

tutions than interpreting, on a sheet of drawing paper, the curves in question by any method of interpretation.

That a subject which is grasped most fully with the use of the calculus, may be treated in a really satisfactory manner without such aid, we doubt. We cannot understand the persistence, still lingering, which characterizes the efforts made to dispense with the calculus in practice; an instrument that has proved so grandly useful all through applied mathematics. As a matter of fact, some abstruse problems are capable of solution with the most elementary knowledge of mathematics; but what cumbersome, involved reasoning! Practitioners are said to forget their knowledge of the calculus; but they should not: it is a tool which they need to keep ready for use. When the mathematics have been *thoroughly* learned once, they may lay dormant in the mind for quite a period of time, ready to spring into activity on refreshing the memory by a slight review. C. A. E.

A SIMPLE RULE TO DETERMINE THE LENGTH OF A PENDULUM. By G. Morgan Eldridge.

Set down the number of beats that the pendulum makes to a minute as the denominator of a fraction, and 60 as the numerator. Reduce the fraction to its lowest terms. Square the numerator and denominator by multiplying each by itself.

Multiply the length of a seconds beating pendulum, 39.2 inches, by the squared numerator and divide the product by the squared denominator.

The length of a pendulum is not the length to the end of the ball, but from the point of suspension to the centre of oscillation, which is at some distance above the centre of the ball—this distance depending upon the weight of the pendulum rod in proportion to that of the ball.

To illustrate: a pendulum beating 90, the fraction is $\frac{60}{90}$, its lowest terms are $\frac{2}{3}$, which squared is $\frac{4}{9}$; multiplying 39.2 by 4 and dividing by 9 gives 17.42 inches. A pendulum beating 120, the fraction is $\frac{60}{120}$, its lowest terms $\frac{1}{2}$, which squared is $\frac{1}{4}$; multiplying 39.2 by 1, dividing by 4, gives 9.8 inches. A pendulum beating 30, the fraction is $\frac{60}{30}$, its lowest terms $\frac{2}{1}$, which squared is 4; multiplying 39.2 by 4, dividing by 1, gives 156.8 inches.

[This is not intended for the scientist, but for the practical workman who has forgotten the square root—if he ever learned it—who has no idea of the nature of a logarithm, and to whom a formula is Greek. It will be entirely within the range of his comprehension and application, and the results are correct.—E.]

THE PRINCIPLES OF VENTILATION AND HEATING, and the Practical Application. By John S. Billings, M.D., LL.D. (Edinb.), Surgeon in U. S. Army.

The work under consideration is peculiarly characteristic of a class which has appeared of late years in all departments of study, being designed to bridge the chasm that hitherto divided the branches of knowledge commonly distinguished as scientific and practical—distinctions which works like the present tend to obliterate.

The author states that he was actuated in the production of his work by the endeavor to comply with a request for "some plain, practical directions

as to the best methods of arranging the ventilation of a building, to be given, as far as possible, in the form of specifications which can be easily understood by an intelligent builder, and not in the form of abstract mathematical formulas," and, while disclaiming the ability to comply strictly with such a request, and to establish a royal road to knowledge, he has attempted to render the progress less difficult.

That he has succeeded in this laudable effort, a perusal of the work demonstrates: and with a full appreciation of the importance of the subject with which it deals we commend it to the public at large as well as to those specially interested.

W. B. C.

SPON'S MECHANICS' OWN BOOK: a Manual for Handicraftsmen and Amateurs. London and New York: E. & F. N. Spon, 1885.

This is a compendium of information useful alike to the professional and to the amateur mechanic. The latter will find in it the knowledge which he requires for his particular hobby, whatever that may be, and the former must be rarely skilled in his art if he cannot find in its pages points in his own specialty which have hitherto escaped his research; and when he needs—as every one does sometimes need—to explore kindred branches of art, he will find in this book a guide, a companion and a serviceable friend.

G. M. E.

PHYSICIAN'S VISITING LIST FOR 1885. 12mo. Philadelphia: P. Blakiston, Son & Co., Publishers.

This standard book, now in the thirty-fourth year of its publication, and so well known to physicians, calls for a few words of praise, it being the aim of its publishers constantly to add to its excellence without much increasing the size of the book. In addition to the blank leaves, properly ruled for a visiting list, monthly memoranda, etc., we have Marshall Hall's method for treating asphyxia; Sylvester's for producing artificial respiration; a list of new remedies by Dr. Henry Morris, in which cocaine is singularly omitted; the usual dose table; poisons and their antidotes, and the decimal system of weights and measures which we are glad to see is making such headway in scientific medicine, leaving little or nothing to be desired in this indispensable volume for the pocket of the busy practitioner.

I. N.

BACTERIAL PATHOLOGY; a series of papers on the Exhibits at the Biological Laboratory of the Health Exhibition under the charge of Watson Cheyne. 12mo. New York: Industrial Publication Company. 1885.

The scientific as well as popular interest in this subject is so great that it has been thought well to collect the series of papers which have appeared in the London *Lancet*, in this little volume which is literally running over with material for thought and action, by our constituted authorities. The micrococcus of pneumonia and the bacillus of typhoid fever and tubercle are briefly described, and illustrated with some excellent wood-cuts. We have also the bacilli existing in milk and butter given, while the pamphlet concludes with the various methods used in the laboratory for cultivation