

It is not very unusual for the *Araucaria imbricata* to produce cones. The first I myself remember to have seen were on the old tree in the Royal Gardens, Kew, in the summer of 1851 or thereabouts. The female cones are large globular masses, the constituent scales of which are not (superficially) very different from the ordinary leaves. What the Duke describes are evidently the male catkins. The trees are ordinarily dioecious, but I have once seen and figured an example in which male catkins and female cones were borne on the same tree.

London, November 14.

MAXWELL T. MASTERS.

IN the garden of the house Bleckley, Shirley Warren, Southampton, there is an *Araucaria* that for many years past has produced annually a large number of cones. The cones are from 40 to 100 in number, and very large, so that their breaking up and falling on to the lawn is a serious inconvenience, it being difficult to sweep them up. No fertile seeds have been produced by this tree, which from all I have been able to learn is the finest *Araucaria* in England; the trunk is over 6 feet in circumference some 2 feet above the ground. There is no history of the tree.

Cambridge, November 15.

D. SHARP.

IF the Duke of Argyll refers (November 6, p. 8) to ovule-bearing cones, which are spherical and about 7 inches in diameter, these have been plentifully produced in almost every part of the British Isles.

Male or pollen cones (catkins), of cylindrical shape and 3 inches long, are, however, extremely rare, although they have been produced in the Bicton Pinetum and on one of Earl Derby's Kentish properties. A tree at the latter place bears annually, and has done so for some years, a heavy crop of perfectly-developed pollen cones; indeed, so great is the quantity that at a short distance away the tree has quite an unusual and remarkable appearance.

A. D. WEBSTER.

Holwood Estate, Kent, November 17.

ATTRACTIVE CHARACTERS IN FUNGI.

THIS subject, which has been introduced by a letter from a correspondent (November 6, p. 9), is one of considerable interest, but it is one also of great mystery and difficulty. In dealing with fungi of the mushroom type we are in contact with a class of plants so different from Phanerogams that it is at once evident that we must not draw the same conclusions from a similar series of initial facts. It is well known that certain fungi possess strong and characteristic odours, and others very conspicuous colours, both of which features are presumed to have some value in the biography of the plant, but *what* influence and *what* value it is not so easy to determine as in the case of plants in which cross-fertilization has to be effected. It is by no means certain that there is any special act of fertilization at all; it is even doubtful if any fertilizing element exists. For nearly a century it has been thought possible to find a fecundating element in Agarics, but all efforts at demonstration have failed.¹ Most of these investigations have been directed to the cystidia, large cells which are recognized as projecting, more or less, on the surface of the hymenium, but these could not be identified with any known process of fecundation.² M. de Seynes, after patiently investigating the hymenium of the *Hymenomycetes*, arrived at a negative result, and this has not since been disturbed. "The hymenium," he says, "has not yet offered an organ which we may suppose in reality to be the male organ;" and he adds, "one sole and self-same organ is the basis of it, according as it experiences an arrest of its development; as it grows and fructifies, or as it becomes hypertrophied, it gives us a paraphysis, a basidium, or a cystidium; in other terms, atrophied basidium, normal basidium, hypertrophied basidium: these are the three elements which form the hymenium. Does it develop either outside the hymenium or on the hymenium, at a time, or in a part which has not yet been discovered, organs which yield

pollen, spermatia, antherozoids; or any other fecundating agent? This is what remains to be discovered."¹

Amongst British mycologists Mr. Worthington Smith has been the most persistent in belief that Agarics are subject to hybridism, which implies cross-fertilization, but he has not contributed much towards the establishment of the proposition that fertilization really exists, except perhaps to emphasize the suggestion that the cystidia are male organs. In his paper on the reproduction in *Coprinus radiatus*,² he remarks: "I consider it quite possible that the mere contact of the threads (or fluid) from the cystidia with the threads from the unpierced spores may be sufficient for the production of a new plant." In more direct reference to the question of hybridism he writes:—"On a dung-heap, which will produce *Coprinus radiatus*, other species, as *C. nycthemerus*, &c., are sure to appear; and not only do allied species come up in company with *C. radiatus*, but every intermediate form between one and the other may be gathered any morning. These latter plants belong to no species described as such, but are natural hybrids, doubtlessly produced by the spermatozoids of one plant piercing the spores of another. Amongst the larger species of Agarics similar forms are quite common, and they prove sore puzzles for those men who only want *names* for the fungi they find."

No one with any extended experience in field work can gainsay that individual Agarics are often met with which strongly suggest hybridism. These forms are so intermediate between more typical forms, with which they were perhaps growing, that it is difficult to get rid of the idea altogether that they are modifications due to some such influences as in higher plants we attribute to hybridization. It would be very unphilosophical to deny absolutely that they are possibly hybrids; but, on the other hand, it would be as bad to declare them hybrids until some sort of impregnation can be demonstrated.

Admitting that hitherto all efforts to discover any process of fertilization in Agarics, which will stand the test of examination, has failed, the difficulty is increased in speculating upon the "why and wherefore" of the phenomena of odour, taste, and colour, in the larger fungi. Yet, notwithstanding this, we may approach nearer the desired end by endeavouring to collect facts, which may some day, by accumulation, serve as a basis for hypothesis.

Why do certain fungi possess very strong odours, which to our olfactory nerves are agreeable or disagreeable? There is a small whitish Agaric, not uncommon amongst grass in woods, which has such a strong and peculiar odour that it is named *Agaricus (Clitocybe) fragrans*. It is not more than about an inch in diameter, is mild to the taste, very pleasant to eat when cooked, and the odour remains after the plant has been dried for some time. Some persons detect in it a resemblance to anise, others to melilot, or the Tonquin bean, and others again regard it as an odour peculiarly its own. Two or three other species, to be found in similar localities, might, at a glance, be confounded with it, but that they are destitute of the odour and pleasant flavour. The novice could at once distinguish this fungus from its associates by its odour, but wherefore it should smell so sweet whilst the others do not is at present an unsolved mystery. It is certainly not specially attractive to insects, and we have never found it attacked by slugs; perhaps the odour is disagreeable to them.

Another Agaric may be found amongst dead leaves, which is twice as large, and of a singular pale verdigris-green colour (*Agaricus (Clitocybe) odoratus*). It possesses very nearly the same odour, possibly a little stronger, and the same agreeable taste. This, again, we have always observed to be free from any indication of attacks from slugs. We have failed to detect the same odour, except

¹ De Bary, "Morphologie und Physiologie der Pilze," cap. v.

² See *Grevillea*, vol. i. (1873), p. 181.

¹ *Grevillea*, vol. ii. p. 41.

² *Grevillea*, vol. iv. (1875), p. 53.