

something similar to the meaning given to it by *The Open Court*, insisting upon an impersonal criterion of truth which he finds in the Fact, identifying the basis of religion with science, etc. We may have occasion to return to this work independently later. It is difficult reading and extremely rugged in style.

Mention should finally be made of the excellent work which *La Revue Philosophique*<sup>1</sup> under the editorship of M. Ribot, and the *Revue de Métaphysique et de Morale*,<sup>2</sup> under that of M. Xavier Léon, are doing. The former review is devoted mainly to psychology and to the related philosophical questions, while the review of M. Léon is concerned with the more formal problems which compose the science of metaphysics in its best sense. Its contributors are eminent thinkers in all departments. Science is especially considered, and in every number a certain amount of space is devoted to the consideration of practical questions, it being a theory of the editor that the power of philosophy also belongs to life. T. J. McC.

### BOOK REVIEWS AND NOTES.

AN OUTLINE INTRODUCTORY TO KANT'S "CRITIQUE OF PURE REASON." By R. M. Wenley, Professor of Philosophy in the University of Michigan. New York: Henry Holt & Co. 1897.

Prof. R. M. Wenley of the University of Michigan with his publishers, Messrs. Henry Holt & Co. of New York, have made a laudable experiment in the publication of this *Outline Introductory to Kant's Critique of Pure Reason*. The little book, which is only ninety-five pages in length, is written in a concise, lively style and gives a very adequate digest of Kant's monumental and epoch-making work. Professor Wenley has supplied an able introduction on the genesis of the *Critique of Pure Reason* showing its connexion with the preceding development of philosophy, and he has evinced throughout the whole of his opusculum a clear grasp of the main trend and significance of Kant's thought. The little book might be read before or collaterally with the *Prolegomena*, a study of which should always be made introductory to that of the *Critique* itself. If the present work is favorably received by teachers and students, it is the intention of the author and publisher to issue a series of works of like character, giving digests of the other leading philosophical masterpieces, to which end the services of prominent teachers in America and Great Britain are to be enlisted. Such a general conspectus as Professor Wenley has given is in Kant's case perhaps more necessary than in that of any other philosopher. But the outcome of each attempt must be judged upon its own merits. We can cordially recommend the present little book and would certainly encourage the author and publisher to continue their plan. T. J. McC.

A MATHEMATICAL SOLUTION BOOK CONTAINING SYSTEMATIC SOLUTIONS TO MANY OF THE MOST DIFFICULT PROBLEMS. With Notes and Explanations. By B. F. Finkel. Kibler, Cokely & Co.: Kidder, Mo. Pages, 352.

Prof. B. F. Finkel has supplied a useful work in his *Mathematical Solution Book*. His purpose has been to give systematic as opposed to routine solutions of the commonest difficult problems of elementary mathematics, and he has searched all the leading works and periodical literature on the subject for the material which he has offered, not omitting the contributions which he has himself made to the art of solving mathematical problems. All the operations of elementary arithmetic

<sup>1</sup>Felix Alcan, publisher. Price, 33 fr. per annum.

<sup>2</sup>Armand Colin & Cie., publisher. Price, 15 fr. a year.

are considered, the processes explained, and a large number of exercises added. Fully half of the work is devoted to mensuration, and in this part not only the common surfaces and solids are treated, but a large number of unusual figures, rarely used in practical thought, are dealt with. For the latter purposes the calculus is employed, the results and rules only being intelligible to the elementary student. The book is rich in definitions, graphical illustrations, and in information which cannot be obtained in the ordinary school-books. A human interest has been infused into the work by the addition of the biographies of three mathematical teachers, but we cannot help thinking that the praise which is accorded to their achievements has been slightly overdrawn. We have two remarks to make, regarding the operations of subtraction and multiplication which might be incorporated in elementary books.

Since adding is a simpler operation than subtracting, it follows that if the latter process can be reduced to the first, the subtraction of large sums from one another can be greatly facilitated. One knows intuitively the complement of every number with respect to 10 and with respect to 9, and consequently to convert any given example of subtraction into addition we have simply to take the complement of the last right hand number of the subtrahend with respect to ten and add that complement to the corresponding number of the minuend, and then take the complements of all the following numbers of the subtrahend with respect to 9 and add these to the minuend, carrying if necessary and rejecting 10 at the close of the process. The reason of the operation is apparent. Its facilitation lies in the fact that it does entirely away with borrowing, and in long subtractions it is almost impossible to commit an error through this source. For example, in the subjoined subtraction,

$$\begin{array}{r} 83452 \\ 35616 \\ \hline 47836 \end{array}$$

instead of following the common method we may say : 4 (the complement of 6 with respect to 10) plus 2 gives 6—write down 6; 8, the complement of 1 to 9, plus 5 gives 13—write down 3 and carry 1; 3, complement of 6 to 9, plus 5 (because of the one carried) gives 8—write down 8; 4, complement of 5 to 9, plus 3 gives 7—write down 7; 6, complement of 3 to 9, plus 8 gives 14—write down 4, and since the operation is completed, reject the 10 which represents the 100,000 originally borrowed. For what we have virtually done is to add 100,000 to the subtrahend and subtracted the minuend from the whole total.

Further, Professor Finkel says that it is more convenient in multiplying to begin at the right. Since the most important numbers of the result are usually the numbers to the left, it would seem logical that we should attempt to reach these first, rejecting, if it suits our purpose, the numbers to the right. In the multiplication of large decimal fractions this is nearly always desirable, and it is one of the great advantages of the use of logarithms. It can be done in the following manner, where we have to multiply 437.25 by 27.34 :

$$\begin{array}{r} 437.25 \\ 27.34 \\ \hline 8745|0 \\ 3060|75 \\ 131|17\ 5 \\ 17|49\ 00 \\ \hline 11954|41\ 50 \end{array}$$

We have put here the units' place of the multiplier under the last number of

the multiplicand and we begin multiplying with the last number of the multiplier to the left, going successively through the multiplicand from the right, and placing the first number of the product underneath the number of the multiplier. We continue in this way always placing the first number of each partial product under the number we multiply by. The decimal point will, in the partial products as well as in the total product, always be exactly where it is in the multiplicand, as the vertical line purposely placed in the example shows. Evidently, in any large example, we can neglect as many decimal places as we see fit.

The above is due to Lagrange. Oughtred (1574-1660) suggested the reversing of the order of the digits of the multiplier, but the same result can also be accomplished by writing the first left-hand digit of the multiplier under the last right-hand digit of the multiplicand, in both cases allowing the partial products their proper inverse order of places. Where the multiplier is put to the left under the multiplicand, of course it is absurd and inconvenient to attempt to imitate the common method.

T. J. McCORMACK.

The Messrs. Ginn & Co. of Boston have just issued a translation, made by Professors Beman and Smith, of Prof. Felix Klein's *Vorträge über ausgewählte Fragen der Elementargeometrie*. The English title is *Famous Problems of Elementary Geometry*, being those of the Duplication of the Cube, the Trisection of an Angle, the Quadrature of the Circle. It will be seen that the contents do not exactly justify the title. They are rather an attempt of the well-known Göttingen geometer to show the applicability of the more refined and more generalised methods of modern mathematics to elementary geometry, and to indicate the improved and broader points of view so obtainable. The little book (80 pages) deals therefore with the possibilities of elementary geometric construction generally, with the nature of transcendental numbers, and with the transcendence of  $e$  and  $\pi$ . The expositions are lucid and interspersed with valuable historical and bibliographical references. Though, as the translators say, the Calculus is nowhere employed, and the whole is intended to bring certain higher, abstruse results of modern mathematics within the reach of the ordinary mathematical devotee, still a good knowledge of the theory of equations, series, etc., is absolutely necessary to the understanding of the book. Both translators and publishers deserve the thanks of students for the reproduction of this delightful little book in English. The translation is good (might not *potency* for *Mächtigkeit* be better than *power*, on page 51?). By a strange blunder the bookbinder has put the names of the translators instead of that of Professor Klein, the author, on the cover. (Price, 55 cents.)

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DR. HENRY F. OSBORNE, Professor of Biology in Columbia University, and Curator of the Museum of Natural History of New York City, has contributed to the November *Century* an admirable appreciation of the late Prof. Edward D. Cope, the most distinguished of American Naturalists. Cope has not been rated by the non-scientific world at his just merits, and it is well that his importance is now so strongly emphasised. The article following Professor Osborne's is devoted to the gigantic and curious monsters of palæontologic times, with handsome illustrations by Knight, based on the material of Cope. The *Century*, in all such occasional articles, is doing good work for science, if only by softening the minds of the people to a moment's attentive consideration of the claims of research.

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