no power whatever to enforce the laws it might make, and could not be expected to put an end to discussion on these points. The knot must be untied, not cut.

2nd. That the binomial system of nomenclature should not be arbitrarily considered to have commenced at any given date; but that recognisable names in all works in which this system is methodically employed should be used according to the rule of priority.

3rd. That it is not necessary to suppress a generic name in zoology because it has been previously used in botany (or *vice versa*); but that it is much to be regretted that any generic name should thus be in double use, and it should always be made matter of reproach to an author that he has committed an act of this nature.

4th. That names must be Latin to the extent that renders them capable of being written or used in scientific Latin; but that classical emendations beyond this are entirely inadmissible; no line except this can be drawn between emendation, alteration, and total suppression. The laws of classical languages have, *per se*, no more right over scientific nomenclature than has the Hindoo language. As regards the much talked-of "Amphionycha knownothing," it should be latinised in the simplest manner, as *Amphionycha knownothinga;* and I would further suggest that its barbarian author be well hissed whenever he ventures to show his face in a scientific assembly.

5th. That as regards placing an author's name after a species, the name so placed should always be that of the first describer of the species; not because he has any right in the matter, but as an additional means of certainty, and as a security against change.

6th. That the specific name is the name of an object, and therefore a noun, and should be changed in gender, or any other manner, when removed from one genus to another.

7th. That it is very undesirable to use the same specific name in two closely-allied genera; but that where this has been done already no alteration should be made till the two names actually come into collision on account of the two genera being united as one genus. Surely to act otherwise is like cutting one's throat for fear somebody else should do it.

8th. That as regards placing an author's name after a genus, the name so placed should be that of the author who established the genus in the sense in which it is actually used. *Carabus* of Linnæus included all the insects now comprised in the family *Carabidæ*, at present divided into several hundreds of genera. To write, therefore, *Carabus* Linn., when we mean something entirely different, may be usual but is not desirable.

I may add, that I consider it useless to expect a perfectly stable zoological nomenclature, until zoology itself is complete and perfect; but that in order to reduce changes to a minimum, classical and other secondary claims must not be allowed any great importance.

D. SHARP

Thornhill, Dumfriesshir

Deep-Sea Soundings

IN reference to the very interesting article in NATURE for February 22, "American Deep-Sea Soundings," may I be permitted to make the following remarks:—It is there stated that the water-collecting cylinder is apt to lead to incorrect conclusions in regard to the gaseous ingredients of sea water obtained by its means from great depths, owing to the escape of a portion of the gases when the pressure is relieved by the cylinder being drawn to the surface. As a member of the *Porcupine* expeditions of 1869 and 1870, I had nearly eight weeks' constant daily experience in the examination of samples of abyssal water thus obtained, and I believe that I was the first to adapt the gas analysis apparatus of the late Prof. W. A. Miller to the exigencies of a laboratory on board ship. The general result of these experiments for 1869 will be found as an appendix in No. 121 of the Proceedings of the Royal Society. My object in writing now is to point out that if there were such an escape of gaseous ingredients as is indicated above, the abyssal water would be so saturated with them at the ordinary atmospheric pressure (*i.e.* after the sample was removed from the water cylinder in the laboratory), that the least elevation of temperature would be sufficient to cause a further quantity to be given off. This, however, never was the case, since I invariably noticed that there was no appearance of bubbles of gas, until the water had been heated above 120° Fahr., and frequently still hotter. I may add that the only samples of water which appeared saturated with gaseous ingredients were those taken at the surface, afte several hours of strong wind. I must confess that after giving a good deal of thought to the subject, and conversing with friends whose knowledge of physics is far greater than mine, who agree with my view of the matter, I am unable to see any reason why we should expect to find any greater quantity of gaseous ingredients in abyssal than in surface water. No doubt, if the excess were there the enormous pressure would retain it, but where is the source of the supply of the supposed excess? I have never seen a satisfactory answer to this question. The solvent is exposed to excessive pressure, but the gases to be dissolved in it are not, unless there is any evolution of gas at those depths. It is probable that this abyssal water was at some point in its circulation near the surface, when an interchange would take place between some of its dissolved carbonic acid and the oxygen of the atmosphere. And it appears to me that it is only when the particles of sea water are near the surface, and exposed to no excess of pressure, that they dissolve their gaseous ingredients, which are afterwards modified in their composition by the animal life on the sea bottom. WILLIAM LANT CARPENTER

Clifton, Bristol, February 26

Snow at the Mouth of a Fiery Furnace

IT would be interesting to ascertain the temperature of the saltatory drops noticed by Mr. H. W. Preece. Sudden and excessive evaporation may have produced actual congelation.

HENRY H. HIGGINS

ON THE SPECTRUM OF THE ATMOSPHERE

DURING the voyage out to India of the Eclipse Expedition, I took every opportunity of observing carefully the spectrum given at sunrise, compared with that at sun-high, and obtained the following results, which, though poor in themselves, will show the wide field open for further research.

When leaving England, and for some way into the Mediterranean, the length of the spectrum as seen at sunrise extended generally from about B in the red to near G in the violet. Great differences were, however, presented in the absorption-lines according to the state of the weather, or perhaps rather according to the state of the sky when the sun rose.

If the sun rose among yellow tinted clouds, the absorption bands about B, C, between C and D, and near D, were exceedingly well defined; at the same time the blue end did not extend so far as usual, showing that there was more absorption of the blue, while probably the greater quantity of aqueous vapour in the air reflected the red and yellow rays. In these cases the tint of the clouds generally changed to a rosy red shortly after sunrise.

A clear sunrise, on the contrary, showed an extension of the violet end, whilst the aqueous bands at B, C, and D were less defined, as if the red and yellow light were not so strong to show them out by contrast.

On passing through the Suez Canal and down the Red Sea the spectrum was shortened at both ends, leaving from little beyond C to a third from F to G; this would seem to show a general absorption going on in the atmosphere from some cause, probably light dust in the air. This idea is strengthened by the beautiful purple colour of the distant mountains, as if, though the violet rays were greatly absorbed, the red rays were so to a less degree, whilst the want of aqueous vapour allowed nearly all the yellow rays to be transmitted.

When clear of the Red Sea in the Indian Ocean, the blue became greatly reduced, and the red end extended to A; the aqueous bands were very strong indeed, so much so that on two mornings D_1 and D_2 could hardly

be distinguished amid the black mass that surrounded them; the lines near C and C' or γ of Brewster were sharp and clear.

On nearing India another change took place; the blue continued to be absorbed, till at sunrise the spectrum could hardly be seen beyond F, but the blue green became very bright, and the dark bands between *b* and F very distinct, the lines commencing at 1825 Kirchhoff especially attracted notice, standing out sharp and distinct, so as at first to be mistaken for F: those nearer F at 1890 K showed as a clear broad band, but not nearly so black as 1825. I am not prepared to give an explanation of this phenomenon, but will remark that when the sun rose clear and free from clouds the aqueous bands to D were less distinct, while the atmospheric bands from D to E were clear and sharp, and those beyond *b* remarkably so. But if the sun rose among clouds, these were generally tinted with a golden yellow, changing afterwards to a rose or red colour, and, as might be expected, the lines from B to D and just beyond D_1 were well defined, whilst from E to near F the spectrum was not so clear.

After this the duties of preparing the instruments for the eclipse prevented my taking any observations, as most of our work was done in the early morning. But after the eclipse, whilst on the Neilgherry Hills, 6,000 feet above the sea, I had an opportunity of finding that the strong line at 1825 had nearly faded away. The weather was then fine, but misty. A few days after, on going down the Ghauts to Bombay, I was struck with the blue colour of the mist that was hanging about the valleys, and I examined it with the spectroscope; the blue extended much farther than usual, and the lines between *b* and F were again distinct.

On the passage home the same results were obtained as on going out; but as I had a much smaller spectroscope I could not make the observations with the same accuracy as before. When passing up the Red Sea the absorption was evident at both ends of the spectrum, and the mountains were of the same beautiful purple colour that I had noticed before.

From Alexandria to Southampton we had very bad weather, constant gales, making it difficult to observe. But I got the following results: With a cloudy sky at sunrise, and appearance of wet weather, the bands from B to beyond D (δ of Brewster) were strong, whilst the blue end of the spectrum was greatly absorbed, and the lines from *b* to F were less distinct; this was reversed with clear weather. As we gained higher latitudes, the blue end of the spectrum lengthened out, and the bands beyond F, particularly about 2330 K, became distinct, while the bands 1825 K and 1890 K gradually faded, and now their intensity is not one-fourth of what I observed it in the Indian Ocean.

These observations are very imperfect, but I hope, if I can get the instruments, to carry out a more perfect system of observation, feeling sure that it is a subject worthy of great consideration in meteorology, especially when taken in connection with the temperature and pressure of the atmosphere and the state of the weather.

Shanklin, Feb. 5 J. P. MACLEAR

PROF. AGASSIZ'S EXPEDITION

IT is probable that I may have been anticipated, as regards part of the present communication. If not, I believe that many of your readers will be glad to learn the objects with which Prof. Agassiz has started, with Count Pourtales and a distinguished band of skilled observers, on a scientific expedition in the United States' surveying ship *Hassler*, and to receive a brief account of what he has already done at St. Thomas and Barbados, at which places he was obliged to touch, in consequence of defects in the vessel or her machinery.

The Professor's chief objects are stated in a letter from himself to Prof. Peirce, the Superintendent of the U.S. Coast Survey. (See NATURE, vol. V., p. 194.)

The Expedition was detained some days at St. Thomas, and the time of the Professor and his assistants was devoted chiefly to the collection and preparation of fishes, with a view to the study of the brain, and the breathing and digestive organs. Several boxes full, preserved in alcohol, were at once shipped to the United States, as the first-fruits of the Expedition.

The party arrived at Barbados on December 26, and spent four days there. The first two were devoted by the Professor to examining and studying the large collection of West Indian shells, marine and terrestrial, of corals, sponges, crustacea, and semi-fossil shells of the island, made by the Governor, Mr. Rawson. Of the marine series he wrote in the following terms to Mr. J. G. Anthony, the Curator of the Harvard Museum:—"I am having high carnival. I have found here what I did not expect to find anywhere in the world—a collection of shells in which the young are put up with as much care as the adult, and extensive series of specimens show the whole range of changes of the species, from the formation of the nucleus to the adult." He was particularly struck with the now unique specimen of *Holopus*, lately procured by Mr. Rawson, which was described by Dr. J. E. Gray in the December number of the "Annals of Natural History," and named by him, from a drawing, *H. Rawsoni*, but which Agassiz, who had seen the specimen of D'Orbigny in Paris, before it disappeared, considers to be a normal specimen of *H. Ranzii*, which had only four, instead of five arms. Count Pourtales recognised among the corals several similar to those which he had obtained by dredging in or near the Gulf Stream, and described in the latest No. (4) of the "Illustrated Catalogue of the Museum of Comparative Zoology at Harvard College," the presence of which on the coast of Barbados serves to indicate the close similarity of submarine life in those two distant localities.

The next two days, or rather the night of the next, and the greater part of the following day, were spent in dredging in the neighbourhood, in a depth of 60 to 120 fathoms, about a mile from the shore, whence Mr. Rawson has procured his fine specimens of *Pentacrinus Müller*i. The *Holopus* was found on the opposite side of the island. The results were beyond the expectations, or even the hopes, of the most sanguine of the party. Only dead fragments of the *Pentacrinus* were obtained, but among the abundant spoils were four specimens of a new genus of Crinoid, without arms on the stem, (like *Rhizocrinus?*) which remained alive, with the arms in motion, until noon on the following day, under the excited observation of the party. A number of deep-sea corals, alive, crustacea, sea urchins of new species, star fish, sponges, crystalline, jurassic, and corallines, &c., and a rich harvest of shells, were obtained. Among these was a splendid live specimen of *Pleurotomaria Quoyana*, F and B, of which genus Chenu writes that only one living species, and of that only one specimen, is known. The animal exhibited remarkable affinities, and the artist accompanying the expedition was able to take several sketches of it. A large *Oniscia*, shaped like *O. cancellata* Sow. but with an orange inner lip (*O. Dennisoni?*), some specimens of *Phorus Indicus* Gmel., a magnificent new species of *Latiaxis*, with many exquisite specimens of *Pleurotoma*, *Fusus*, *Murex*, *Scalaria*, and three or four of *Pedicularia sicula* Sw., with innumerable Pteropods and Terebratulinæ, rewarded these "burglars of the deep." The Professor was delighted, and it was with reluctance he abandoned so rich a field in order to secure his passing through the Straits of Magellan at a right season.

Barbados, January 26 R. W. R.