

of total heats, for example, rather than their absolute amounts.

Prof. Mollier, of Dresden, in 1906 published tables and sheets of curves calculated on Callendar's methods, and these were published by Sir J. A. Ewing in the third edition of his book on the steam engine in 1910. Prof. Smith and Mr. Warren have recalculated all the numbers (with slight divergences from Mollier's results), using values of the constants which seem to them best, and they reproduce Prof. Mollier's curves showing total heat on an entropy base. They give both Centigrade and Fahrenheit tables. If Prof. Callendar's methods are right there can be no doubt that Prof. Smith and Mr. Warren have done a great service to steam engineers. They nowhere state what is their unit of heat, but it is probably that which agrees with  $J=1399$  or  $1400$ . This will not agree with their figures for the total heat of water. It is also a pity that they do not give the actual experimental results on which their calculations are based; no doubt great weight is given to the Joly-Callendar value of  $L$  at  $100^{\circ}$  C., and to Callendar's specific heat as well as the Munich results.

Fair agreement of the steam tables with measured values of  $L$ , &c., is no proof that Prof. Callendar's method is legitimate, because good agreement may be effected even if we take  $c$  to be a constant,  $b$  being the volume of water, or, indeed, if we take steam to be a perfect gas. The only real test would be that the calculated specific heat for various temperatures and pressures should agree with measured values. This test cannot be applied until we have better experimental results.

J. P.

#### PRACTICAL AGRICULTURAL CHEMISTRY.

*Practical Agricultural Chemistry.* By Prof.

S. J. M. Auld and D. R. Edwardes-Ker. Pp. xxiv+243. (London: John Murray, 1913.) Price 5s. net.

UNTIL recently the teacher of agricultural subjects in this country suffered from the disadvantage (or advantage if one looks upon it in that light) that very few textbooks were available to help him in his teaching. The result was that each man had to devise his own course and modify it as time went on and experience accumulated. There is a tendency at the present time for teachers to put their courses on record, and the plan has much to commend it.

The latest scheme thus printed is the laboratory course for students of agricultural chemistry used by Dr. Auld and Mr. Edwardes-Ker. It opens with a good section on plant-life which is dis-

tinctly fuller than usual, including experiments with certain plant constituents not commonly studied in other laboratories. The teacher will find material here that may be new to him and that he may advantageously embody in his own course. The section on soils presents few novel features; indeed, there are some directions in which marked improvements might be made. Above all things, it is necessary to be clear in dealing with the agricultural student. But we find that on p. 86 the "clay" in soil is estimated by a method which will bring out particles less than 0.002 mm. in diameter; on p. 90 by a method which brings out particles less than 0.01 mm. in diameter; while on p. 62 a scheme of classification of soils is given which supposes that "clay" is something altogether different from either. Yet there is no hint that the word is being used in three different senses. The precise definition of clay must be a matter of convention; it is much better for the young student to begin on the British convention and defer the detailed study of other conventions until he is more advanced in the subject.

We should like also to have seen some of the newer and improved methods of analysis brought in. The Neubauer method of examining soil extracts, and the titration method for determining phosphates, are much simpler and quicker than those given, while the perchlorate method of estimating potassium is at least as accurate as, and much cheaper and more convenient than, the costly and cumbersome platinum method. These, however, are essentially matters of detail, and as the authors have shown courage in introducing some new matter in their course, it may be hoped that they will have the further courage to test the newer methods that are now available and adopt them in their teaching.

E. J. R.

#### SCIENTIFIC EGYPTOLOGY.

- (1) *Service des Antiquités de l'Égypte. Catalogue Général des Antiquités Égyptiennes du Musée du Caire.* Nos. 61,051-61,100: The Royal Mummies. By G. Elliot Smith, F.R.S. Pp. vii+118+103 plates. (Le Caire: Imprimerie de l'Institut Français d'Archéologie Orientale, 1912.)
- (2) *British School of Archaeology in Egypt. Studies Series. Vol. iii. The Formation of the Alphabet.* By Dr. W. M. Flinders Petrie, F.R.S. Pp. iv+20+9 plates. (London: Macmillan and Co., Ltd., and Bernard Quaritch, 1912.) Price 5s. net.

(1) PROF. ELLIOT SMITH'S studies of mummification, the result of work carried out during the years he spent in Egypt,