

Now all this egregious contrast between human society, as well as the flora, on the one side, *versus* the other, of Southern Africa (excepting some details dependent on the soil and the prevailing direction of the wind) are due to the Indian Ocean imparting to the air on the east coast an invisible, yet most potent quality which the Atlantic does not confer on the western coast. Could there then be found a more expressive emblazon, suitable to the present day, for a coat of arms for one of the flourishing new Governments on the eastern side of South Africa, than a wet, and dry, bulb hygrometer pictured with both bulbs marking 85° F., and with the surf of the Indian Ocean beating in the distance?

May 29

C. PIAZZI SMYTH

The Composition of the Edible Bird's-Nest

As I have been much interested in the controversy concerning the composition of the edible bird's-nest, and particularly in the bearing of Mr. Green's investigations, which are given at length in your last issue (p. 81), would you permit me to give the result of some observations I made on this subject in the Solomon Islands. It will be remembered that it was the association of these nests with a so-called "fungoid growth" in the caves of North Borneo that led Mr. Pryer to consider that he had found the source of the material of which the nests are made, a supposed discovery which led to the re-opening of the controversy (*NATURE*, vol. xxx. p. 271). This low plant-substance was determined by Mr. George Murray to be the result of the growth of a microscopic alga, a species, probably new, of *Glaucopsis* (*Proc. Zool. Soc.*, 1884, p. 532).

In the Solomon Islands I was only able to obtain the edible nest in one locality (Oima Atoll) since the bird usually frequents inaccessible sea-caves and cliffs. The nests were of inferior quality, and were for the most part composed of fibrous materials derived from the vegetable drift (the husks of pandanus seeds especially). The gelatinous substance thickly incrusts the interior of the nests, and attached them to the rock. The surface of a cliff in the vicinity of the cave frequented by the swifts was coated by a reddish gum-like growth, which proved on examination to be an aggregation of the cells of a protophytic alga about 1/2500 of an inch in size. Unfortunately my specimens of this growth have miscarried, but I feel assured that it is very similar to that observed by Mr. Pryer in the Borneo caves, samples of which, through the kindness of Mr. George Murray, I had the opportunity of seeing at the British Museum. A similar growth is commonly to be found coating the coral-limestone cliffs in this group. It may be seen in all stages, the older portions being dark-coloured and rather tough, and the fresher portions being, as Mr. Pryer aptly remarked, like half-melted gum tragacanth. There are but few cells in the fresh alga, the mass being apparently composed of cellular debris, immersed in a rather diffuent material, the whole somewhat resembling the third section given in Mr. Green's paper.

That the salivary glands are especially concerned in the production of the gelatinous nest-substance there can now be but little doubt, and the investigations of Mr. Green have established the nature of its composition; yet it is possible, and I make the suggestion with great diffidence, that a *vegetable mucin*, or a substance closely allied to this animal product, may be found in these low plant-growths.

H. B. GUPPY

95, Albert Street, N. W., May 29

"Arithmetic for Schools"

IN *NATURE* of May 20 (p. 51) there appears a criticism of my "Arithmetic for Schools," in which your reviewer states:—"In the purely arithmetical part of the book logical accuracy is attempted with considerable success. Want of grasp is much more evident in the part which deals with the applications. Then the division into subjects is strangely illogical, and slight inaccuracies of thought and language occur. Is it really the case, for example, that rate of interest (p. 181) is totally independent of time?" These are very serious charges to make against a book of the kind, and ought not to be made without very good reason. As your reviewer suggests the inferences (1) that the book is divided into parts, one of which contains the "pure arithmetic," and the other the "applied," and (2) that it is stated that *rate of interest is totally independent of time*, and as neither of these inferences has any foundation in fact, it seems only fair to myself

that your reviewer should be asked to quote *verbatim* the other slight inaccuracies on which he bases his general statement.

Gonville and Caius College, May 24

JOHN B. LOCK

SUNSPOTS AND PRICES OF INDIAN FOOD-GRAINS

IN the volume of the *Bombay Gazetteer* which deals with the province of Kathiawar, there is at page 217 a long list of prices of the principal food-grains at Bhavnagar. The list contains, along with other information, the price of Indian millet for nearly every year from 1783 to 1882. This series of figures is long enough to afford the means of testing whether there is any tendency, in India, for times of scarcity, and consequent dearness of food, to recur after more or less regular intervals of years.

Ever since the discovery by Schwabe of the periodicity of the sunspots, and the further discovery by Sabine of the same periodicity in the variations of the earth's magnetism, there has been a growing belief in the minds of scientific men that the varying condition of the sun exerts a far greater influence on terrestrial affairs than is usually thought at all probable, and various investigators have traced, with more or less definiteness, a periodicity of eleven years—coinciding with that of the sunspots—in the variations of the rainfall, in those of the temperature and pressure of the atmosphere, and in the frequency of storms, &c. The late Prof. Stanley Jevons went so far as to express the opinion that even trade depressions are the remote effects of corresponding variations in the condition of the sun.

I am not aware that any attempt has hitherto been made to trace out any direct connection between the variations of prices in India and solar phenomena. The apparent hopelessness of the task has probably acted as a sufficient deterrent, for although it may be reasonable to suppose that solar variations influence the rainfall and other purely physical phenomena, yet it is well known that there are many causes of variation of price which cannot, with any show of reason, be attributed directly to the sun. Such, for instance, are wars, the gradual increase of the population, variations in the quantity of money in use, changes in the total volume of trade, &c. These circumstances complicate the problem very much, but it does not necessarily follow that it is hopeless to attempt to trace the possible influence of solar periodicity on the prices; for there are statistical methods by which most of the disturbing influences can be approximately, if not entirely, eliminated. Indeed, when these methods of elimination have been applied, it may be found that the solar periodicity is more decidedly traceable in the prices than in the rainfall: for, in the one case, the produce of every field exercises its due share of influence in determining the price; while, in the other case, the quantity of rain actually measured is but an infinitesimal portion of the whole quantity which falls, and may therefore very imperfectly represent the total rainfall over the whole of a district.

In considering a price in relation to the causes of variation to which it is subject, it may be thought of as divided into portions, each portion being assigned to its own particular cause. What is wanted here is to separate as distinctly as possible that portion which may be due to the variation of the influence of the sun from all the rest. But before any satisfactory attempt can be made to distinguish that portion of the price variation which may be due to variation of solar influence from the portion due to the average amount of solar influence and to other causes, it is necessary to adopt some standard of comparison which may reasonably be supposed free from solar effects of a periodically variable nature. Now as the physical state of the sun is known to go through a complete cycle of changes in a period of almost exactly eleven years, the average price for any consecutive eleven years