

for 1911, 1914 and 1921. The mathematical methods are explained in a series of interesting appendices. These methods have a somewhat home-made appearance, and should not yet be regarded as standardised. Applied intelligently, and with a constant effort to keep in touch with the realities to be represented, they seem well suited to the immediate problem.

The statistical terminology is not always happy; terms like 'datum solid' used when 'frequency surface' seems to be intended, tend to obscure the essential contrast between *data* and *quæsitæ*. Much mathematical work will evidently be necessary before an adequate procedure is evolved, since the observations are necessarily sparse and are not simultaneous. The reviewer would judge that the full value of the observations will not be made available until the distribution problems involved are treated by methods of fitting rather than by methods of interpolation. R. A. F.

*A Course of Modern Analysis: an Introduction to the General Theory of Infinite Processes and of Analytic Functions; with an Account of the Principal Transcendental Functions.* By Prof. E. T. Whittaker and Prof. G. N. Watson. Fourth edition. Pp. vi+608. (Cambridge: At the University Press, 1927.) 40s. net.

WITH the exception of certain corrections and additions, the fourth edition of this comprehensive work differs in no material respect from the third edition published in 1920. "Whittaker and Watson" has entered and held the field as the standard book of reference in English on the applications of analysis to the transcendental functions. This end has been successfully achieved by following the sensible course of explaining the methods of modern analysis in the first part of the book and then proceeding to a detailed discussion of the transcendental functions, unhampered by the necessity of continually proving new theorems for special applications. In this way the authors have succeeded in being rigorous without imposing on the reader the mass of detail which so often tends to make a rigorous demonstration tedious.

The book is admirably printed. The only faults which have been noticed are the omission of the upper and lower bar in the definitions of the 'upper' and 'lower' Riemann Integral (§ 4.11) and the omission of the line in the fraction on the right of the first identity in § 13.14. These are insignificant defects in a fine work which makes accessible a continuous account of methods recorded in a scattered series of memoirs. L. M. M.-T.

*Blut und blutbildende Organe menschlicher Embryonen.* By Dr. W. Knoll. (Denkschriften der Schweizerischen Naturforschenden Gesellschaft, Band 64, Abl. 1.) Pp. ii+81+9 Tafeln. (Zürich: Gebr. Fretz A.-G., 1927.) n.p.

OPPORTUNITIES for the examination of fresh human tissues are of such rare occurrence that the present monograph will be greeted with interest by cytologists and medical hæmatologists. Dr.

Knoll has been fortunate enough to collect human embryos in a living condition by surgical removal of the uterine contents through an abdominal incision, in twenty-eight interrupted pregnancies. He has undertaken a detailed examination of the various cellular structures in human embryonic blood, not only in permanent sections of the rapidly fixed embryo, but also in blood films prepared by the more modern hæmatological methods; especially interesting is the examination of fresh embryonic cells in hirundinised plasma. The physical characters and staining affinity of the various types of cells are analysed and also the oxidase reaction studied. Dr. Knoll's technique is presented in detail; for the oxidase reaction he uses a mixture of 1 per cent.  $\alpha$ -naphthol in normal saline and 1 per cent. di-methyl-para-phenylene-diamine base.

The work is well illustrated and contains nine magnificently reproduced plates in colour presenting the details of the blood cells and stages in their development.

*Coup d'œil sur la théorie des déterminants supérieurs dans son état actuel.* Par Maurice Lecat. Pp. viii+100. (Bruxelles: Maurice Lamertin, 1927.) 16 francs.

THE matrix in  $n$ -dimensions was originated by Cayley and Sylvester. It is quite possible that this purely algebraic conception may find a physical application in space of more than two dimensions. The contributions of M. Lecat to our knowledge of this subject are many, and the present summary is a forerunner of a treatise in three volumes to be published shortly, in which the original researches of the author will be more fully treated. The symbol of Kronecker which figures largely in the exposition is not defined. It may help the reader to note that this symbol  $\delta_{i,j}$  is equal to unity if  $i=j$  and is zero if  $i \neq j$ .

*Physics for School Certificate (Heat, Light and Sound): a Revision Course.* By W. Littler. Pp. 231. (Exeter: A. Wheaton and Co., Ltd., 1927.) 3s.

THIS is frankly a revision course. It contains the information required by the examiners in a reasonably small compass, and should prove useful in any school in which the chief object of including physics in the curriculum is to provide another subject for the school certificate examination. That there is a demand for such books is a serious criticism of the relative functions of schools and examinations.

*Examen des différentes méthodes employées pour résoudre les problèmes de géométrie.* Par G. Lamé. Pp. xii+124+2 planches. (Paris: J. Hermann, n.d.) 21 francs.

A SIMPLE reprint, without introduction or notes, of an early work on algebraic geometry, first published at Paris in 1818. It is important historically as being the first book in which it was remarked that all curves (or surfaces) of order  $n$  which pass through the points common to two,  $f=0$  and  $g=0$ , of this order, are represented by equations of the form  $f+\lambda g=0$ .