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### Conversations on Arithmetic

In this 1835 work, Sarah Porter, née Ricardo (1790–1862) shows her enthusiasm for arithmetic, and her concern for teaching it in a way that will develop the pupil's mind: 'There is no branch of early education so admirably adapted to call forth and strengthen the reasoning powers.' She uses the device of a conversation between pupil and teacher, popularised by Jane Marcet (several of whose works are reissued in the Cambridge Library Collection), to guide young Edmund from the written symbols for numbers through addition, subtraction, multiplication and division, fractions and decimals, proportion, and square and cube roots. Answers to the questions are provided at the end of the book. A member of the Central Society of Education, which promoted imaginative theories of education instead of rote learning, Mrs Porter reworked her book in 1852 as *Rational Arithmetic*, a more conventional and less entertaining textbook for use in schools.

Cambridge University Press  
978-1-108-07535-0 - Conversations on Arithmetic  
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# Conversations on Arithmetic

SARAH PORTER



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CONVERSATIONS  
ON  
ARITHMETIC.

BY

MRS. G. R. PORTER,

AUTHOR OF "ALFRED DUDLEY,"  
&c.

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LONDON:  
CHARLES KNIGHT, 22, LUDGATE STREET.

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## P R E F A C E.

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AN author should not, perhaps, offer to the public a new elementary work, without assigning some reason for thus swelling the already numerous list of books written for the purposes of education.

Every writer hopes that his individual work will not be found one of supererogation, and believes that what he has to propose will correct established errors in practice, or afford new facilities for acquiring knowledge. However little may be accomplished in these respects, there is, perhaps, sufficient reason for attempting that little. In this hope, and influenced by this belief, I have written the following work.

Having had my attention early awakened to the beauties of the study which forms the subject of these pages, it has ever been a matter of regret with me that arithmetic should be acquired in the unsatisfactory manner in which it is generally taught. There is no branch of early education so admirably adapted to call forth and strengthen the reasoning powers; this object,

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therefore, independent of the advantages attendant on the thorough knowledge of arithmetic, offers in itself a sufficient motive for engaging the young mind in the pursuit. If its end and aim were only to exercise these mental faculties, the time thus employed in the education of youth would be well bestowed, “not so much to make them mathematicians as to make them reasonable creatures.”\*

To assist in rescuing arithmetic from the degraded rank it at present occupies among intellectual pursuits, is a principal object of the following work. I have endeavoured so to simplify the subject, that mothers or instructors, who have not previously turned their attention to this interesting and important branch of education, may be enabled by its help to teach their pupils the *rationale* of the science, and to lead them gently and almost imperceptibly, step by step, to the full understanding of the subject—thus imparting to them a clear insight into the science of arithmetic, at the same time calling into action their reasoning powers, and “preparing them for those difficult and knotty parts of knowledge which try the strength of thought.”\* Whether or not I have succeeded in my attempt can only be discovered by the test of experiment, and from the verdict of enlightened preceptors.

Rules should never usurp the place of reasons, and particular cases should not be confounded with general

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\* Locke's *Conduct of the Understanding*.



## PREFACE.

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principles. The pupil should be led to think for himself, and then he will, as he feels his own strength, be glad to exercise his new-found power, provided it be not crushed while in its first infancy by the imposition of an overwhelming weight. Very young children can better understand the first rudiments of arithmetic than they can engage in the mere mechanical operations of numbers; they will be interested in exercising their ingenuity by answering simple questions while yet they would be perplexed with the management of many figures; and if they be early tried with the latter, they become hopeless of understanding what is set before them;—they learn by rote what is necessary to the working of a sum, and continue to have vague and obscure ideas on the subject ever after, or until self-education, if that ever should take place, at length dispels the cloud.

It is particularly hurtful to the mind to be hurried into knowledge, and it cannot be too strongly urged, that but little should be proposed at once, and till this is thoroughly understood and mastered, nothing new on the same subject should be offered;—the advantages attendant on this manner of instructing cannot be more forcibly put, than in the words, and on the authority of Locke. “ This distinct gradual growth in knowledge is firm and sure; it carries its own light with it in every step of its progression in an easy and orderly train, than which there is nothing of more use to the understanding. And though this, perhaps, may seem a very slow and lingering way to knowledge, yet I dare confidently

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affirm that whoever will try it in himself or any one he will teach, shall find the advances greater in this method than they would in the same space of time have been in any other he could have taken.”

I am aware that the manner in which it is here proposed that arithmetic should be taught, differs materially from the usual practice. But it must be recollected that a two-fold object is sought to be attained—that of teaching the science, in combination with the cultivation of the reason. To this end I have studiously avoided giving any rule without having first called upon the pupil’s ingenuity to seek one for himself, or without having clearly explained to him wherefore the method is followed, or on what principles the rule is founded. Many children would rather acquiesce than inquire; and if they can seize upon and apply a rule to practice, will not pause to ask why the required results are produced. I have therefore endeavoured throughout to awaken the attention of the pupil, and incite him to the use of his understanding, before any general rule has been given for performing what was to be done.

In the arrangement made, I have wished that the easy should be placed before the difficult, and that the successive propositions should as much as possible depend on what has preceded them. Perhaps the chapters on the properties of numbers, and the method of cancelling may meet with some objections. But I believe

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these to be quite requisite as preliminaries to the proper understanding and application of fractions, while the method of cancelling may be advantageously applied to the solution of almost all intricate questions in arithmetic. This has been found to be no unpleasing mental exertion to children; they who have practised it like thus to shorten their work by their own ingenuity, while it initiates them into an acquaintance with the nature of numbers, better than any of those routine sums with which pupils are ordinarily exercised.

I shall not, I trust, incur the charge of presumption for thus putting forth a method which differs from that which is usually practised. My views are not the fanciful speculations of a mere theorist, nor would I have ventured to offer this work to the public, had it not been the result of a conviction, gained by practical experience, that arithmetic can be taught thus with advantage and success.

The form of conversation has been chosen, since it affords a greater facility for explanation and familiar illustration than any other. In the first part I have been desirous, while addressing the pupil, of avoiding all terms or even words, but those which it might be supposed a young child can well understand. It was at the same time desirable to make some observations suited to a more advanced age, and occasionally to offer to the instructor reasons for a departure from established methods. To meet this difficulty all such

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matter as is not intended for the very young pupil is placed within brackets, thus [ ], and therefore need not in any way interfere with, or perplex the explanations necessary for the young beginner. In the latter parts these interruptions will be found less frequent, since it is taken for granted that when the pupil has arrived at more advanced stages, he will readily comprehend most of the observations which each particular rule has drawn forth.

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