the Scotch agricultural laborer subsists principally upon oatmeal and peas, whilst the English laborer uses a diet which is to a far less extent made up of these articles. Were the English and Scotch laborers supplied with precisely the same kind and quality of food, we think there would be little, if any, difference in the amount and quality of their work. The highly nutritious nature of the pea and oat, as compared with the potato, will be evident from the analyses made of them.

These analyses prove that one pound of peas is capable of putting more muscle on the human machine than fifteen pounds of potatoes could do; and that, taking the amount of flesh-formers in a substance as a measure of its nutritive value, oats are more valuable than potatoes as food—that is, a pound of oatmeal will form as much lean flesh as half a stone of potatoes! The value of a food substance is not, however, altogether in proportion to its amount of nitrogenous or flesh-forming matters, but also, to a great degree, upon the proportion of starch it yields. In this respect the potato is by no means an inferior aliment; indeed, were it as deficient in heat-giving and fat-forming matters as it is in flesh-forming substances, it would be utterly impossible for working men to subsist, as they do, almost exclusively upon this so called "national esculent."

From what has been stated, it is clear that potatoes contain a quantity of starch altogether disproportionate to their amount of nitrogenous or flesh-forming substances; and we have no hesitation in asserting that, as a general rule, a man fed exclusively on potatoes cannot be as hard-working and intelligent a laborer as if he were supplied with other food of a more concentrated kind—one in which the muscle-forming constituents