

intervals of the twigs and smaller branches of these trees, and their content in starch was carefully tested and observed. The general result was that the ivy is a decided starch-tree, inasmuch as at no time during the winter was its wood found free of starch or anyway nearly so. No doubt, as compared with summer, there was a great diminution of this substance, many of the medullary ray cells being completely empty of granules, and moreover, e.g. on January 18, only about one-quarter of these cells were stored with starch, and even this gave a reddish-brown tinge to iodine, as if amyloextrin was intermixed therewith. As regards the holly, there could be no question that the amylaceous reservoirs of its wood had suffered a still more serious depletion. Nevertheless, they were never found completely void, a more or less considerable accumulation of starch granules being readily distinguishable along some portion of the medullary rays; the pith, too, was never empty (that of the ivy was found invariably depleted). It may be added that in both cases starch was completely absent from the bark during the winter months.

The overthrow by the boisterous gales of the departing year of a crab-apple that was perched aslant on a sharp ridge of rock afforded an opportunity for observation of the root appanage of this tree. The wood of the root contained a considerable amount of starch, but none was found in its bark. The alcoholic and aqueous extracts of the latter proved very rich in phloridzin, the reactions thereof being yielded with eminent distinctness and beauty, and the phloretin prepared from it indicated by its behaviour in alkaline solution with nitroprusside of sodium that it was a fatty aromatic ketone. Phloroglucin was detected in the wood, but none in the bark.

Whilst exercising on the hills on January 19, numerous faded and embrowned bracken fronds were seen which a week or so previously had been overlaid with a thick mantle of snow. The fronds of one of these were incinerated, and the crude ash was found to contain no less than 43.6 per cent. of silica, also 13.2 CaO and 0.8 phosphorus (or 1.8 P_2O_5). This enormous amount of silica is all the more remarkable, inasmuch as in August the ash of the fronds contains only about 9 per cent. of this constituent and that of the stem about 7 per cent.—the difference is doubtless to be attributed to the very considerable diminution of the soluble salts, and not of the lime, during the course of autumn. In this case, as in that of all calcifugous species, a strong proportion of lime in the young and vigorous frond would offer a serious obstacle to the presence of a considerable quantity of potash. Thus, on June 3 the amount of potash and soda in the ash is somewhere about 32 per cent., in August 27 per cent., and in late autumn about 2 or 3 per cent. The lime, on the other hand, fluctuates from about 6 to about 13 per cent. only, and thus while in a great many leaves the autumnal deficit is, so to speak, covered by lime, here in the case of the bracken it is refunded by a lavish plethora of silica. The general inference is that the frond, having been utilised as a support for the reproductive parts (sporangia), the strain thereby involved leads to a very advanced condition of decay, whence a tremendous drainage of silica towards the organ. Perhaps it is this very faculty of remaining decayed without disfigurement, encased in silica, that is one of the causes why abundant remains of ferns are found in the fossil state.

Patterdale, Westmorland.

P. Q. KEEGAN.

The Species Problem in Corals.

MAY I direct the attention of your readers to an exhaustive article, dealing specially with "species" among the reef-corals, by Prof. Döderlein in the current number of the *Zeitschrift für Morphologie und Anthropologie*? It is somewhat hard to find myself there blamed for continuing to use the word "species" in relation to a group in which it is totally inapplicable, for I laid the whole subject before the Linnean Society a year ago. I stated the difficulty and suggested a provisional alternative method of designating specimens. I carefully explained that I was proposing a method of view in order that we might discover the true species by gradual arrangement of the variations. In the autumn of the same year I made a brief statement at the International Congress of Zoologists in Berlin, but the report has not yet appeared; and again, later in the year, I read a paper before the Cambridge Philosophical Society. This has appeared in the last number of the *Proceedings* of that Society under the title "On the Unit of Classification for Systematic Biology."

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It will be noticed that while Prof. Döderlein discusses the general problem very fully, he makes no practical suggestion as to how to designate the different forms for reference. I, struggling with nearly a thousand foolscap pages (dealing with three genera) for the "Catalogue" of the Great National Collection of Corals at South Kensington, was compelled to invent some way of labelling them. But before finally adopting it, I sought the advice of many of the leading zoologists and botanists within reach.

HENRY M. BERNARD.

Clapham, S.W., March 21.

Sun Pillars.

ON January 19, 1901, during zero weather at Winnipeg, Manitoba, the fine icy particles which floated over the city as a cloud at 11 a.m. gave a halo round the sun with two mock suns to the right or left at the same altitude as the sun, and above the halo an inverted arc of about 120° showing prismatic colours. There was a good deal of wind at the time.

At night the wind dropped and the air became very still. The haze of icy particles descended, and in the middle of the night its illumination by the strong arc lamps of the city gave a column of light, comparable to a sun pillar, extending above each lamp to a height estimated at 300 feet. A striking feature of the phenomenon was the perspective effect, the columns diminishing in apparent height in such precise proportion to the increasing distances of the street lamps that it was evident the upper surface of the cloud of particles was truly horizontal. At this time the vertical columns of light were also visible below the lamps and extended to within a few feet of the ground. A few hours later, viz. at 4 a.m. January 20, the lower ends of the columns were more than 60 feet from the ground, and therefore far above the lamps.

They extended to a height of about 300 feet, as judged by the distance of the nearest lamp and my elevation above the ground, which was about 60 feet. A narrow rift extended horizontally through the cloud, breaking each column of light into two parts. The figure is re-drawn from a rough sketch made at this time of the columns above three, only, of the numerous arc lamps.

The slight haze of minute icy particles which is common in zero weather is, I believe, called *poudrette* in Eastern Canada.

VAUGHAN CORNISH.

Swarm of Velella.

ON a former occasion while sailing in the Mediterranean I have noticed the abundance of this beautiful Hydro medusa, usually known as the "Portuguese Man-of-War," sometimes distributed over the surface of the sea, but never in numbers such as have been stranded along the northern shores during the past few days.

When taking my usual morning bathe at Mentone on April 5, I plunged into a living mass of these Siphonophora, which extended many yards from the shore. It was about the same on the 6th, when I gathered a number and preserved them in formal (5 per cent. from the 40 per cent. solution). Since then the shore has been literally strewn with them, a very disagreeable odour being emitted. At Bordighera yesterday and here to-day, nearly fifty miles from Mentone, their dried remains strew the shore and appear to be well preserved, though, of course, minus their beautiful colour. We have had no strong south winds, and I cannot see how to account for so remarkable a shoal.

ISAAC C. THOMPSON.

Alassio, April 9.