OUR BOOKSHELF.

Elliptic Integrals. By Prof. Harris Hancock. Pp. 104. (Mathematical Monographs, No. 18.) (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1917.) Price 6s. net.

INSPIRED by Sir G. Greenhill, to whom he makes due acknowledgment, Prof. Hancock has compiled a very useful monograph, compact, well arranged, and apparently accurate. Chap. i. is on elliptic integrals, properly so called, and their reduction to Legendre's normal forms; it is illustrated by appropriate graphs. Chap. ii. is on the sn, cn, dn functions, and gives the period-pavement for each. Chap. iii. gives a well-arranged list of integrals involving elliptic functions. Chap. iv. is on computation, and follows Jacobi and Cayley in the main. It begins with Jacobi's two-circle proof of the addition theorem, goes on to the Landen transformation, and then gives worked-out examples, using the descending scale of moduli ($k, k_1, k_2, \ldots$) as Jacobi does. The algorithm of the arithmetico-geometric mean is explained and applied, and there is a particularly neat discussion (p. 79) of integrals of the second kind. There are three tables, all to five places: (i) Complete integrals K, E with $k = \sin \theta°$, and $1°$ step for $\theta°$; (ii) elliptic integrals $F(k,\phi)$ with k as above, step $5°$ for $\theta°$ and $1°$ for $\phi°$; (iii) elliptic integrals $E(k,\phi)$ with k,ϕ as for (ii). All these tables were reproduced from Levy's " Théorie des fonctions elliptiques "; they are well printed and properly spaced.

It is unfortunate that restrictions of space prevented Prof. Hancock from giving any formulæ relating to the first-stage functions $\wp$, $\wp'$. It is true that in numerical applications we have to use a modulus k instead of two invariants, but in many parts of theory Weierstrass's functions are the proper ones to use.   G. B. M.

Farm Forestry. By Prof. J. A. Ferguson. Pp. viii + 241. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1916.) Price 6s. net.

SCATTERED all over the United States, amidst the farm land, there are numerous small woods, which are in most cases remnants of the original virgin forest. These wood-lots, as they are called, are said to cover in the aggregate as many as 200,000,000 acres. Though, as a rule, poorly stocked with timber at present, the wood-lots are of great value to the rural population, as they provide cheaply the fuel, posts, fencing, and timber required on the farm. Under proper care and management their productive capacity is capable of great expansion, and it is estimated that all the timber necessary for the manifold industries of the United States might be grown on the wood-lots alone. Great efforts are now being made by the Department of Agriculture at Washington and by the agricultural experiment stations in each State to encourage the farmer to take a greater interest in his wood-lot.

The importance of forestry as a subject of instruction in agricultural colleges and in high schools is now universally acknowledged. The present volume is a suitable text-book for agricultural students and for owners of small woodlands, as it covers in a simple way the whole subject of farm forestry. It consists of a series of readable chapters on the economic value of the wood-lot and on the principles of sylviculture as applied to small woods.

The Yearbook of the Universities of the Empire, 1916 and 1917. Published for the Universities Bureau of the British Empire. Pp. xvi + 412. (London: Herbert Jenkins, Ltd.) Price 7s. 6d. net.

FOR reasons of economy the Yearbook was not published last year. Since the commencement of the war few changes have been made in the regulations of the universities, and the information regarding the conditions of admission, faculties, degrees, scholarships, and publications of the various universities contained in the 1915 issue continue to be substantially correct and are not repeated here. In view of the fact that there are certain matters to which it is forbidden to refer, the part which the universities have taken in national service of all kinds is not summarised in the Yearbook; this subject is postponed until the conclusion of hostilities. Three appendices added to the present volume give full particulars of the Beit fellowships, the scholarships awarded by the Royal Commissioners for the Exhibition of 1851, and the Rhodes scholarships.

The Yearbook provides a very useful summary of university activities throughout the Empire.

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.]*

Labyrinths in English Churches.

As the author of "Amusements in Mathematics," reviewed in NATURE of December 20, says that he does not know of any instance of a labyrinth in an English church, it may be mentioned that one is represented in one of the bosses of the north-aisle of the nave of St. Mary Redcliffe, Bristol. The style is Somerset Perpendicular, the date probably about 1420.

           C. S. TAYLOR.

Banwell Vicarage, December 21.

An Optical Phenomenon.

IN physiological laboratories several routine experiments are in use for demonstrating phenomena of the kind described by Capt. C. J. P. Cave (NATURE, December 13, p. 284). These phenomena all support Hering's theory of the reciprocal after-effects of stimulation (see W. H. R. Rivers in Schäfer's "Text-book of Physiology," vol. ii., pp. 1146–47, especially fourth paragraph, p. 1147). The seat of illusion begins at the retina, but (as hinted in my letter on p. 165, November 1) involves all the intricate labyrinth of nerve tissue from the retina to the highest sensory and motor centres.

The way in which the reciprocal after-effects operate in the cases under consideration cannot be fully dis-