his theory in a more solid and more general way, and in this case also I shall have attained my aim. L. SOHNCKE

University of Jena

Holothurians

THE observations which I made in 1883 among the coral-reefs of the Solomon Group on the habits of the Holothurians support the view that these animals do not subsist on living coral. I carefully examined the material voided by about twenty individuals, and found its composition to be of a mixed character. In addition to the calcareous sand and gravel which formed its bulk, there were numerous tests of the large foraminifer—Orbitolites—and several small univalve and bivalve shells, besides the joints of a stony alga and the operculum of a young nerite, &c. This observation is supplementary to those contained in my previous letter on this subject (NATURE, vol. xxvii. p. 7).

Traders in this group tell me that when collecting a species known in the trade as the "large tit-fish," they have frequently found a small eel inside the animal, which usually escaped before it could be secured. One man received a smart electric shock, whilst handling a trepang containing one of these eels.

H. B. GUPPY

H.M.S. *Lark*, Auckland, N.Z., January 1

Unconscious Bias in Walking

SURELY Mr. W. G. Simpson has written from imperfect memory when he tells us in NATURE (vol. xxix. p. 356), "if the majority of people, as Mr. Darwin argues, are left-legged, they would circle to the *left* in a mist, as Mr. Larden says they do." In Mr. Larden's letter (p. 262) the following passage occurs: "This theory (his own) involving as further consequences that those in whom the left leg is the strongest would circle to the *right*," &c.; again, "I myself am right-legged and in a mist I always circle to the left." Although Mr. Simpson has misquoted Mr. Larden, he has arrived at the same conclusion that I did (see NATURE for January 31, p. 311), but gives his views in different words, namely, that "there is a bias *towards* the stronger limb, irrespective of length." JOHN RAE

The Storm of January 26

THE lowest reading, reduced to the sea-level, of the barometer here, about six miles south-east of Omagh, during the gale on Saturday, the 26th ult., was 27·68, and occurred at 4.15 p.m. Dublin time. ROBERT DIXON

Clogherny, Beragh

PALESTINE EXPLORATION

THE following communication has been forwarded to us for publication :—

Mediterranean Hotel, Jerusalem, January 18, 1884

DEAR PROFESSOR OLIVER,—A chest in a waterproof cover leaves here to-morrow for London to Messrs. Cook and Son, Ludgate Circus. It should arrive on February 25 or sooner, and I have directed that it should be forwarded immediately to Kew. I hope to arrive soon after. It contains all my dried plants. They are made up in various packages, with localities written outside. Of course you will have them kept dry and looked after, but I think they had better not be overhauled until I come, as I should like to open them as they are, while the contents of each package and its associations are fresh in my memory. The earlier desert plants are in many cases only valuable for recognition, I fear, as they are withered remains, but I frequently obtained a lingering flower and many seeds. All my seeds and bulbs I have sent according to promise to Mr. Burbidge, of the College Botanic Garden, Dublin. In the mountains about Sinai and Jebel Catherine I obtained better specimens, and things gradually improved to Akaba. We got through a good deal of unexplored country and had a most efficient conductor. Along the Wady Arabah I made frequent detours into the mountains on either side, and was especially fortunate in having a good collection on Mount Hor and at Petra and its neighbourhood. The flora of Mount Hor (5000 feet) is extremely rich—a warm sandstone. I also collected mosses and lichens in the desert, and am still gathering all I can. My collections reach to here, including a run down to the Jordan. The pace is now (horses) often too rapid, but the camel was an admirable companion on a long march. We were delayed in the Ghor-en-Safiet, at the south-east end of the Dead Sea for ten days, an unparalleled sojourn in this most interesting place. It was early a little, but I made large collections there, and was very glad of the difficulties that opposed our departure. I found many unexpected plants —three ferns, for instance, on Mount Hor, and a *Stapelia*. I knew the names of very few of the things, and had no books, but Redhead and Lowne's papers were a help, though they gave a very poor idea of the real state of affairs. There is a fine *Acacia* in the Ghor-en-Safiet, distinct in many respects and far finer than *A. seyal*. It is the true "scent" about which there seems a lot of confusion. Hoping my collections will be satisfactory,

I remain yours very truly,

(Signed) HENRY CHICHESTER HART

P.S.—Here in Jerusalem there are about six plants in flower; down below in the Jordan I gathered about a hundred two days ago! (Signed) H.

FAIRY RINGS

THE dark green circles of grass known as "fairy rings" formed the subject of a paper in the *Philosophical Transactions* of the new-born Royal Society in 1675; but it was only last year that the Rothamsted chemists, Messrs. Lawes, Gilbert, and Warington, announced what is no doubt a correct explanation of these phenomena.

The original theory of the electrical origin of the rings was succeeded by that of "chemical causes" propounded by Dr. Wollaston at a meeting of the Royal Society in 1807, and by Prof. Way in a paper read to the British Association in 1846. Besides the "mineral theory" which was here pressed into the service of a discussion that commenced, as already stated, more than two hundred years ago, De Candolle applied his famous "excretory theory" to its elucidation. At Rothamsted, however, the causes of fairy rings were still regarded as having been unsatisfactorily explained.

Sir John B. Lawes and his colleague Dr. Gilbert commenced their inquiries on this subject many years ago. Almost from the commencement of their experiments at Rothamsted they had regarded the alternate growth of fungi and grass as a striking example of what may be called the "natural rotation" of crops. As long ago as 1851 they described fairy rings in the *Journal of the Royal Agricultural Society* as "a beautiful illustration of the dependence for luxuriant growth of one plant upon another of different habits." It will be remembered that the experiments at Rothamsted led to the substitution of what is called the "nitrogen theory" for the "mineral theory" of former days, and practical agriculturists who know the value and the cost of nitrogen as an all-important agent of fertility will learn, perhaps without surprise, that the rich verdure of a fairy ring is due to the effect of nitrogen. Nitrogen is the *sine quâ non* of plant growth, and fungi require a large amount of it. From what source do they obtain it? At the present time few, if any, chemists would maintain that they obtained it by the absorption of free nitrogen from the atmosphere, but in 1851 the eminent investigators at Rothamsted attributed the nitrogen of the fungi to their extraordinary power of accumulating that substance from the atmosphere; and this they thought enabled them to take up the minerals which the grasses, owing to

their more limited power of obtaining nitrogen, could not appropriate from the soil. They assumed that it was the nitrogen rather than the mineral constituents of the fungi to which the manuring action was mainly to be attributed, and in this they were right; but the theory has required some correction nevertheless, inasmuch as they have since proved the source of nitrogen in the fungi to be the soil, not the atmosphere.

As doubts were entertained at first on this point, direct experiments were tried at Rothamsted, and in 1874 samples of soil were taken within a fairy ring, immediately upon it, and outside, and these yielded on analysis the lowest percentage of nitrogen in the soil within the ring, a higher percentage under the ring, and a higher still outside it. The soil therefore had lost nitrogen by the growth of the fungi, and the obvious conclusion was that the fungi possess a greater power than the grasses of abstracting nitrogen from the soil.

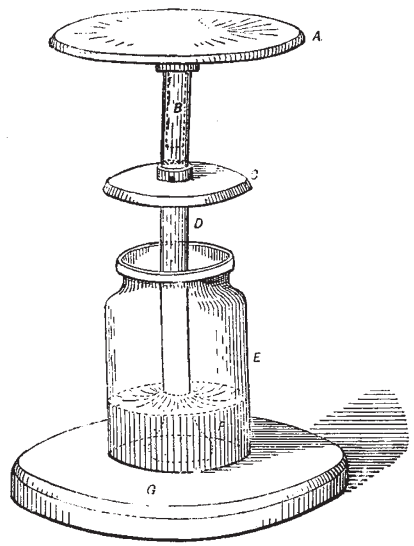
The analyses of the various species of fairy-ring fungi do not greatly differ. Two species occurring at Rothamsted—*Agaricus prunulus* and *Marasmius orcadum*—contain nitrogenous compounds to the amount of one-third of their dry substance, the ash being rich in potash and phosphoric acid. Their occurrence on pastures, like that of the common mushroom, is probably due to the manuring of the ground by animals and their continuance and growth depend on certain conditions of soil and season. They are rarely developed on rich soils, or on those which are highly manured, or in seasons favourable to the general herbage of the turf; and when they do appear under these conditions they will probably not be reproduced, or only in patches. The recent wet seasons have dispersed fairy rings in situations where they have usually proved persistent. They prevail wherever the growth of the grasses is inferior, especially on the poor downs of the chalk districts, and on poor sandy soils where the natural herbage is wanting in vigour.

The history of fairy rings, as it has now been written at Rothamsted, will attract close attention from all who are interested in the nutrition of plants, including the student of agriculture, and all, in fact, who are specially concerned in the question of the food supply. It was not previously known that any kind of plant could feed directly on the organic nitrogen of the soil itself. It was recognised that the root-development of plants differed, and that the greater extension of their roots enabled some plants to secure a larger proportion of the constituents of the soil than others. But here is a race of plants possessing quite unsuspected powers of assimilation! Instead of rising from the ashes of the phœnix they feed upon its undecayed body, that is, upon the organic nitrogen of the soil. The Leguminosæ, for example, such as beans and clover, are known to assimilate more nitrogen from a given soil than the Gramineæ, such as wheat and barley, and this has been attributed to absorption by their leaves, or to the superior development of their roots. Another alternative is now suggested, and possibly a new departure may be taken in the science of agriculture, as the result of the recent discoveries in connection with fairy rings. HENRY EVERSHED

A CHEAP INSULATING SUPPORT

INSULATING-SUPPORTS are so indispensable in the work of an electric laboratory that several forms have come into extensive use. The plan devised by Sir W. Thomson for securing high insulation by surrounding a glass stem with concentrated sulphuric acid to absorb the moisture which otherwise would condense from the air and form a conducting film over the surface of the glass is remarkably efficient, and has many advantages. Modifications of this form of insulator have been largely used by Prof. Clifton, F.R.S., in the Clarendon Laboratory, and by Profs. Ayrton and Perry in the laboratories of the Technical College at Finsbury. Another modification due to M. Mascart, was described in NATURE, vol. xviii. p. 44; and this pattern has come into extensive use under the name of the *support isolant Mascart*. Though excellent in every way it is very expensive, as its manufacture necessitates a special piece of glass-blowing. The central support of glass is solidly fused into the bottom of a glass vessel with a very narrow neck into which acid is poured through a tubulure at the side.

The insulating support which I have recently described before the Physical Society of London is a much simpler affair, and can be made very quickly and cheaply from the materials at hand in every laboratory. The figure shows the form of the support. A wide-mouthed glass bottle, E, about 10 cm. high, and from 5 to 6 cm. diameter, is selected. A piece of stout glass tubing about 20 cm. long is then taken. One end is closed in the blowpipe flame, and blown into a thick bulb; and while yet hot the bulb is flattened, so as to form a foot for the stem. The flattened bulb should be as large as is compatible with its insertion into the mouth of the bottle. To hold it in its



place some paraffin wax is melted in the bottle—from 50 to 70 grm. is quite sufficient—and when it has cooled so as nearly to have become solid the stem, previously warmed, is inserted. When cool, the paraffin holds the stem firmly in its place. To keep out the dust a disk cut out of sheet guttapercha is fitted on as a lid. If dipped into hot water for a minute it can be moulded to the required form. It fits loose-tight upon the stem, as shown at C, and when the stand is not in use is slid down over the mouth of the bottle. A brass disk, A, having a short brass stem, B, below it, slips into the upper open end of the tube, and forms the top of the stand. It is also found convenient to make from rods of glass other supports, shaped at the top in the form of hooks, which can be slipped down into the central tube. These are very useful for holding up wires that pass over the experimenting table and require to be well insulated. The bottle is let into a wooden foot, G. In cases where very perfect insulation is required I have poured a little strong sulphuric acid into the bottle above the paraffin. In practice, however, the insulation of the paraffin is amply sufficient for most purposes, provided dust is properly excluded.

SILVANUS P. THOMPSON

JOHN HUTTON BALFOUR

IN Prof. Balfour, whose death we announced in our last issue (p. 365), has passed away another of that group of eminent teachers, including Goodsir, Syme,