

required for reference" by students preparing for the elementary stage examination of the Department of Science and Art in practical inorganic chemistry. As only seven bases and four acids are included in the syllabus, and the mixtures given are soluble in water or dilute acids, the scope of the volume is very limited. The author begins by stating the possible number and character of the constituents of mixtures that come within the range of the syllabus, and then gives a list of all the substances available for the examiners to make the mixtures from. Then follow lists of reactions and tables of methods. After these is a quotation from the published description of that part of the examination that consists of questions to be answered, and as the examiners state that "the value of the answers will be greatly enhanced by neatness and clearness of sketches," the author proceeds to give "the sketches required," a series of 21 figures all duly labelled, and which presumably includes every sketch that can possibly be needed. The student is recommended to practice copying the figures until he "can draw the apparatus neatly and accurately."

Notes on Trigonometry and Logarithms. By Rev. J. M. Eustace, M.A. (London: Longmans, Green, and Co., 1890.)

THIS work is not like an ordinary text-book, but consists of a series of well-arranged notes on the elements of trigonometry and logarithms. The subject is treated so that it may be useful to beginners, and to those working it up by themselves. The book-work will be found fully worked out, and, in each chapter, examples on it are given to demonstrate the methods of solution.

Great care has been bestowed on the explanations of the various manipulations to which logarithms can be applied, and the author has reprinted some pages of the mathematical tables published by Messrs. W. and R. Chambers, giving a full explanatory account of the method of using them, which to a beginner will prove most serviceable. Two excellent chapters on solutions of triangles and heights and distances give the student a good insight into the more common problems that are generally worked out in this way.

Miscellaneous propositions and examples are dealt with in the last two chapters: in the former, such propositions as the nine-point circle, distance between centres of circumscribed and escribed circles of triangles, &c., are discussed; while in the latter we have a series of well-selected examples taken from the usual sources.

Elementary Statics. By the Rev. J. B. Lock, M.A. (London: Macmillan and Co., 1890.)

MANY are the treatises which deal with the subject of elementary statics, but few can rival in clearness the present stereotyped edition of Mr. Lock's work. The alterations that have been made have not necessitated any considerable change in the character of the book. By the addition of some fully worked out illustrated problems, and of a carefully graduated set of interesting examples for the student to solve, the author has slightly enlarged the scope of the treatise. The number of the miscellaneous examples at the end have been greatly increased by the insertion of problems that have appeared in the Cambridge examinations in the last two or three years. The subject throughout is treated in the author's best style, and the book can be cordially recommended for the use of beginners.

Die photographische Retouche in ihrem ganzen Umfange. By Wilh. Kopske. (Berlin: Robert Oppenheim, 1890.)

IN order to remove the defects incidental to photographic pictures, a process of "touching up" has to be resorted to, and the present pamphlet of 80 pages in length offers instructions in this subject, which will be found of use

by practical photographers. The amount of valuable information compressed within the compass of the little work before us is quite remarkable, and shows that the author is thoroughly familiar with this branch of his art. We can commend the book to photographic artists.

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.]

Photographs of Meteorological Phenomena.

AT the Leeds meeting of the British Association a Committee, consisting of Mr. G. J. Symons, F.R.S. (Chairman), Prof. Raphael Meldola, F.R.S., Mr. John Hopkinson, and myself, was appointed to report upon the application of photography to the elucidation of meteorological phenomena, and to collect and register photographs of such phenomena.

The success with which these instructions can be carried out necessarily depends in a great measure upon the voluntary co-operation of others.

Will you therefore allow us to appeal to photographers through the medium of your columns, and to ask all those who have in their possession negatives of clouds, lightning, hoar-frost, hail-stones, or any other meteorological phenomena, or of damage done by whirlwinds, tornadoes, or storms, to communicate with me?

We shall be grateful for copies of any such photographs, but shall especially welcome offers of future assistance in the shape of photographs taken in accordance with some simple instructions which will be supplied on application.

ARTHUR W. CLAYDEN.

Warleigh, Tulse Hill Park, London, S.W., November 18.

Some Habits of the Spider.

THE experiment given by Mr. Boys can be successfully made with a common table-fork. The spider will seize the handle and grapple with it in a ridiculous fashion, but it soon tires of the performance. The prongs will continue vibrating for some little time if struck smartly on a wall.

A curious habit of the spider has perhaps been recorded, but I have never seen it noted. A large, dark spider is sometimes seen in the centre of a strong and regular web. Blow the spider with a slight puff, and if it does not fall or run away, it will shake itself violently for a quarter of a minute. These oscillations are not natural, as the spider will only produce them once or twice, and the natural oscillations are slower. The motion is circular and very rapid, so that the outline of the spider disappears and a blurred appearance three or four times as large as the spider is produced.

This habit is probably protective. Birds would be puzzled rather than frightened, and would find it difficult to make a good shot at the spider. The species of spider is fairly common in gardens and hedges, and is abundant in parts of Norway. It is dark, with a few light spots.

A. S. E.

Newton's Rings.

WHILE arranging some experiments on the interference of light for class illustration at the Working Men's College, Melbourne, with a friend, Mr. Wilfred Kernot, of this city, we came across a method of showing Newton's Rings which I have not seen described, and which may be new to some of your readers, though probably any who have had to arrange the experiments for themselves will have come across it.

The apparatus used was a pair of glass plates, $2\frac{1}{2}$ inches square by $\frac{1}{16}$ inch thick, squeezed by a pair of clamps at the centres of a pair of opposite edges. A beam from an electric lamp (900 candle-power) was sent through the plates so as to be partly reflected and partly transmitted, and the images formed by these two beams were received on a pair of screens about 5 feet from the plates. Holding the plates at an angle of about 10° with the incident beam, the complementary colours are shown with great brilliancy on the screens; by varying the in-

clination of the plates to the beam the colours can be changed at pleasure.

In this form the experiment is well suited for class illustration; care is necessary to avoid irregular reflection at the edges of the plates; we covered ours with ordinary gum paper.

B. A. SMITH.

Working Men's College, Melbourne, October 10.

Mutual Aid among Animals.

RECENT discussion of this subject has recalled my attention to an observation made some time ago, while studying the animals of Casco Bay, on the coast of Maine.

Among the specimens brought back from one excursion were four of the common Echini (*E. drobachiensis*). The last one taken had been left exposed to the sun some time before it was noticed and properly cared for.

These four animals were placed alone in a small aquarium, and, as we wished to study the action of the ambulacræ, each was turned mouth up. Soon the action began, with which every naturalist is familiar, and three of the captives slowly rose on edge, and then deliberately lowered themselves into the normal position. The fourth, the injured one, made much less rapid progress: all it could achieve was a slight tipping of its disk. The two nearest Echini, from six to eight inches distant, now moved up and stationed themselves on opposite sides of their disabled comrade.

Fastening their tentacles for a pull, they steadily raised the helpless urchin in the direction in which it had started. As soon as it was possible, one of the helpers moved underneath the edge of the disk on the aboral side, and, when the half-turn was accomplished, the other took station on the oral side, gradually moving back as the object of so much solicitude was very gently lowered to the position nature had made most convenient.

This is the best instance of "giving a lift" I have ever met with among animals of so low a grade. It may not be without interest to others.

WM. ELDER.

Colby University, Waterville, Maine, U.S.A.

The Chrysanthemum.

THIS being the centenary year of the introduction of the Chrysanthemum into England, a word on the subject from its native place, Peking, may not be out of place. It is not generally known that the Chinese grow the Chrysanthemum as a standard tree especially for selling. They graft them on to a stalk of *Artemisia*. There is a species of *Artemisia* that grows wild and covers the waste ground round Peking; it springs from seed every year, and by the autumn attains to a tree 8 or 10 feet high with a stem $1\frac{1}{2}$ inch thick. The Chinese cut it down, and, after drying it, use it as fuel; the small twigs and seeds are twisted into a rope, which is lighted and hung up in a room to smoulder for hours; the pungent smell of the smoke drives out the mosquitoes. This plant, after being potted, is cut down to about 3 feet and used as the stock, the twigs of Chrysanthemum are grafted round the top, and it quickly makes a fine tree, the flowers grow and open, and as the stock soon withers the whole tree dies, and folks say, "another ingenious fraud of the Chinamen."

A favourite style of growing Chrysanthemums is in the shape of a fan, with eight or ten flowers in different parts of it. If the flowers are not grown on the plant, they are tied on, which also does for selling.

The winters in Peking are very cold, and last about four months, and having no glass houses the Chinese gardeners do not have the chance of producing such a variety or such fine flowers as their European brethren, but in the case of Chrysanthemums they have many curious and beautiful varieties.

THOS. CHILD.

Dispersal of Freshwater Shells.

I AM putting together such instances as I can find of dispersal of freshwater bivalves by closure of their shells so as to cling to the toes of birds, amphibia, water-beetles, &c., and of univalves by adhesion to the wing-cases of water-beetles, &c., and venture to ask for co-operation. Any notes or references which your readers may have the kindness to send to the undermentioned address will be welcomed and carefully acknowledged.

H. WALLIS KEW.

5 Giesbach Road, Upper Holloway, N.

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The Common Sole.

THE post-larval flat-fish obtained in 80 fathoms off the west of Ireland, which in NATURE (vol. xlii. p. 520) I referred to as common sole, have turned out, on closer examination to be the fry of *Pleuronectes cynoglossus*, called "white sole" in the Dublin markets.

I shall feel obliged by your finding space for this correction.
Dublin, November 15. W. SPOTSWOOD GREEN.

The Scientific Investigations of the Fishery Board for Scotland.

IN the review of the "Eighth Report of the Fishery Board for Scotland," which appeared in NATURE (vol. xlii. p. 653), the reviewer, misled by the private information to which he refers, makes an inaccurate and baseless statement, reflecting upon me personally, and which I therefore crave leave at once to correct. In dealing with my report on immature fish, which, by the courtesy of the Secretary for Scotland, was placed in the hands of the delegates of the recent International Fisheries Conference, and which has already been referred to in your columns by Prof. McIntosh, F.R.S., the reviewer states: "We have certain information that the original discoveries which led to this report were made" by Mr. T. Scott; and that "it is only fair that the credit which is Mr. T. Scott's due, and which is denied him there, should be acknowledged here."

Had your reviewer disregarded his private information, and looked at p. 161 of the paper which he has reviewed, he would have found there the following footnote to the statement that "nearly 13,000 food-fishes" had been "carefully measured, and the condition of the reproductive organ registered," viz., "This has been mainly done by Mr. Thomas Scott, F.L.S., one of the naturalists of the Fishery Board, and partly by Mr. Peter Jamieson, assistant naturalist."

What Mr. Scott and Mr. Jamieson did was precisely what is stated—namely, to measure the length of the fish and record on the form provided whether the milt or roe was mature or not. The subjoined note from Mr. Thomas Scott, which I request you to publish along with this, shows that he considers this acknowledgment sufficient. The study and elaboration of these daily records, nearly 13,000 in number, mainly in my private time, was only a part, and a small part, of many months of labour bestowed on my report on immature fish; and the results occupy less than three pages of the fifty-four devoted to the subject. No other person had any part or share whatever in the conception or composition of that report, and this attempt to deprive me of the credit of my work, solely on the strength of private and erroneous information, is not, I think, either usual or creditable.

The reviewer is equally in error as to what I wrote in the Report for 1887, and which he only partially quotes. The entire sentence is as follows: "We have organized a series of extensive and systematic inquiries into the condition of the reproductive organs of the various kinds of fish throughout the year, with particulars as to their sizes, the nature of their food, &c., which will help to clear up the hitherto obscure problems as to the minimum size of sexually mature individuals, the commencement and duration of the reproductive period, the spawning places, and many other points of great interest." If the reviewer will now peruse p. 8 of the Seventh Report, he will find it there stated that these inquiries were "devised by Dr. Wemyss Fulton" (in 1887), which is the fact.

T. WEMYSS FULTON.

20 Royal Crescent, Edinburgh, November 3.

14, Lorne Street, Leith, November 1.

DEAR SIR,—I have read the article in NATURE of October 30, and desire to say that I consider the footnote at p. 161 of part iii. of the Board's Report for 1889 a sufficient acknowledgment of my work in connection with the immature fish investigation.

You have always from the first acted towards me in a very friendly manner, and would be the last to detract from any credit belonging to me.

THOMAS SCOTT.

Dr. T. Wemyss Fulton, Secretary Scientific Investigations.

Araucaria Cones.

HAVING been away from home, I have only now seen the Duke of Argyll's letter in NATURE of November 6 (p. 8), relating to the cones of *Araucaria*. Doubtless before this some of your correspondents have answered the Duke's inquiry.