

community to tolerate the company of such, which might be called social selection.

It is often assumed by writers on evolution that permanent differences in the methods in which a life-preserving function is performed are necessarily useful differences. That this is not so may be shown by an illustration drawn from the methods of language. The general usefulness of language is most apparent, and it is certain that some of the laws of linguistic development are determined by a principle which may be called "the survival of the fittest;" but it is equally certain that all the divergences which separate languages are not useful divergences. That one race of men should count by tens and another by twenties is not determined by differences in the environments of the races, or by any advantage derived from the difference in the methods. So easy recognition of other members of the species is of the highest importance for every species; but difference in "recognition marks" in portions of a species separated in different districts of the same environment is no advantage. Under the same conditions, habits of feeding may become divergent; but, since any new habit that may be found advantageous in one district would be of equal advantage in the other district, the divergence must be attributed to some initial difference in the two portions of the species.

I have recently observed that, of two closely allied species of flat-fish found on the coasts of Japan, one always has its eyes on the right side, and the other always on the left. As either arrangement would be equally useful in the environment of either species, the divergence cannot be considered advantageous.

Osaka, Japan.

JOHN T. GULICK.

Self-Colonization of the Coco-nut Palm.

THE question whether the coco-nut palm is capable of establishing itself on oceanic islands, or other shores for the matter of that, from seed cast ashore, was long doubted; and if the recent evidence collected by Prof. Moseley, Mr. H. O. Forbes, and Dr. Guppy, together with the general distribution of the palm, be not sufficient to convince the most sceptical person on this point, there is now absolutely incontrovertible evidence that it is capable of doing so, even under apparently very unfavourable conditions.

In the current volume of NATURE (p. 276) Captain Wharton describes the newly-raised Falcon Island in the Pacific; and in the last part of the Proceedings of the Royal Geographical Society, Mr. J. J. Lister gives an account of the natural history of the island. From this interesting contribution to the sources of insular floras we learn that he found two young coco-nut palms, not in a very flourishing condition, it is true; but they were there, and had evidently obtained a footing unaided by man. There were also a grass, a leguminous plant, and a young candle-nut (*Aleurites*), on this new volcanic island—a very good start under the circumstances, and suggestive of what might happen in the course of centuries.

W. BOTTING HEMSLEY.

On Certain Devonian Plants from Scotland.

I AM indebted to Mr. James Reid, of Allan House, Blairgowrie, Scotland, for the opportunity to examine a collection of fossil plants obtained by him from the Old Red Sandstone of Murthly and Blairgowrie in Perthshire, some of which have been noticed by Dr. Geikie in his "Text-book of Geology."

The collection is remarkable for the striking resemblance of the matrix and the contained vegetable debris to those of the lower part of the Gaspé sandstones of Logan, and the species of plants are, so far as can be determined, the same.¹

Psilophyton princeps largely predominates, as in Gaspé, and is represented by a profusion of fragments of stems and branches, and more rarely by specimens of the rhizoma and of the sporocarps. *P. robustius* is represented by fragments of stems, but is less abundant, and *Arthrostigma gracile* by some portions of stems. On the whole the assemblage is exactly those of the sandstone beds of the lower division of the Gaspé sandstones. There is nothing distinctively Upper Devonian in the collection.

The collection also contains two slabs of dark-coloured sandstone from Caithness, one of which contains what appears to be a fern stipe similar to those of the genus *Rhodea*. Another shows a remarkable plant having apparently a short stem giving

origin to a quantity of crowded leaves which are long, narrow, and parallel-sided, and show only a very faint linear striation. This plant is identical both in the form and arrangement of the leaves with that found in the Devonian of Canada, and which I have named *Cordaites angustifolia*. I have, however, already stated in my Reports on the Flora of the Erian of Canada (Geological Survey of Canada, 1871 and 1882), that I do not consider this plant as closely related to the true Cordaites, and that I have not changed the generic name merely because I am still in doubt as to the actual affinities of the plant. Mr. Reid's specimens would rather tend to the belief that it was, as I have already suggested in the reports above cited, a *Zostera*-like plant growing in tufts at the bottom of water.

Some of the sandstone slabs from Murthly contain specimens of rounded objects referable to *Fachytheca* (Hooker), a genus of uncertain affinities but characteristic of Silurian and Lower Devonian beds on both sides of the Atlantic. One of these is perfectly spherical with a shining surface, and 2.75 mm. in diameter, the others have been broken so as to show a central cavity or nucleus about 1 mm. in diameter, and with a thick carbonaceous wall partly pyritised and showing obscure radiating fibres. Prof. Penhallow, of McGill University, has kindly examined these, and has compared them with slices of *Pachytheca* from the Wenlock limestone, kindly communicated by Mr. Barber, of Cambridge, and with specimens presented by Prof. Hicks from the Silurian of Corwen and with specimens in the author's collection from the Silurian of Cape Bon Ami; and also with the excellent figures in Mr. Barber's paper in the *Annals of Botany*. He has not been able, however, to arrive at any conclusions beyond the probable general similarity in structure of the various forms, which may, however, as Mr. Barber suggests, have differed in their nature and origin. The only thing certain at present seems to be that these puzzling organisms had a thicker outer coat of radiating fibres, and of so great density that it was less liable to compression than the other vegetable tissues with which it is associated.

A few small specimens sent more recently by Mr. Reid contain some curious but not very intelligible objects from the same beds. One is a stem coiled at the end very closely in a circinate manner. In form it resembles the circinate vernation of *Psilophyton princeps*, but is much larger. It may belong to *P. robustius*, or possibly to a fern, but is too obscure for certain determination. Several others appear to represent flattened fruits or sporangia of obovate form and of large size. One has a stalk attached with what seems a rudiment of a bract, and another shows obscure indications of having contained round or disk-shaped bodies about 2 mm. in diameter. All show minute longitudinal striation. I have not previously met with bodies of this kind in the Devonian, and can only suggest that they may represent the fructification of some unknown plant, possibly that to which *Pachytheca* belonged.

J. WM. DAWSON.

Montreal, March 5.

Exact Thermometry.

I AM glad to observe that Prof. Sydney Young and myself are now in substantial agreement as regards the tension theory of the ascent of the zero in thermometers, and approximately in agreement as regards the actual cause of the ascent in the neighbourhood of the ordinary temperature.

Some time ago, in connection with an investigation of melting-point, I devoted three years to an examination of the properties of the mercurial thermometer. Among other conclusions which then seemed to me probable, the application of the known plasticity of glass under pressure to account for the enormous ascent (in lead-glass) of the zero at high temperatures appeared of some value. I have never advanced it as a mature theory, and am perfectly open to correction on the subject; but neither Prof. Crafts (with whom I at that time discussed the matter), nor any subsequent experimenter, has submitted the suggestion to a crucial examination.

Prof. Young's experiments (NATURE, March 27, p. 489) are very interesting as far as they go; but the kind of glass of which his thermometers are constructed is not that which brings out the peculiarities of the material in their most striking development. This, indeed, has long been known. It may well be that, in German soda-glass, the plasticity is masked by a preponderating tendency of the harder or more crystalline silicates of the bulb to set. Much could be done towards settling the question as to plasticity, if three thermometers of lead-glass—one vacuous,

¹ See papers by the author, Journal Geol. Society, London, 1859, and Proceedings Geol. Society, Edinburgh, 1877.