found in either of them. The largest medical specialist library in England, that of the Medical and Chirurgical Society, cannot claim to be more than half the size of the Washington Library, or to contain many books that are not to be found elsewhere; and it does not grow with all the rapidity of the New World.

For some time probably all seekers after the most difficult and most complete medical knowledge will have to turn to this "Index Catalogue," and will trust that Mr. Billings may be able to go on year after year putting forth his modest quarto of 1000 pages, until six or seven years may see him at the end of his great work.

A. T. MYERS

OUR BOOK SHELF

Mémoires de la Société des Sciences Physiques et Naturelles de Bordeaux. 3e série, tome i. (Paris: Gauthier-Villars, 1885.)

WE have frequently had occasion to direct our readers' attention to the high-class memoirs which this energetic Society puts forth. The volume before us is one of a kind that we should like to see brought out by our own scientific Societies. Under the title "Niels-Henrik Abel, sa vie et son action scientifique," it contains a full and most valuable sketch, by Prof. C. A. Bjerknes, of Christiania, of the writings and life of one of the ablest and acutest mathematicians of modern times. That the account is a full one will be evident when we say that the work occupies 365 octavo pages: it is a translation in French from the original memoir, and is further enriched by a considerable appendix. The labour of seeing the present form of the work through the press has principally fallen upon M. Hoüel, to whom the author warmly expresses his thanks. Abel was born at Findö, Christiansand, on August 5, 1802, and died near Arendal on April 6, 1829, and was interred at Froland.

The main body of the work consists of fifteen chapters, and the appendix occupies thirteen chapters more. His works, originally edited by M. Holmboe, the professor under whom he studied, were published in 1839, and quite recently a new edition was referred to in these columns. We give two or three extracts which show the appreciation of his powers amongst his contemporaries, an appreciation which has rather increased than decreased since his death. Jacobi writes of a *deduction* Abel had drawn as being "elle est au-dessus de mes éloges, comme elle est au-dessus de mes travaux." Legendre says, "il me tarde beaucoup de voir les méthodes qui vous ont conduit à de si beaux résultats; je ne sais si je pourrais les comprendre, mais ce qu'il y a de sûr, c'est que je n'ai aucune idée des moyens que vous avez pu employer pour vaincre de pareilles difficultés. Quelle tête que celle d'un jeune Norvégien!" Gauss expresses similar views, and on hearing of Abel's death, wishes for particulars of the life "de cette tête éminemment distinguée." We could easily add other extracts from Prof. Bjerknes' admirable record of the distinguished Norwegian's life, which is a fitting companion to the before-cited edition of "the works," but forbear. Should any desire, with Gauss, to have his portrait, they will see here in the frontispiece the well-known, to some of us, lineaments.

Solid Geometry. By Percival Frost, D.Sc., F.R.S. Third Edition. (London: Macmillan and Co., 1886.)

It would have been superfluous to recommend the third edition of Dr. Frost's "Solid Geometry," even if the third edition had been merely a reprint of the second. The book has now taken its position alongside the very best mathematical treatises in use, and requires "no bush." What we have got to do with, however, is no

mere reprint: there is once again presented to us a notable increase of matter—much more than a cursory glance is likely to detect—and there has been considerable improvement generally. One change, greatly to the student's advantage, is the careful graduation of the problems at the end of each chapter, and the separation of them into groups. There is still a lack of references to original memoirs, and though, apparently, the author is conscious of it, he needs reminding that it is not sufficient merely to say that this or that is due to Cayley, Chasles, or any one else. Such incomplete statements serve only to give discoverers their dues; they do not assist the advanced and inquiring student.

We have pleasure in learning that an Appendix is about to be issued giving hints for the solution of the problems, but the pleasure is far more than counterbalanced by observing that the title-page bears no longer the words "Vol. I.," the inference being that Dr. Frost has followed the sad example of Thomson and Tait. There is no dearth of men willing and on the whole able enough to write mathematical text-books for beginners: those who could produce a volume to follow Frost's "Solid Geometry" are rare as white crows. When found—by press delegates—they should not only be made a note of, but coerced.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

Flora of South Africa

NO one, who ever spent much of the impressionable period of his youth at the Cape, that land of lowly plants with exquisite flowers,—but will be vividly interested in the masterly description of those plants' geographical regions of habitat, as given by Mr. Bolus, per your reviewer, "J. D. H.," on pp. 77-79 of your last week's issue.

But what can either one, or other, of those gentlemen mean by saying of "the Natal region" that it is "bounded on the east and south-east by the Atlantic"?

By the Indian Ocean if you like; and then you have a ready means of conveyance for those "Indian types of plants, both in genera and species" which the above-quoted authors say do abound along that eastern coast of South Africa,—but which the Atlantic could never have brought to it.

There is, however, a further local difference in the qualities of the two oceans, of such overwhelming importance to all vegetation, that I wonder no mention appears of it in a Cape botanical essay.

The Natal coast, for instance, on the east, is washed by a warm current from the equator, giving out so much steamy moisture that not only, as your article truly states, are there "the herbage- and bush- and tree-foliage greener, and the leafage larger" than elsewhere; but there, in that region of luxuriously fed, densely growing plants, does game abound; there do Kaffir tribes congregate and establish their kraals; and thereto do Dutch Boers emigrate out of the old, dried-up, southern colony, and found new republics; while therein have we also, every few years, to wage successive wars either with them, or with Zulus or Amakosi tribes of various power, until British lives have been sacrificed by thousands, and British money expended by millions.

But the west coast of South Africa, bless it, being washed by a cold current from the Atlantic coming from Antarctic seas, and giving out little or no vapour, even under a nearly vertical sun,—can hardly but be, even just as it is, an arid desert, where only a few starving Boschjesmen wander miserably up and down, existing perhaps on an occasional antelope, or roasted ants and stray locusts; and no one fights there for permanent possession of the ground.

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?

C. PIAZZI SMYTH

May 29

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 *Glaucapsa* (*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 incrusting 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 diffident 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