of a discussion on the zoological system as commonly taught, Prof. H. E. Ziegler emphasises the view that the rhizopod and flagellate animalcules, together with the Sporozoa, form an allied assemblage, while the ciliated animalcules, both as regards the nature of the nucleus and the mode of reproduction, are altogether different. In a fourth important communication Dr. Bresslau amplifies and illustrates his discovery that the marsupium of the marsupials, in place of being a simple organ, is really formed by the amalgamation of a number of small pouches. These pouchlets, which at first form solid ring-like growths of the epidermis, soon begin to degenerate, and are merged in the wall of the marsupium. R. L.

The Optical Dictionary. Edited by Charles Hyatt-Woolf, F.R.P.S. Pp. x+77. (London: The Gutenberg Press.) Price 4*s.* net.

THIS is an optical and ophthalmological glossary of English terms, symbols, and abbreviations, together with the English equivalents of some French and German terms arranged alphabetically. The meanings are, as a rule, very clearly given, and the book should prove of use to students (especially medical students) who suddenly come upon an unfamiliar term in the course of their general reading. Of course, it must be understood that it is practically impossible to explain properly any scientific term in a line or two, and this is all that is attempted; the meanings given must therefore in most cases be somewhat unsatisfactory. But the book will doubtless succeed in its aim, especially in the translation of foreign terms. As regards accuracy—the *sine quâ non* of a dictionary—we only notice a very few actual errors, *e.g.* *dioptrically* does not mean *by reflection,* and in the definition of *numerical aperture* the words *refractive index of the medium in which the object is immersed* scarcely indicate that the medium must extend into contact with the objective. *Underlant* is apparently a misprint for *undulant,* and one-third of p. 70 has got into its wrong place.

But these are not very important blemishes, and we cordially recommend the book to those whom it may concern.

Practical Professional Photography. Vols. i. and ii. By C. H. Hewitt. Pp. 126 and 114. (London: Iliffe and Sons, Ltd., 1904.) Price 1*s.* net each.

THESE two volumes form a very useful addition to the *Photography* bookshelf series, of which they form Nos. 17 and 18. Although the author does not profess to go into any great detail, he gives an excellent account of the necessary requirements of the professional photographer, from the choice of business premises, the handling of customers, book-keeping, &c., down to the packing up of the finished pictures and their dispatch. The chapters on portraiture, composition, and lighting are especially satisfactory, and many a valuable hint is contained therein.

A great number of illustrations accompany the text, and serve the useful purpose of illustrating the author's remarks on many lines of work.

Solutions of the Exercises in Godfrey and Siddons's Elementary Geometry. By E. A. Price. Pp. 172. (Cambridge: The University Press, 1904.) Price 5*s.* net.

THIS book will be found very useful to all, both pupils and teachers, who use the well known work of Messrs. Godfrey and Siddons. The solutions, 1836 in number, contain not only the deductive, but the drawing exercises, the figures being all such as the pupil is required to construct. We cannot refrain from pleading for a better figure of a hyperbola than that given on p. 143, which a trained eye rejects at once, although it is not essential to the pupil's work.

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.*]

Average Number of Kinsfolk in Each Degree.

MAY I ask you to insert yet another brief communication on the above subject, because private correspondence shows that paradoxical opinions are not yet wholly dispelled? The clearest way of expressing statistical problems is the familiar method of black and white balls, which I will now adopt.

Plunge both hands into a dark bag partly filled with black and white balls, equal in number, and well mixed. Grasp a handful in the right hand, to represent a family of boys and girls. Out of this unseen handful extract one ball, still unseen, with the left hand. There will be *on the average* of many similar experiments, as many white as black balls, *both* in the original and in the residual handful, because the extracted ball will be as often white as black. Using my previous notation, let the number of balls in the original handful be $2d$. Consequently the number in the residual handful will be $2d-1$, and the average number in it either of white or of black balls will be half as many, or $d-\frac{1}{2}$. It makes no difference to the average result whether the hitherto unseen ball in the left hand proves to be white or black. In other words, it makes no difference in the estimate of the average number of sisters or of brothers whether the individual from whom they are reckoned be a boy or a girl; it is in both cases $d-\frac{1}{2}$. The reckoning may proceed from one member of each family taken at random, or from all its members taken in turn; the resultant average comes out the same.

This, briefly, is my problem. FRANCIS GALTON.

On the State in which Helium Exists in Minerals.

IN 1898 I published in the *Proceedings* of the Royal Society the results of some experiments on the evolution of gases from minerals on heating them. I succeeded in proving that the hydrogen and carbon monoxide in the gases could be accounted for quantitatively by the reduction of water vapour and carbon dioxide by ferrous oxide, or by similar substances, and that, except in cases in which cavities could be proved to exist, the evolution of a gas from a mineral implied chemical change at the moment of heating. In the cases in which helium was evolved on heating a mineral, I pointed out that by the action of heat it is possible to obtain only half the helium, though the evolution of this gas never really ceases, but only becomes very slow. This I took to be evidence of the existence of a chemical compound of helium with some constituent of the mineral.

Recently (*Trans.* Roy. Dublin Soc., 1904) Mr. Moss has shown that by grinding pitchblende *in vacuo* helium is evolved, and considers this result as certain evidence of the existence of the gas in the free state in cavities. Since, however, helium is evolved, though slowly, from the crushed mineral at a temperature not above 300° C., the liberation of the gas in Mr. Moss's experiment may be attributed to local heating set up in the process of grinding.

In view of recent discoveries it appears to me that both of us have been on the wrong track in looking for an explanation of the phenomenon. As Sir William Ramsay and Mr. Soddy have shown, the presence of helium in the minerals may have resulted from the decomposition of radio-active matter, formerly present in them. Recently Dr. Jaquerod, of Geneva (*Comptes rendus,* 1904, No. 20, p. 789), has found that when helium is heated in a quartz bulb to a temperature above 500° C. the gas passes out through the quartz with a velocity which increases with the temperature. At 1100°, in a comparatively short time the pressure in the bulb fell considerably below that of the atmosphere. Hydrogen appeared to behave similarly.

This experiment shows that quartz, and probably substances of the nature of the minerals we are considering, though impermeable to helium at low temperatures, become permeable at moderately high temperatures, and furnishes us with a solution of the second part of our problem.