

It is gratifying to find a writer on sociology acquainted with modern mathematical methods of statistics, and one who clearly recognises the value of such methods, but the definitions given in Chapter iii. of the introduction require some rewording. The word "number" on p. 21 is apparently used in the sense of "magnitude of the variable" instead of in the more natural sense of "frequency," but even in this sense it would not be correct to define the median as "the number midway between the lowest and highest"; it is correctly defined by the statement that magnitudes greater and less than the median occur with equal frequency, so that the median will not in general coincide with the middle of the observed range. Again, it is hardly correct to speak of a measure of variation as the "mode of the deviation"; mode is used in the sense of "most frequent value," and the most frequent deviations in the case of symmetrical distributions will be those approximating to zero. The term "standard deviation" was defined by Prof. Pearson, its introducer, in the sense of root-mean-square deviation, and it is apt to lead to misunderstanding if used in a vague sense, as in the text. The section on the "law of sympathy," pp. 108-110, would also be the better for, at least, some additional explanation; it is from its curtness almost incomprehensible as it stands, and some of the symbols used appear to be only defined in the appendix.

The book is suggestive of many possible lines of research by means of indirect statistical index-numbers, but we cannot help feeling that the author has tried to cover ground too wide for a single volume. The work as it stands is so abstract that it is almost impossible to estimate the practical value of the author's ideas, and such abstractness alienates the sympathy of the statistician. A much more liberal discussion of examples in the text would be both valuable and refreshing.

G. U. Y.

Optical Lanterns and Accessories. Edited by Paul N. Hasluck. Pp. 160. (London: Cassell and Co., Ltd., 1901.)

THIS handbook forms one of a series of practical manuals, and it brings together the more important and useful information in relation to the construction and management of optical lanterns. For the main part the editor has utilised material which has been published from time to time in the weekly journal *Work*, and has coordinated it in such a form that it will be found very serviceable to those who have much to do with lanterns. There are also chapters on the making of ordinary photographic, coloured and mechanical lantern slides, and some useful hints regarding the management of kinematographs. The book is well illustrated and should be found very handy.

Plane Geometrical Drawing, including numerous Exercises and Army Examination Papers, with Solutions. By R. C. Fawdry, M.A. Pp. xi+185. (London: E. and F. N. Spon, Ltd., 1901.) Price 6s. net.

THIS is a work of quite an elementary character, and very well suited to candidates for admission to Woolwich and Sandhurst. A good feature of the book is that it either gives a proof for each construction or refers to the particular proposition of Euclid on which the construction is founded. In addition to constructions relating to right lines, triangles, polygons and circles, there is a short chapter on the ellipse, which, in a second edition, might very well include a treatment of the parabola, inasmuch as the parabola is at once one of the simplest and the most useful of curves in the applications of mathematics. There are two good chapters on the use and construction of scales, and the book concludes with several specimens of papers set in the subject at the Woolwich and Sandhurst examinations, together with the solutions of the questions.

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LETTERS TO THE EDITOR.

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The "Chestnuts" of the Horse.

THESE structures are well known and have been variously interpreted. But I believe that a suggestion as to their nature which I shall now put forward has not yet been made. Some months since I called attention in this Journal (vol. lxii. p. 523) to the general prevalence among mammals that use their fore limbs as grasping or climbing organs—in fact, in all other ways excepting as mere organs of progression—of a tuft of long hairs upon the wrist. I have since that time examined a large number of mammals, and find these vibrissæ in a considerable number of genera belonging to the orders Marsupialia, Rodentia, Carnivora, Lemuroidea (in which latter group the vibrissæ in question were first noted by Mr. Bland Sutton). They are absent from the Ungulata with the exception of hyrax, an admittedly ancient type of ungulate. Usually, but not always, a stout branch of the radial nerve of short extent ends in this patch of integument which bears the vibrissæ. The vibrissæ are quite similar to those found upon the head of the same mammals, for example the "whiskers" of the cat. The general occurrence of this carpal tactile (?) organ makes it, at least on *a priori* grounds, reasonable to suppose that traces might be met with in the ungulates, other than hyrax, where it unquestionably exists. There might not at first sight appear to be much in common between the callous pad, such as is the "chestnut" of the horses and asses, and this tuft of vibrissæ; but the conditions which I found to obtain in an armadillo (*Dasypus villosus*) suggested the comparison. In that animal the carpal tuft of vibrissæ is present; but instead of being a closely compacted tuft of about six hairs, as is usually the case, the hairs in the armadillo are not much larger than those of the skin generally, and are spread over a patch of integument of about half an inch in length and are more numerous. The patch of skin which bears them is thickened. If this were to proceed further the more strongly cornified epidermis would cease to bear vibrissæ, which would be, so to speak, driven into a corner beyond the specially thickened tract of skin. This stage, moreover, is not hypothetical; for in *Lemur catta* precisely this state of affairs exists, *i.e.*, a callous tract of skin close to which is a tuft of vibrissæ. If the latter were lost we should have the "chestnut" of the horse. The chestnuts on the fore feet, he it observed, occupy the right position, a little above the wrist.

FRANK E. BEDDARD.

Frost Patterns.

AS I was responsible for opening the discussion in these columns in 1892 and as I am able to confirm Dr. Catherine Raisin's observation as to the recent recurrence of the phenomenon on December 15, I am glad of the present opportunity of sending a few lines on the same subject in order to rectify an omission. In 1873 Prof. Joseph Henry, of the Smithsonian Institution, Washington, forwarded to Prof. Tyndall on behalf of Prof. Lockett, of the Louisiana State University, a beautiful photograph of "plumes produced by the crystallisation of water," the said pattern having been formed in the coloured sediment in the bottom of a basin in which the water had frozen during the night. This photograph is reproduced as a plate in Tyndall's "Lectures on Light" (I have only the second edition, 1875). It escaped my notice during the correspondence in 1892 or I should certainly have called attention to it.

R. MELDOLA.

Roads and National Welfare.

IN NATURE of December 19, 1901 (p. 149) is given a criticism of a work, in which some essential points in the making and maintenance of roads are strongly insisted on. At p. 156 of the same number there appears an excellent commentary on Mr. Balfour's speech to the students of the Goldsmiths' Institute at New Cross on December 12. With your comments I am in thorough sympathy, and would beg leave to point out that the two subjects are far more closely connected than might at first appear. Excellence and superiority