

The importance of these fungi, and the loss that followed to the farmer, some time since attracted the attention of Professor Henslow. His description of those minute yet extensive varieties, which too often tenant the wheat plant, was given with his usual clearness (*Journal of the Royal Agricultural Society*, vol. 2, p. 1.) and will well illustrate the observations of the Rev. Edwin Sidney, on the present occasion:

"All fungi, be it remarked, grow upon some kind of organized matter, none of them deriving their nutriment directly from the soil, water, or the atmosphere, like other plants. They are of great importance in the economy of nature, by assisting in the decomposition of decaying or decayed animal and vegetable substances. A few of them appear to grow upon healthy subjects, but these may possibly most frequently have originated on a part where disease or decay had already effected some alteration in the tissue; and then, by spreading rapidly from thence, they may afterwards occasion the decay of other parts also. None of this tribe of plants attain to any great size, when we compare them with many species of flowering plants, or even with many of those of other neighbouring tribes, (as the ferns, &c.) which never flower. Among fungi we find a multitude of extremely minute species, which it needs the skill of an experienced microscopic observer to detect and examine; and it is also among the very lowest of the several groups, into which these minute fungi are classed, that we must search for the few species that produce the fatal diseases in corn we are about to notice. But if these fungi are themselves so exceedingly small, how much more so are those reproductive bodies, analogous to the seeds of flowering plants, by which they are propagated and multiplied! So very minute are these sporules (as botanists term them) that they altogether escape observation by the naked eye, and can only be just distinguished by the highest powers of the microscope. Many of these kind of fungi live beneath the scarf-skin, or epidermis, and within the very substance of certain plants. In the progress of their growth, they raise blisters under the epidermis, and, when arrived at maturity, they burst through it, and then form spots or irregular blotches of various colours, which are frequently orange, brown, or black. These spots (or *spori*) are masses of fructification, and are surrounded by the tattered edges of the ruptured epidermis. A vast number of these fungi are known to botanists. Like parasitic animals, they are restricted in their powers of attack, being able to live on certain species only, and even on particular parts only of particular individuals of these species. There is often a strong general resemblance between many of them; but a naturalist will readily detect such important differences between two fungi which may infest distinct species of plants, that he is compelled to consider them also as species distinct from each other. Thus it happens in the animal kingdom, that different species of flea, and different species of lice, can exist only on particular species of quadrupeds or birds. The flea which infests dogs is distinct from that which annoys man. So also with these parasitic fungi; some are restricted to one species of plant, some to another; but, generally speaking, most of them are capable of living upon more than one species of the same genus; where, of course, we might expect the resemblance in all points to be very close. Some fungi confine their attacks to the seed, others to the stem or leaves, and some even to one side only of the leaves. One of those which attack wheat live only on the grain, another more particularly attacks the short stalk (*pedicel*) on which each flower is seated, whilst three of which we are about to speak are restricted to the straw, chaff, and leaves; but all five live at first beneath the epidermis, and not upon it. In this respect, they bear a close analogy to those parasitic animals which live

within the bodies of other animals, some immediately beneath the skin, others in the intestines, and others again within the very substance of the muscle. It is the extraordinary minuteness of the sporules (or seed-like bodies) of these fungi, which allows of their being absorbed by the roots, and probably also through the pores of the stem and leaves of plants; and then they are conveyed by the sap to the various parts where they are enabled to germinate, grow, and fructify. The sporules of fungi appear to be everywhere dispersed through the atmosphere, ready to germinate wherever they may find a dead or living subject in a condition suited to their attack. Common mouldiness, for instance, which so readily forms on many substances in moist situations, is the most familiar example of the inconceivable numbers in which the sporules of a minute fungus are everywhere diffused. The difficulty of admitting such a universal dispersion of these sporules, has induced some modern philosophers to support the old exploded theory of spontaneous generation. Of this theory, however, we may safely assert, in the present state of human knowledge, that it involves difficulties an hundred fold more inexplicable than any which attend on the opposed theory, which teaches us that all living creatures proceed from similarly organized beings, originally called into existence at the fiat of the Almighty. We shall therefore consider these minute fungi to be plants, which have proceeded from, and are capable of reproducing, their kind by means of those minute sporules, with which direct observation has made us well acquainted."

It is only of the *general remarks* of which the lecture was chiefly composed, that we have been able to avail ourselves. These were valuable and instructive, and, although with the exception of the prevention of the smut in wheat, scientific researches have not yet enabled us to ward off the attacks of these fungi, yet, it is very probable that much in this way will be hereafter accomplished. For as the Professor remarked, when speaking of the *Bunt*, *Smut Balls*, or *Pepperbrant*—"The fungus which occasions this well known and much dreaded disease has hitherto been met with only in the grains of wheat. Its presence is readily recognized by the peculiarly disgusting odour of the infected ear. It may be detected in the young seed, even in the very earliest state of the flower bud; and when fully ripe it most frequently occupying the whole interior of the grain, but without bursting the skin, so that the wheat seed retains very nearly the same size and shape that it would have assumed had it been perfectly sound. When examined under the microscope, the Bunt-fungus is seen to consist of vast numbers of extremely minute globules, of a dark colour, and which are at first attached to a mass of matted thread-like matter, analogous to what is termed the spawn in mushrooms, and other Agarics—and which in those plants spreads underground, and frequently occasions the remarkable appearances called fairy-rings. It is not easy to see this spawn of the Bunt-fungus, but the little dark globules, called spores, may readily be detected. They may be considered analogous to the seed-vessels of flowering plants, and each of them contains a mass of almost inconceivably minute sporules by means of which the plant is propagated."

"The reproductive powers of fungi are quite beyond our comprehension. Fries, one of our greatest authorities, has calculated that a particular fungus may contain 10,000,000 sporidia. The terms *spora*, *sporule*, *sporidia*, &c., have either been applied synonymously or vaguely by different authors. The more modern practice appears to be, to use *sporule* for the ultimate granules analogous to seeds; *sporidia* for the cases or vessels containing them; and *spora* for an additional covering, which sometimes includes several *sporidia*.