and Himyaritic civilizations once adjoined one another, and that their overthrow marked the triumph of the Beduin children of Ishmael. Since Mr. Doughty's travels, Prof. Euting and M. Huber (who was afterwards murdered by the Hharb Arabs) have visited Medain Salihh and Teyma, and carried away with them a large number of valuable inscriptions. One of these, on a stèle discovered at Teyma, is now in Paris.

It is interesting to find Mr. Doughty confirming the statement that the final *n* of classical Arabic is still pronounced in the Nejd. His remarks on the diseases prevalent among the natives are also curious, though it is difficult to believe that the ophthalmia from which he had himself suffered is due to drinking cold water before going to bed. Everyone, however, who has had much experience of the Beduin will agree with the character he gives of them. The Egyptians have a proverb: "He who shows a Beduin the way to his door will have long sorrow"; and the traveller is unfortunate who is compelled to intrust himself to their tender mercies.

A. H. S.

OUR BOOK SHELF.

Charts showing the Mean Barometrical Pressure over the Atlantic, Indian, and Pacific Oceans. (London: Published by the Authority of the Meteorological Council, 1888.)

THESE charts are issued in the form of an atlas, and deal in a very complete manner with the barometer means and range of all oceans. The months for which separate charts are given are February, May, August, and November, which have been selected to represent the mean values for winter, spring, summer, and autumn respectively in either hemisphere. In addition to the large charts, which give the material in considerable detail, there are four index charts, on a smaller scale, which exhibit for the same months the isobars, or lines of equal pressure, over the entire globe. These are followed by four charts, on the same scale, showing the range of barometrical pressure. The observations have been derived from logs and documents deposited in the Meteorological Office; logs and remark-books of Her Majesty's ships, furnished by the Admiralty; published narratives of various voyages, and various published results of other nations; also observations at coast stations and islands obtained from all available sources. The number of observations obtained from the Meteorological Office logs for these several oceans are: the Atlantic Ocean, 339,300; the Indian Ocean, 162,000; the Pacific, 88,300.

The barometrical means are given in large figures for areas of 5° of latitude by 5° of longitude, and for the benefit of those who require the material in greater detail smaller figures are given to show the means for areas of 2° of latitude by 2° of longitude, the several means being obtained from the daily averages. The range to the nearest tenth of an inch for each 5° area is placed over the mean for that area, and the number of observations under it; so that the charts not only supply the navigator with all the detail he is likely to require, but afford opportunity of the values being combined by other compilers with material of a similar nature. The isobars are given for each tenth of an inch, and the free use which has been made of the barometrical values for the coast stations greatly enhances the degree of dependence of the several lines. To facilitate the use of the charts for the navigator, the observations are corrected for a constant altitude of 11 feet above the sea, and are reduced to 32° F., but are not corrected for gravity; a table is, however, given on the face of each chart to facilitate this correction.

The general charts which give the isobars of the globe show very conspicuously the prevalence of high-pressure areas in each ocean in each of the four seasons. Change is of course shown in the distribution of pressure, but there is the same tendency to the persistency of high reading. It is seen that these areas oscillate and alter somewhat in intensity with the season, but there are many characteristics in common. The northern Indian Ocean, which is much more surrounded by land, is, however, an exception, the high pressure being situated over the northern part of the ocean, in November and February, and decreasing southwards; whilst in May and August the pressure is lowest in the north and increases southwards, this change being intimately related to the monsoon winds. The charts of range show well the influence of season, the largest differences occurring in the winter months in each hemisphere. In February the range to the west of the British Islands is 2.0 inches, whereas in August it is only one-half as great. The effect of latitude on the amount of range is very evident, the values near the equator being very small. These charts, which have been compiled by Nav.-Lieut. Baillie, R.N., are considerably in advance of any previous work of a similar nature, and will materially aid in explaining the general circulation of the wind over the globe, barometric pressure and wind being so intimately co-related.

Commercial Mathematics. (London: Longmans, Green, and Co., 1888.)

THIS volume is the continuation of a series of books on commercial education, and specially adapted for candidates preparing for the Oxford and Cambridge Schools Examination Board. Arithmetic is first dealt with, the first chapter consisting of an account of the decimal system in France. Moneys, weights, and measures, of Germany, Italy, Spain, Portugal, and Russia, are next discussed, followed by numerous examples; and the first part concludes with a chapter on "Exchange." Algebra is the subject of Part II, which extends as far as quadratic equations, including involution and evolution, and a chapter on the methods of testing algebraical results. The examples are very numerous throughout, and the book ought to be much in demand by the above-mentioned students and others. The volume concludes with a list of results of the various examples.

A Wanderer's Notes. By W. Beatty-Kingston. In Two Vols. (London: Chapman and Hall, 1888.)

FOR about thirteen years Mr. Beatty-Kingston acted as a newspaper correspondent, and in this capacity he had to visit many centres of life on the Continent. In the present volumes he offers a selection from the innumerable pen-and-ink sketches taken during his "multifarious peregrinations." The work, we need scarcely say, has no strictly scientific interest; but it is fresh and amusing, and will no doubt give pleasure to many a reader who has never had an opportunity of seeing the places described in its lively pages. The author is particularly successful in the chapters devoted to Germany, where he seems to have had exceptional means of making himself acquainted with the characteristics of the various classes of the community.

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 intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

The "Sky-coloured Clouds" again.

THESE clouds have reappeared. Last night was the first occasion I have noticed any very distinct display of them

this year; but I first saw them on June 12, and again on the 14th; and I think I saw them on June 13 and 17, but was not sure. Previous to that, on May 15 and 16, the green sky, when the sun had set, was of unusual brightness, showing, as I thought, a tendency to the formation of these clouds. Each summer they appear to be growing fainter since they were first generally noticed in 1885.

This year's observations were made in Cornwall, with the exception of last night's, which was at Sunderland.

Sunderland, June 26.

T. W. BACKHOUSE.

Earth Pillars in Miniature.

I HAVE taken two photographs of an interesting specimen I obtained from the cliffs here. The stone is composed of very fragile sand-rock containing fragments of flint. A large mass of this became detached from the higher part of the cliff, and some of the pieces chanced to fall on a ledge upon which dry sand was constantly pouring in windy weather. The action of this falling sand wore away all parts of the surface of the stone save those protected by the small embedded fragments of flint, and hence the formation of these miniature pillars.

Owing to the extreme incoherency of the substance, I unfortunately lost one of the most perfect pillars before the photograph was taken.

I conclude that the formation of these pillars was the work of a very few days—perhaps hours. On visiting the spot a few days later, all traces of sand-action had been obliterated by rain. An analogous case was that described by Mr. Blake ("Geol. Miscell. Tracts," 10) as occurring in the Pass of San Bernardino, California; the surface of the granite had been worn by blown sand, but the garnets therein stood out in relief upon long pedicles of feldspar, as a proof of their superior hardness.

CECIL CARUS-WILSON.

Bournemouth, June 23.

Egg-masses on *Hydrobia ulva*.

CAN any of your readers give me information in regard to the eggs of the Gastropod *Hydrobia ulva*?

At a recent excursion of the Biological Society to Hilbre Island, while crossing the great stretch of wet sand which lies in the estuary of the Dee, it was noticed that the surface was covered in some places with vast numbers of *Hydrobia*. Some of these were brought back to the laboratory in their wet sand; and, on being put in a dish of sea-water, the mollusks were found next day to have crawled out of the sand, and I then noticed that nearly every specimen had several little rounded excrescences scattered over the surface of its shell. On examining these, it was found that each was a little mass of small sand grains, in the centre of which was a clear jelly containing several segmenting ova or young embryos. They were undoubtedly molluscan eggs, as I kept them alive until one or two had reached a veliger stage; but did they belong to the *Hydrobia* or to some other mollusk? No other mollusk was, however, noticed in any abundance in the neighbourhood. Has, then, the *Hydrobia* acquired the habit of laying its eggs upon its neighbours' shells, as being the only comparatively stable objects to be found in the fine shifting sands around it? Possibly the method of oviposition of *Hydrobia* is already known, but I have not come across any reference to it.

W. A. HERDMAN.

Zoological Laboratory, University College, Liverpool,
June 23.

Interpretation of the Differential Equation to a Conic.

MAY I ask, with reference to Mr. Asutosh Mukhopadhyay's geometrical interpretation of the above in NATURE of the 21st inst., how to draw a curve at every point of which the radius of curvature vanishes, or the curvature is infinite?

Is it not evident that the osculating conic of a conic is the conic itself, and the "aberrancy curve" therefore a point, the centre of the conic?

The "sought found," then, is the fact that a conic is a conic!
June 24.

R. B. H.

The Nephridia of Earthworms.

THE last number of the *Quarterly Journal of Microscopical Science* has just come into my hands, containing a paper, by Mr.

Beddard, on the nephridia of certain earthworms. In November of last year I read a paper, before the Royal Society of Victoria, on the anatomy of the large Gippsland earthworm, *Megascolides australis*. This, which reaches the length of 6 to 8 feet, is, I believe, the largest recorded earthworm, and its nephridial system is of great interest, corresponding closely in many points to that described by Mr. Beddard, in the above paper, as present in *Acanthodrilus multiporus* and *Perichæta aspergillum*. My drawings have been for some time in the lithographers' hands, but as it will still be one or two months before the full paper is published, I should be glad to draw attention to the, in some ways, still more interesting features of the nephridial system in *Megascolides australis*. The nephridia are very evident, and can be divided clearly into two sets.

(1) A great number of small vascular-looking little tufts lining the body-wall, save in the mid-dorsal and ventral lines, especially abundant in the segments containing the reproductive organs (segments 11-19). They have no internal opening.

(2) A series of much larger nephridia, one pair of which only is present in each of the segments in the middle and posterior regions of the body—that is, from about segment 120 to segment 500, or whatever may be the number of the last segment, which varies according to the worm's size. They are placed in the anterior part of each segment, whilst the smaller nephridia form a ring round the body-wall posteriorly. Each one has the usual ciliated funnel opening through the septum into the segment in front.

Throughout the body, where the smaller nephridia occur, there is a network of intra-cellular ducts lying immediately beneath the peritoneal epithelium in connection with the nephridia, and giving off an irregularly arranged series of branched ducts opening externally. Ventrally, also, there appears to be on either side, in the middle and posterior portions of the body, a longitudinal duct running from segment to segment within the most ventral pair of setæ: into this duct open, first, the larger nephridia, and, secondly, the most ventrally placed small nephridia of the same segment; the latter, again, are united with the network of ducts connected with the ring of smaller nephridia.

In the case of the latter there appear to be two somewhat differently formed sets of external openings. All over the body, except in the clitellar region, where there is a great glandular development in the body-wall, the duct leading to the exterior is intercellular, small, and composed of minute cubical cells; in the clitellar region, on the other hand, the duct, though similarly intercellular, is much swollen out, slightly coiled, and always provided with a distinct coiled blood-vessel running by its side: its lining cells form a flattened epithelium.

The external opening itself is formed of cells of the epidermis, so modified as to present very much the external appearance of a taste-bulb—that is, they form a sphere with the cells thicker in their middle parts, and the two ends attached to the poles of the sphere, the duct passing right up through the centre. This structure of the external opening is common to all the ducts in the body, but is more clearly made out in the case of those referred to.

The large size and ciliated funnels of the paired nephridia distinguish these clearly from the more numerous smaller ones, which are devoid of internal openings, and are without a doubt homologous with those of *Acanthodrilus* and *Perichæta*. At the same time it is important to note that histologically the network of ducts and the longitudinal duct, which are intimately connected with each other, are precisely similar in structure, and, *a priori*, might be expected to have a similar origin, *i.e.* to be derived from the same germinal layer.

Leaving out of consideration at present the question dealt with by Mr. Beddard and others as to the homology of the larval nephridia of Chætopods, and assuming the existence of a genetic relationship between the adult nephridial system of Platyhelminths and Chætopods, the following questions suggest themselves with regard to the various nephridial structures present in different forms:—

(1) Are the longitudinal ducts in *Lanice*, the embryo of *Lumbricus* and *Megascolides*, homologous with each other? Before this can be determined the development of each must be known.

(2) Granted, of which there can be little doubt, that the smaller nephridia of *Megascolides* are homologous with the nephridia of *Perichæta* and *Acanthodrilus*, are not the large nephridia of the former, which are completely wanting in both