therefore recommend Mr. Palmer's book with confidence to those teachers who take a special interest in and make a special study of the teaching of arithmetic. They will probably find rules and methods which they do not approve of, but these can be neglected without any loss. The method of dealing with the multiplication of decimals is open to the objection that without any gain a much more difficult method than the direct one is given. The author makes use of rough approximations before and rough checks after working out an example. These are very good, and should be used in all working, but they should not be made the means of finding the decimal point in approximations. The placing of the point should give no difficulty if a logical method has been adopted throughout the study of decimals.

(3) Mr. Jones's book is a laudable attempt to remove the study of arithmetic from its commercial trammels and widen its scope. We are afraid that, in the attempt, he has overburdened his book. Practical work is introduced at all stages of the work, and the numerous explanatory diagrams will be a useful addition to the teaching of the subject. There are one or two things which strike us as being out of place in a book which is intended for a general course in arithmetic. Thus the tables of weights and measures include some units which are not in general use. The introduction of these tends to specialise the work, a thing which Mr. Jones claims, in his preface, that he desires to avoid. We are sorry to see in an arithmetic of this type the instruction to " move the point." It is always difficult for a teacher to keep before young pupils the reason for the step, and he is not aided when the text-book adopts the mechanical method. Mr. Jones has added an index, an example that ought to be followed by all writers of school text-books.

F. L. G.

OUR BOOK SHELF.

Die typischen Geometrien und das Unendliche. By B. Petronievics. Pp. viii+88. (Heidelberg: C. Winter, 1907.) Price 3 marks.

THE author of this curious work asserts (p. 86) that it is impossible to make a one-one correspondence between the points of a linear segment and the elements of the arithmetical continuum (0, 1); in other words, he not only declines to accept the Dedekind-Cantor axiom, but asserts that it is illogical. His attempted proof (p. 85) involves the assumption of actual infinitesimal segments; thus he says "so entspricht dem ersten Punkte, der sich mit dem 0-Punkte berührt, gar keine Zahl in der Zahlmenge 0 . . . 1, da das entsprechende Segment unendlich klein ist, und dasselbe wird auch für den zweiten, dritten usw. Punkt gelten."

This idea of immediately adjacent yet different points pervades the whole tract, and leads to wonderful paradoxes; an attempt is made to remove the most obvious difficulties by a distinction between real and unreal points (pp. 9, 10), but this is not satisfactory. There is a continual confusion between the idea of space consisting of points and that of points forming "parts" of space. You cannot eat your cake and then look at it; if in one context "point" means something with extension, it should not be treated elsewhere as having position only. Moreover, no intuition, logic, or metaphysic can get a geometrical thing having extension from two points devoid of it.

Unless something better than this can be said for it, the assumption of actual infinitesimals of different orders in geometry is not likely to be accepted, and the Dedekind-Cantor axiom will probably be retained as the simplest way of connecting geometry with analysis. From the metaphysical side we want something better than a puerile criticism of Cantor's transfinite number-system, vitiated by misunderstandings. Extensional quantities (lengths, volumes, &c.) can be arithmetically defined for figures in an arithmetical space; but no one with an active geometrical imagination can enjoy this way of treating the subject, although he may admire it as a logical feat. Again, take the connectivity of Riemann surfaces, or the classification of knots; here are things with characteristics easily recognised by inspection, but difficult to specify by the arithmetical method; cannot we find some means for testing our intuitions without putting them into this newly invented arithmetical machine? To give a satisfactory answer to the questions arising from the modern aspects of mathematics is a task sufficient to strain the highest philosophical powers; and although Dr. Petronievics has the temerity to declare that Hilbert's "Grundlagen der Geometrie" is logically defective (p. 24, end), he has added little, if anything, which is of value or interest to the discussion.

G. B. M.

Engineering Workshop Practice. By Charles C. Allen. Pp. vii+254. (London: Methuen and Co., n.d.) Price 3*s.* 6*d.*

A BOOK for students on engineering workshop practice is, in many ways, more difficult to write than one addressed to those who, from years of actual practice, have gained an intimate knowledge of the elaborate processes by which engines and other machines are produced. The beginner requires ample explanations of processes, which he has probably never seen carried out, but which to the workman are as familiar as his daily paper.

This book, good as it is, would have been much more useful if no attempt had been made to write for the information of both the beginner and the skilled workman; their needs are so different that the result cannot be satisfactory to either class. A typical instance of the consequences of such an attempt occurs on p. 159, with reference to the cutting of vee threads in a lathe. In a short paragraph the author points out, quite properly, that, in taking a cut over the whole form, there is a great tendency to rip the thread, and then goes on to state that the diagrams indicate the proper method, but offers no further explanation of them. To a skilled workman these diagrams are quite unnecessary; to a student they are merely perplexing. He is left to discover, if he can, that one diagram is intended to indicate that the roughing cut is to be taken on one side of the vee, while in a second diagram a tool, apparently floating in mid-air, lies between two objects, which he may or may not recognise as rake gauges. In other cases where explanations of the diagrams are given they are far from being clear; thus on p. 191, in the instructions for cutting helical gears, we are told that "The cutter used must be selected for the number of teeth there would be in a gear with outside diameter equal to the diameter of a circle determined by the curvature of the gauge in this way." But the author gives no intelligible explanation of what "this way" is.

While it is proper to direct attention to blemishes