

LETTERS TO THE EDITOR.

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Introduction of a West Indian Frog into the Royal Gardens, Kew.

A SHORT time ago Mr. W. Watson, the Assistant-Curator of Kew Gardens, informed me that he had noticed for several years, in some of the hot-houses, specimens of a small frog, which, hiding away during the day among the pots and orchid-baskets, enlivened the quiet evenings with their shrill, whistling notes. Suspecting that this frog must be a foreign importation, I asked the Director to allow some of the specimens to be caught, and some days ago I had the pleasure of receiving three specimens in excellent condition.

The frog is *Hylodes martinicensis*, a small arboreal species, distributed over, and common in, many West Indian Islands (Martinique, Porto Rico, St. Vincent, Dominica, Barbadoes, &c., and possibly in Trinidad). Mr. Watson recollects that he observed it first some ten years ago, that he lost sight of it for some time, but that it reappeared about four or five years ago. Taking into consideration the few facts with which we are acquainted as to the reproduction of this frog, it seems most probable that several specimens of both sexes were, on more than one occasion, accidentally introduced in Wardean cases.

However that may be, it is evident that the frogs have freely propagated since their introduction. At present they are most numerous in the propagating houses, in which the temperature ranges between 80° and 100°, sinking in winter at times to nearly 50°. Accompanying Mr. Watson one evening, I heard from several points the call of the frogs, which somewhat resembled the piping of a nestling bird; and guided by the sound, I had soon the pleasure of seeing one of them clinging to the side of a glass-case.

There is nothing extraordinary in the accidental importation of individuals of a tropical species of frog into Europe; but it is an interesting experience, that the species should have permanently established itself. This is owing, in the first place, to the favourable conditions under which it found itself placed, and, secondly, to the peculiar mode of its propagation.

Hylodes martinicensis, and probably the majority of its congeners, does not spawn in water, but deposits from fifteen to thirty ova on leaves in damp places. After a fortnight the young frogs are hatched in a perfect form, having passed through the metamorphosis within the egg, thus escaping the vicissitudes and dangers to which they would have been exposed during the progress of the usual Batrachian metamorphosis.

This instance of the acclimatisation in Kew Gardens of the "Coqui" (as the frog is called in Porto Rico) is unique in Batrachian life at present. I trust that the little guest may long flourish where it has found such a congenial home, and where it usefully aids in the destruction of plant-eating insects and wood-lice, of which I found great numbers in the stomach of a specimen. If at a later period a nest with ova were discovered, Mr. Dyer would delight the heart of embryologists, to whom the opportunity of examining fresh ova of this frog would be most welcome.

ALBERT GÜNTHER.

Kew, October 20.

The Cause of an Ice Age.

It appears to me that the position taken up by Sir Robert Ball in his book, "The Cause of an Ice Age," is seriously misrepresented by Sir H. Howorth in one paragraph of the criticism which appears in NATURE of October 17. Sir H. Howorth says, that the fact of the invariability of the ratio of the heat received by our hemisphere in summer to that received in winter cannot be the cause of variability in climate; "if, as we are told in the book over and over again, this particular proportion (63 : 37) is the cause of the Ice age, we must be living in an Ice age now, and we must always have been living in an Ice age." Now it is nowhere asserted by Sir Robert Ball that the invariability or the magnitude of this ratio is the cause of an Ice age, but it is very clearly explained that he assumes the cause of an Ice age to be a particular range of positions of the line of equinoxes combined with a high value of the eccentricity of the earth's orbit,

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and that the fact that the above ratio is 63 : 37, and not unity, as appears to have been supposed to be the case, is relevant only so far as it inclines us to regard the changes of climate due to the causes just mentioned as much greater than we might otherwise have regarded them.

It seems obvious that a large value of the eccentricity contemporaneous with a favourable position of the line of equinoxes will correspond to some change in climate. Whether this cause is a dominant one, or even an important one, in its effect on climate, is of course an open question, and one upon which I express no opinion. Sir H. Howorth thinks that Sir Robert Ball has inadequately recognised the fact that the ratio of heat received in summer to that received in winter by one hemisphere has been calculated by Wiener. I find, however, on page 90 (second edition), the following reference to Wiener's work. "They depend on the mathematical calculation given for the first time, I believe, by Wiener in his work, "Zeitschrift der Oesterreichischen Gesellschaft für Meteorologie," vol. xiv., 1879, p. 129. . . . My chief object is to emphasise the relation of these calculations made by Wiener to the astronomical theory." Wiener's work is also mentioned in the preface.

On the general question as to the adequacy of Croll's theory, with or without the fact which Sir Robert Ball adduces solely with a view of strengthening that theory, I express no opinion; it seemed to me, however, that in fairness, some of the remarks made by Sir H. Howorth required refutation.

Christ's College, Cambridge.

E. W. HOBSON.

Green Oysters.

ONLY to-day I was able to read Prof. Lankester's letter (NATURE, May 9, 1895), and wish to reply briefly. My note in *Monitore Zoologico* was simply a preliminary communication; the proofs of my assertions will be given *in extenso* in a paper which will soon be published. My conclusions in that part which may interest the previous labours of Prof. Lankester may be briefly expressed as follows:—

(1) My observations have always been made on true *huitres de Marennes*.

(2) I believe that Prof. Lankester must have overlooked the recent works on the histology of Molluscs by Janssen, Rawitz and others, or he would have seen that his "gland cells" are the *becherzellen, cellulules caliciformes* of the authors quoted; which are inside the branchial epithelium, and not on its surface, and never can be considered wandering, nor can they have amoeboid movements. It would be strange, therefore, to consider such "gland cells" as similar to the amoebocytes of the blood!

(3) Prof. Lankester says that the "gland cells" contain green granules in the Marennes oysters, but this is entirely due to an optical illusion; if one examines a fresh piece of branchial lamella of the green *huitre de Marennes*, the "gland cells" appear green, but if these cells be separated from the epithelium, one finds that they are always colourless, and that they appeared green because they are surrounded with green matter. Making careful sections of the branchial lamellæ or the labial palps, one finds clearly: (a) that the gland cells are never green; (b) that the superficial epithelium is green; (c) that some amoebocytes and large masses included in the epithelium are also green. I am ready to furnish Prof. Lankester with microscopical preparations showing what I assert.

(4) The green of the Marennes oysters is not a hurtful substance which must be got rid of, and it is incorrect to imagine a defensive phagocytosis performed by amoebocytes. To me it is quite obvious that the green colouration is merely due to a true assimilation of nutritive substance which takes place through the agency of the epithelium in some portions of the intestine and in the branchial lamellæ. And no doubt it is the amoebocytes who carry the green substance, assimilated from the epithelium, to the liver. I am quite aware that these results of my researches are new, and it is for this reason that in communicating them to the *Monitore Zoologico* I noted that they are of some importance to our further knowledge of the physiology of mollusca.

(5) It is a mistake to believe that the oysters are green because they feed on *Navicula ostrearia*; the truth is that the alga is green for the same reason that the Marennes oysters are so, which is from the nature of the *parcs* and *claires* bottom. It is therefore the same substance, viz. the blue pigment "Marennin," which is found in both.

(6) The chemical part of my work is not concluded, and I