

sincerity cannot fail to be inspiring to anyone who will be at pains to understand it. It would be a mistake to criticise the earlier half of the book as if it were a treatise on the cubic surface; it is the author's assembling of his materials for the constructions which follow, and the very want of elaboration which it occasionally exhibits is a proof, if an incidental one, of the independence with which the author has carried out his research. Perhaps the analytical investigation of the double-six theorem, which occupies pp. 16 to 19, is an extreme case; a geometrical proof might have been given, though the author's is simple and self-contained.

The book is accompanied by reproductions of elaborate diagrams, carefully drawn to scale. They would have been more interesting if not so much reduced in size. There is a long bibliography of the general literature in regard to the cubic surface, which is likely to be useful. Under 1902 there should certainly be the entry, "Beziehungen der allgemeinen Fläche dritter Ordnung zu einer covarianten Fläche dritter Classe," by Th. Reye, *Math. Annalen*, Bd. lv. Also the paper of G. Kohn, "Ueber einige Eigenschaften der allgemeinen Fläche dritter Ordnung," *Wiener Sitzungsberichte*, Bd. cxvii., p. 66, should be referred to, and a recent paper by Prof. W. Burnside in the *Camb. Phil. Proceedings*, on double-sixes with projective transformations.

Medizinisch-chemisches Laboratoriums-Hilfsbuch.

By Dr. Ludwig Pincussohn. Pp. xi+443. (Leipzig: F. C. W. Vogel, 1912.) Price 13.50 marks.

ONE cannot say that Dr. Pincussohn's book fulfils any real need, seeing that laboratory guides of the same nature are already numerous. The author was formerly assistant to Prof. Albderrhalden, and is well known as an original worker in the field of physiological chemistry. The book he has produced is a very good one, and is specially useful because of the tables of physical and chemical data which occupy its last hundred pages. The introductory chapters deal with general chemical methods, and the remainder, as the title indicates, with that portion of the science which it is the fashion to call bio-chemistry. The analytical and other methods of research selected are up-to-date, and are described in a clear and interesting way. W. D. H.

Books that Count. A Dictionary of Standard Books. Edited by W. Forbes Gray. Pp. xx + 315 + lviii. (London: A. and C. Black, 1912.) Price 5s. net.

OF the fourteen sections into which this dictionary is divided, one deals with science, and some others are concerned with such kindred subjects as education, geography and travel, philosophy and sociology. The sections are necessarily incomplete, for the editor intends his lists chiefly for the use of young students and ordinary readers. The work should, however, be very valuable for reference to notable books in many departments of knowledge.

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LETTERS TO THE EDITOR.

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Luminous Halos surrounding Shadows of Heads.

THE phenomenon referred to in a note in NATURE of December 12 (p. 419), as observed in rice-fields of Japan, can also be seen on grass when the sun is low in the sky. The presence of dew, I believe, increases the intensity of the halo, but it is perfectly distinct also on dry grass.

If the grass surface is near to the observer, a faint halo is seen to surround the shadow of his head, and this is more easily perceived if he is moving than if standing still; my attention was indeed first attracted to the phenomenon when bicycling.

In this mountain region I have frequently seen the halo projected on a grassy slope a mile or more distant, and under these conditions it appears as a circular or elliptical patch of light without the central shadow, the diminution of intensity due to the penumbral shadow of one's head being, of course, quite inappreciable at such distances. It is difficult to determine the size or shape of this patch, owing to irregularities in the brightness of the background; but I have been able to compare it with the nearly full moon rising immediately above it, and should judge it to be at least 2° in diameter, and probably elliptical in shape with the long axis vertical. The light appears to emanate from the grass itself, which apparently reflects more light in the direction of incidence than in other directions; it is certainly not due to dust or haze in the intermediate column of air. I am unable to say whether a smooth rock surface would give the same appearance, but a dense white cloud certainly does so, with the addition of a faintly coloured ring surrounding the white patch. This I presume is allied to the "Brocken spectre," seen when the illuminated cloud or fog is near to the observer.

The analogy of this elliptical bright patch opposite the sun with the *Gegenschein* is so striking that one cannot help believing both to be due to the same cause, and that matter outside the earth's orbit and beyond the limits of the earth's shadow reflects more sunlight in the direction of incidence than in other directions. That the *Gegenschein* usually covers a much larger angular area than the 2° patch seen on these hills may be accounted for by the much more favourable conditions in which it is seen, with a dark and uniform sky-background. J. EVERSHED.

Kodaikanal Observatory, South India,
January 4.

EXACTLY a month ago to-day, in the Betul district, Central Provinces, I had set out on field work at dawn, with my colleague, Mr. H. Walker, and two chaprasis (Indian servants). I happened to be watching our shadows as we passed along the edge of a field of young green wheat, when, to my surprise, I noticed a halo of light round the shadow of my own head and neck. Looking at the other shadows, I was still more surprised to see that only my shadow was invested with this halo. I directed the attention of Mr. Walker and the chaprasis to the phenomenon, and found that each could see a halo round his own head only. Whilst we were investigating the matter our camp passed on the march, and inquiries made both from our servants and from local people showed