

the labels by rubbing the surface in a moistened groove in a cake of sapolio.

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MOST IS—WHAT?

TO THE EDITOR OF SCIENCE: Since the natural sciences came into their inheritance, about thirty years ago, it has been quite the orthodox thing with the "humanists" to demonstrate the inherent disability of these subjects to impart "culture" by satirically deriding the English of embryonic doctoral dissertations. Judge, therefore, of the shock to my esthetic sensibilities occasioned by this sentence, which stands on page 61 in the issue of SCIENCE for January 10: "*most of the brotherhood of teachers of English is in the same state,*" where the adjective-noun most, having the plural form because clearly referring to number and not quantity, is made the subject of a verb in the singular number. This communication appears to have been written by a professor of English and, presumably, a humanist.

F. W. MARTIN

SCIENTIFIC BOOKS

Methods of Measuring Electrical Resistance.

By EDWIN F. NORTHRUP, Ph.D. New York, McGraw-Hill Book Company. 1912. Pp. xiii + 389. Price \$4.00.

The measurement of electrical resistance is of interest not only to the physicists but to engineers and others engaged in scientific, technical and commercial work. The methods used are described in various technical and scientific papers and in text-books on electrical measurements. But only a few of these are described in any one place, if we except Price's book written about twenty years ago. The author "has selected for presentation all those methods which in his judgment are useful, for commercial tests and measurements, for purposes of instruction in educational institutions and for application in technical and research laboratories." So we have collected

in one book a large number of methods covering practically the entire field of electrical resistance measurements.

The first part of the book is of an introductory character and better than any other shows the wide experience and sound judgment of the author in matters pertaining to electrical measurements. Particularly good are his comments on accuracy and method and few there are, of those who make electrical measurements, who could not read with profit the first six pages. Then follows a discussion of errors and estimation of the accuracy obtainable by deflection methods. The way an error in measurement may affect the result desired is clearly shown, but no effort is made to arrive at the probable accuracy by the means of the theory of probabilities.

Deflection methods are taken up first. Various voltmeter methods and voltmeter and ammeter methods are considered very fully. Then follows a discussion of null methods and of these the differential galvanometer methods are considered first. In this connection no mention is made of the Kohlrausch method, which is generally considered to be by far the best and by some to be the only differential galvanometer method suitable for use in the precise comparison of resistances.

In the discussion of the Wheatstone bridge methods the Carey Foster method receives the fullest consideration. Six kinds of measurements are listed for which it is stated that this method "is especially useful." For one of these measurements deflection methods give all that is usually desired. When a higher accuracy is necessary it is easily obtained by the simplest kind of a bridge. Another is of interest only to the manufacturer in the adjustment of resistance coils. The other four can, provided a substitution method is used, be made much better with a simple bridge costing not more than half as much as the Carey Foster bridge.

In the discussion concerning Wheatstone bridges various arrangements of ratio and rheostat coils, including the author's four-coil decade, are considered; the author's special bridge for reading directly the per cent. error