

a long period unless it is applied. I well remember a peculiar case in point. A wild hill-top covered with gorse and bracken was to be taken into cultivation; it had been unturfed, the turves and gorse being piled in heaps and burned on the ground (many acres in extent) now ready for the plough. It was in the month of August. While these heaps were still smouldering, there came two days of heavy rain; immediately after, sprang up like magic an immense crop of mushrooms, chiefly close to the ash-heaps. They were unusually large, and the tops were very brown—scarcely to be distinguished from the bare earth they grew on.

These germs must have been gradually collecting under the turf for years, beaten in by the weather, the moss slowly growing over and hiding them from the air and heat. The removal of the turf exposed them, when, forced by the extraordinary heat of the burning heaps, they suddenly sprang into existence. In after years, when the ground was under cultivation, they were seen no more, for the reason, probably, that when the plant-life was all destroyed, a great part of the insect-life went with it, and thus the means of propagation was lost.

Biarritz, November 23.

R. HAIG THOMAS.

P.S.—I have never actually seen cattle or horses eat mushrooms, but that goats certainly eat some kinds of fungi I can state positively, as last year, in Norway, I had an opportunity of personally observing the fact. A party of us were walking through the pine forest; one of the peasants was leading a goat down the mountain from a *sater* to his farm below. My companions called me to look at the goat, which had stopped in the path-way, and was greedily nibbling at a large piece of sponge-like fungus, such as one finds commonly in the woods. She speedily ate it all up. We expressed some surprise, but the peasants told us goats were very fond of and often eat fungi.—R. H. T.

As stated by Mr. Cooke (NATURE, November 20, p. 57), there is an apparent contradiction between the impossibility of finding out some process of "impregnation" previous to the formation of the spores in Hymenomycetes, and, on the other hand, the occurrence of forms suspected to be "hybrids."

A very remarkable statement in De Bary ("Morphol. u. Physiol. der Pilze," § 1, p. 2), however, may perhaps afford a clue to the mystery, viz. the occurrence of amalgamations between hyphae originally produced from distinct spores. Might not such a process as this possibly lead to "hybrids," if those spores belonged to distinct species? W.

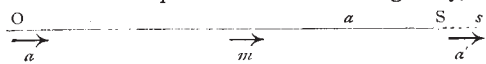
Freiburg, Badenia, November 22.

I WAS shown the other day, in a wine cellar, completely excluding light and fresh air, a remarkably beautiful growth of fungus, covering the wall and floor, to a depth of 4 inches in places, and suggesting cotton-wool in form and colour. When taken up and pressed, it turned brown and emitted the characteristic fungus smell. I should be glad to learn the name, and whether the pure white of the fungus is due to the total exclusion from light. M. H. M.

### Doppler's Principle.

THIS subject was referred to in NATURE some months ago, but, although the question is comparatively simple, there is one point of some importance which was not then brought out and to which I have never seen any reference. The change in pitch is, of course, due to the change in the rate at which the cycles of disturbance which constitute the wave-motion fall upon the ear. To determine this change of rate, it is necessary to consider (1) the space occupied by each cycle; (2) the relative velocity of the wave-motion and the observer. Consideration (1) is connected with the velocity of the source of sound, and if wave-length be defined as the shortest distance between two vibrating particles in the same phase, then the space occupied by each cycle may be called the wave-length. If, however, wave-length be defined as the distance which the wave-motion travels through the medium during the "period" of vibration of the sounding body, then the wave-length so defined is unaffected by the motion of the sounding body. It is in connection with this point that there is generally some ambiguity in the usual terms of explanation.

Let  $s$  denote the position of the sounding body, and  $o$



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that of the observer. If  $a$  denote the velocity of the observer,  $a'$  the velocity of the sounding body,  $m$  that of the medium, and  $v$  the velocity of sound, then during the "period" of the vibration of the sounding body the disturbance travels, *through the medium*, a distance  $\frac{v}{n}$ , where  $n$  is the frequency of the vibration. During this period, however,  $s$  is displaced to  $s$ , a distance  $\frac{a'}{n}$ ; and, owing to the motion of the medium, the disturbance originally starting from  $s$ , although traversing a length  $\frac{v}{n}$  through the medium, only reaches a point  $a$  at a distance  $\frac{v-m}{n}$  from  $s$ . The distance,

$sa = \frac{v+a'-m}{n}$ , is thus the actual distance between two particles in the same phase, or gives the *effective* wave-length.

The velocity of the motion through the medium is  $v$ , and therefore its velocity relative to  $o$  is given by  $v+a-m$ . Hence, in one second, the number of effective wave-lengths which fall upon the ear is expressed by

$$n' = \frac{v+a-m}{v+a'-m} n.$$

That is, the pitch of the note heard at  $o$  is given by  $n'$ . This is the formula given by Prof. Everett in NATURE, vol. xlii. p. 81.

Cambridge, November 18.

R. W. STEWART.

### The Comb of the Hive-Bee.

IN a recent article the Bishop of Carlisle puts forward, as conclusive objections to the perfecting of the cells in the comb of the hive-bee by natural selection: (1) the fact that other kinds of bees continue; (2) that the sterile workers cannot transmit favourable variations.

But (1) other bees, however inferior in comb-making, may have advantages in other respects; thus the humble-bee can reach the nectar of flowers that are not accessible to the common hive-bee. (2) Favourable variations in the workers would presumably or possibly appear in the further swarms thrown off from the hive or home from which these proceeded; and further, seeing that the workers are really females, the queens in the swarms so thrown off may inherit and transmit the favourable tendency. WM. KNIGHT.

Savile Club, 107 Piccadilly, W., November 22.

### A Swallow's Terrace?

MR. A. G. VERNON HARCOURT has just shown me, in his boat-house at Cowley Grange, a specimen of swallow's architecture unlike anything I have seen or heard of. The nest, which is itself normal, is placed at the end of a small beam extending from the top of the door to the angle of the building. This beam is about two feet and a quarter in length, and four inches broad. The nest is at the end next the door; the whole of the rest of the surface of the beam is occupied with an adjunct to the nest, which looks as if it had been meant for the family to perch and roost on. It consists, like the nest, of a foundation of dried mud, carefully covered with dry grass; and it is obvious that much care and pains were spent on its construction. Its length (excluding the nest) is nearly two feet.

Mr. Harcourt thinks that the nest was built late last summer, but he did not notice it then, or discover the use of this curious terrace. Can any of your readers parallel or explain it?

W. WARDE FOWLER.

Lincoln College, Oxford, November 20.

### Araucaria Cones.

IN answer to the Duke of Argyll's inquiry respecting the coning of the *Araucaria imbricata* in the British Isles, I beg to state that there have been, within my own cognizance, several instances of the same during the last thirty or forty years in this country, notably at Maresfield in Sussex, at Bicton in Devonshire, and especially at Chatsworth. The famous avenue of them at Chatsworth frequently produced cones during the last ten years of the trees' existence prior to 1860, when the memorable severe frost on Christmas Eve completely destroyed the whole avenue, despite the artificial screens of branches of evergreen shrubs that had been annually adopted for their protection from severe wintery weather, so I have been informed by a trustworthy