

— Science Notes. —

USEFUL MICROBES.

MICROBES are now held responsible for so much that is harmful to us that it is satisfactory to know that some of them, at all events, contribute to our well-being. Although not in themselves a useful article of diet, certain among them may be made to render us service by reducing our butcher's bill. Meat is, to those who eat it, their chief source of nitrogenous food, but it is a very expensive source. Flesh feeders are, after all, only second-hand vegetarians, for the ox and the sheep build up their bodies from grass and other herbs. Nitrogenous compounds exist in the soil, and vegetables have the advantage over animals that they are able to utilise these compounds as food. Nitrogen existing in vegetable form is taken in by the ox and the sheep, and so conveyed to the human being, who has to expend part of his resulting energy in returning to the soil nitrogen equivalent to that of which he, with the assistance of the plant and the lower animal, has robbed it. In other words he brings nitrates from South America to supply the English fields.

Since all vegetables compare unfavourably with meat in respect of their percentage of nitrogen, it follows that if the consumption of meat is to be reduced, the vegetable food substituted for it must be as rich as possible in nitrogen. Those vegetables which can best replace meat are peas, beans, lentils, etc., and they, with clover, vetch, and many others, are classed by botanists as belonging to the Natural Order *Leguminosæ*. Yet plants of this order, distinguished for the quantity of nitrogen they contain, impoverish the soil less, and can, therefore, be grown at less cost than other crops. Sir J. B. Lawes and Professor Gilbert, on their famous experimental grounds at Rothamsted, successfully grew red clover (in a rich soil) for thirty consecutive years without supplying nitrogenous manure. Moreover, they found that in a rotation of crops it was an advantage to the ground to grow beans or clover on it between crops of barley and wheat instead of allowing it to lie fallow.

It is a common saying that one cannot "live on air," yet it is well known that one constituent of air, oxygen, is indispensable to both plants and animals. Plants, moreover utilise as a source of food the well-known carbonic acid gas, with which we, in common with all other animals, vitiate the air. As long as daylight lasts plants are engaged in splitting up the product of our respiration, keeping the carbon to manufacture sugar for their own use, and returning to us the free oxygen for ours.

Recent experiments have proved that some plants, notably the *Leguminosæ*, also feed upon the remaining constituent of air—nitrogen. Here they have a never-failing supply, which renders them, to a certain extent, independent of nitrogenous manure. This is the explanation of the curious fact that the plants which give us the most nitrogen cost us least in nitrogenous manure, but it is to microbes that we are indebted for this. The plant's power of assimilating free nitrogen appears to depend upon the presence of nodules on its roots, and these nodules are due to the growth of bacteria.

Notes on Art.

THE ARTS AND CRAFTS EXHIBITION.

(First Notice.)

IN the last paper an attempt was made to show how much Art depends on the artist's mind and perception, his genius enabling him to select and depict what is truly beautiful even in the meanest subjects. It must not, however, be forgotten that a distinct school of artists deliberately subordinate beauty to technical skill, and hold that any subjects, whether they be beautiful or ugly, differ little in the opportunity they afford the artist for the display of power. For the present, we will consider that the aim of all artists is to produce beautiful things, and will turn from the consideration of the separate schools to examine the Arts and Crafts Exhibition, which was opened last week at the New Gallery.

Now there can be no question that the object of the members of the Society which is responsible for these interesting Exhibitions, is not only to ensure that the decoration of our houses shall be really beautiful, but to make the most ordinary appliances used in daily life, both truly artistic and structurally honest. Let us see how far success has been attained. If we are to accept the verdict of *The Times*, the success is incomplete, for we are told that—

"The truth is that in this Exhibition a number of Englishmen have produced a number of excellent works, but they have somehow contrived to do this without inspiring any new confidence in the future of English Art. . . . The worst of it is," *The Times* adds, "that when an average Englishman, with his own practical instincts asks, 'Why must my candlesticks be made like this, or why must I use this strange looking chair,' the only possible answer is that things were made so about 400 years ago, and that there is good mediæval precedent for them. . . . The decoration of our rooms, and even of our churches, is not the highest function of the artist."

What higher aim can Art have than the decoration of our churches, and if the Exhibition does show that the influence of Mediæval Art and tradition is not wanting, why is this? Surely because the modern craftsman has gone back to the great School of Nature from which the early workers derived their inspiration.

In the last century, and in the first half of this, there was a great break in the continuity of British Art and handicrafts. Things were hopelessly and dismally ugly, and, moreover, there is a large section of our people who still either love to have them so, or at least have no general sense of beauty, and are unconscious of the lack of beauty in things around them.

"Our charge is," said Sir Frederick Leighton, a few years ago—

"That with the great majority of Englishmen the appreciation of Art, as Art, is blunt, is superficial, is desultory, is spasmodic; that our countrymen have no adequate perception of the place of Art as an element of national greatness; that while what is excellent receives from them honour and recognition, what is ignoble and hideous is not detested by them, is, indeed, accepted and borne with a dull indifferent acquiescence."

Yet *The Times* tells us that this Exhibition, which is full of really beautiful things, and delicate colour, "does not inspire confidence in the future of English Art." We differ entirely from this opinion, and contend that if, as the rule and not the exception, crafts

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