

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.

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#### 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  $10^\circ$  with the incident beam, the complementary colours are shown with great brilliancy on the screens; by varying the in-