

for the output of the whole or part of the watch on the interchangeable system, the latter of those who still kept to the old mode of making them "under a system of sub-letting to small makers who work at their own homes."

Messrs. Rotheram and Sons, of Coventry, about the oldest and the largest firm of watch manufactures in England, headed the list, and seem to have had a fine display, theirs being one of the most striking exhibits in the Exhibition.

In the remaining pages the author gives an account of the merits and exhibits in the manufacture of clocks, turret clocks, tools, watch-cases, &c., concluding with a short summary.

On the whole, the British section seems to have fared very well, and to have held its own against foreign competition, and to those interested in the subject this work will afford a good insight into the present condition of watch and clock making.

*The Harpur Euclid.* Books V., VI., and XI. By E. M. Langley, M.A., and W. Seys-Phillips, M.A. (London: Rivingtons, 1890.)

THIS is an edition of Euclid's Elements revised in accordance with the reports of the Cambridge Board of Mathematical Studies and the Oxford Board of the Faculty of Natural Science.

The books dealt with are V., VI., and XI.

In most of the works on this subject Book V. is generally omitted, and only the definitions are learnt; but the authors have thought it advisable for the reader to acquaint himself with the terms used and with some of the theorems which are established in it. Although he is allowed to use these theorems as axioms, proofs are given depending on the definitions, the notation used being that recommended by De Morgan and adopted by the Association for the Improvement of Geometrical Teaching in its Syllabus and Elements.

Preceding Book XI. is a good and well worked out series of propositions on loci, harmonic division, similarity, maxima and minima; and a few miscellaneous problems, such as the nine-point circle, &c.

The proofs in Book XI. differ slightly from those ordinarily given in text-books, but are made shorter and perhaps clearer by the adoption of symbols.

The method throughout of dotting all construction lines is a great help to the reader, and is to be heartily recommended, the figures in Book XI. showing this off to advantage.

A large number of exercises are given here and there for the student to practise his ingenuity on.

*The International Annual of Anthony's Photographic Bulletin*, 1890-91. Edited by W. Jerome-Harrison and A. H. Elliott. (London: Iliffe and Son, 1890.)

THIS is the third volume that has been published of this most interesting Bulletin, and, glancing through its pages, we conclude that it is one of the best publications of its kind that we have come across. The articles, written in great part by men of acknowledged ability, contain a large amount of useful knowledge, forming a store of information from which workers in every rank of the art may obtain something that will interest them.

One of the chief features of the volume is the great increase in number of illustrations, which are printed by the various kinds of processes now available, and which show the advancement made in the application of photography for purposes of illustration.

The usual collection of tables is presented at the end. Among them may be mentioned Dr. Woodman's table of view angles, tables for the simplification of emulsion calculations, and tables of comparative exposures. The work concludes with a revised list of the Photographic Societies of the British Isles, British Colonies, America, and most of those on the Continent.

NO. 1082, VOL. 42]

## LETTERS TO THE EDITOR.

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### The Discharge of Electricity through Gases.

IN the Bakerian lecture on "The Discharge of Electricity through Gases," in the last number of the Proceedings of the Royal Society, Prof. Schuster says:—"I do not see how the insulating power of air at the ordinary temperature is consistent with the presence of ions, however few in number, for ultimately a diffusion to the electrodes and a discharge would necessarily take place. This seems to me to be fatal to J. J. Thomson's view of the disruptive discharge."

This statement implies a misconception of the theory of the electric discharge advanced by me in the *Philosophical Magazine*, June 1883, for there is nothing in the theory of the discharge there given which makes the presence of free ions in air at ordinary temperatures and pressures essential. I will quote two sentences from the paper to show what the theory is:—"In order to make the spark pass through an elementary gas, we have to decompose the molecules into atoms. Thus the stronger the connection between the atoms in the molecules, the greater the electric strength." "Chemical decomposition is not to be considered merely as an accidental attendant on the electrical discharge, but as an essential feature of the discharge, without which it could not occur."

The misconception has, no doubt, arisen from my using in the same paper the Clausius-Williamson hypothesis of the interchange of atoms among the molecules to account for the difference of pressure in different directions in the electric field. But this hypothesis is not essential to the theory of the discharge given in the paper, for on that theory the discharge does not take place until ordinary dissociation of the molecules is produced by the electric field. The existence or non-existence of the quasi-dissociation of the Clausius-Williamson hypothesis which does not produce any chemical effects, does not affect the theory of the discharge, though it does that of the inequality of pressure.

J. J. THOMSON.

Cambridge, July 19.

### Birds and Flowers.

IN your note on Mr. G. F. Scott-Elliott's paper on this subject (*NATURE*, July 17, p. 279) you remark: "In accordance with the view of Darwin, but opposed to that of Wallace, Mr. Scott-Elliott believes that the identity of colour (an unusual shade of red) in the majority of ornithophilous flowers and on the breasts of species of *Cinnyris* is an important element in pollination by birds." There must be, I think, some misapprehension here. I am not aware that Darwin has anywhere referred to the colours of birds as being generally similar to those of the flowers they frequent. Mr. Grant Allen has done so in his work on "The Colour-Sense," and I have opposed his views in *NATURE* (vol. xix. p. 501), because he founds the resemblance on the theory of sexual selection, and because the facts do not support any such general relation. That such a relation does sometimes occur I have shown, by quoting Mrs. Barber in my "Darwinism" (p. 201) as to the scarlet and purple colours of a sun-bird being highly protective when feeding among the similarly coloured blossoms of the *Erythrina caffra*, which, at the time, has no foliage. I have also called attention (in the same work, p. 319) to the numerous flowers now known to be fertilized by birds, and to the numerous large tubular flowers of a red and orange colour in Chile and the Andes, which are apparently adapted to be fertilized by humming-birds. The general uniformity of colour would be advantageous as an indication of bird-flowers as distinguished from insect-flowers; but there is no similarity to the colours of the birds. Curiously enough, the common Chilean *Eustephanus* is green-coloured in both sexes, while its close ally in Juan Fernandez is red in the male. Yet the flowers it frequents in the island are not red, but mostly white and yellow (see "Tropical Nature," p. 272). It is evident, therefore, that the prevalent colours of the flowers do not determine the colours of the birds which frequent them, unless those colours are so predominant that a similar colour becomes protective, as is more generally the case in the scantily-wooded plains of South Africa than anywhere else.

ALFRED R. WALLACE.