we arrive at the law that the simpler the operations (especially in widely disparate senses), the more time is gained in performing them simultaneously, there being a loss of time in doing complex acts at the same moment.

To multiply on paper 7,897,654,987,896,687,786 by 7 took M. Paulhan 62 seconds; to recite 25 lines of 12 feet each, 38 seconds; the sum of which is 100 seconds. To do both together required 98 seconds, so that this is about the complexity at which there is neither gain nor loss. Here is a simpler pair of processes: to write out the product of 1.321,242,131,221,241,211 by 2 required but 11 seconds; to recite a certain couplet, 7 seconds; to do both at once, only 12 seconds, — a saving of 6 seconds in 18. The maximum of saving occurs when it takes no longer to do two acts than one; then certainly the two are done at once. This occurred when 421,312,217 was multiplied by 2 while 4 lines of 12 feet each were spoken; each of the processes consuming 6 seconds separately, and no more when performed together.

If the two processes are closely similar, and probably calling into action intimately connected brain-centres, there is a more decided loss. To write out the product of 33,213,442,124,343 by 2 with the left hand while the right does the same for 12,321,443,-432,123 by 2, showed a loss of 15 seconds in 38. The right did the multiplication almost twice as rapidly as the left hand.

The following times illustrate the same principle: to write four verses of 'Alholie' required 22 seconds; to recite eleven verses from de Musset required 31 seconds; to do both at once, only 40 seconds.

The sum of the times necessary to read a selection aloud and to mentally repeat another selection was 33 seconds, while to do both simultaneously required as much as 38 seconds.

An attempt was made to have three series of mental operations go on side by side; to have the left hand writing the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, while the right wrote a verse, and the vocal apparatus recited some lines of poetry. This is a very difficult matter: the two hands tended to work intermittently, and there was much evident hesitation, friction, and loss of time.

We see, then, that the brain-centres, though closely co-ordinated, can so thoroughly acquire the habit of doing their more simple functions that it requires but a small portion of the attention to guide their action, while the rest can be given to the activities of another centre. The more unlike in function the other centre, the better can this subdivision take place. But when the act is complex, it soon requires the total amount of attention at command; and to attempt to do any thing else is a loss of energy. That individuals differ largely in their powers to perform such 'double acts' goes almost without saying.

ARTICULATED AND SIGN LANGUAGE. — When we wonder at the rapidity with which deaf-mutes spell out their words on their fingers, we are apt to feel that this invention has really diminished the disadvantages of this class of persons almost to a minimum. That such is not the case is vividly suggested by the statistics which a teacher of the deaf-mute has had the patience to gather. He has counted the average number of words which a pupil in his school wrote or spelled on the fingers per day, and finds it to be 1,118: the teacher similarly employs 216, but uses signs equivalent to 861 words daily. It has been estimated that a mother talks 27,000 words to her child in a day. Making due allowance for the habit of forming only parts of sentences which the deaf-mutes cultivate, and also for the suggestiveness of the sign-language (which hearing people really also use in the form of an expressional accompaniment), the comparative meagreness of the deaf-mute's conversation, and slowness with which his mental food can be brought to him, are plainly evident.

BOOK-REVIEWS.

The Ruling Principle of Method applied to Education. By ANTONIO ROSMINI SERBATI. Tr. by Mrs. WILLIAM GREY. Boston, Heath. 8°.

OUR English educational literature has had no richer contribution than this translation of Rosmini by Mrs. Grey. It is at once philosophical, scientific, and practical. Rosmini himself is too little known in this country; and it was our intention, in noticing this book, to give some slight idea of his life and thought in so far as they moulded educational doctrine. But in this we have been anticipated by Mr. H. C. Bowen, late principal of Finsbury Training-College. As Mr. Bowen's sketch is inaccessible to American readers, we feel that we are doing them a service in reproducing most of it. Mr. Bowen calls Rosmini 'the Italian Froebel.'

Antonio Rosmini Serbati was born at Rovereto, in the Italian Tyrol, in 1797. He died at Stresa in 1855. When it is added that he keenly felt and took an active part in the events of his time, these dates above will suffice to show us that his life is worthy of attention, and was not without its trials and exciting episodes.

It was towards the close of 1839 that Rosmini, who had already more than once published the results of his study of psychology, undertook his work on pedagogy. It appears that a pious and generous lady of Stresa, Anna Maria Bolongaro, had offered to intrust to the Institute of the Brethren of Charity (the order founded by Rosmini) the management of an elementary school which her grandfather had founded in that place. The offer was accepted, and Rosmini set to work to compose a complete treatise on pedagogy. 'The Ruling Principle of Method applied to Education' is that part of it which he accomplished, and it carries us very nearly to the end of the kindergarten age. To quote from Francesco Paoli's preface to the original edition, "Rosmini based his treatise directly upon anthropology and psychology, which give us the knowledge of the human faculties which we are to educate, and their modes of action; on idealogy and ethics, which point out the objects, both proximate and ideal, by which the human faculties must be stimulated in order to be properly educated; and on ontology and theology, which provide the knowledge of the ends towards which the human faculties should harmoniously develop, to find in them rest and full satisfaction, which is the ultimate goal of human education." Rosmini divides life, not into periods of years, but into stages or degrees of cognition, — the successive acts of the understanding (*intellezioni*) through which the human mind advances in the development of its powers. The first period extends up to the first smile (roughly, a period of about six weeks), and possesses no definite cognitions, except the primary and fundamental cognition or intuition of being (the innate assurance that something is). It possesses also what Rosmini calls the 'fundamental feeling,' or that generally diffused feeling of our own bodies which, though it is not as yet attended to, constitutes us sentient beings. The cognitions of the second period, which extends up to the first articulate word (roughly, till the end of the first year), consist of the simple perception of things as subsisting, with corresponding volitions, termed by Rosmini 'affective' or 'instinctive,' which have these things for their object. Speech is the sign that the child has entered upon the third period of life, or the second order of cognitions, this order being formed by the child's analyzing the cognitions of the first order, and by his abstracting the more interesting, sensible qualities of things from the ideas of these things in his mind (imaginal ideas); and to these correspond the affective volitions, which have for their object these more interesting qualities abstracted from the actual things, and marked off from the things' other qualities, to which the appetitive faculty is at present indifferent. The third order of cognitions shows itself when the child begins to learn to read, say, at the end of the third year. We have now the exercise of the judging faculty, which has become able to connect by synthesis the elements of the previous analysis, and to affirm the existence in a subject of the qualities before abstracted. The corresponding volitions are the estimative or prizing volitions, by which the mind recognizes in a thing its interesting qualities, and thus estimates them. This is soon followed by the cognitions of the fourth order, which introduce analysis once more, as far as is necessary for forming comparisons between two objects judged of, and giving the preference to one over the other. The volitions belonging to this order are the appreciative, or the volitions of choice. The moral sense, which existed in germ in the preceding periods, now takes a larger development. The cognitions of the fifth order consist in a synthesis by which are determined the relations existing between two things combined into one, and conceived as one, of which conceptions the most important is that of the 'I' and of self-identity. About this

time appears the first dawn of conscience. And so, with their regularly alternating analysis and synthesis, Rosmini would have gone on sketching for us the characteristics of the succeeding orders. But here, to our misfortune, the treatise terminates, and we have nothing but rough notes and hints as to what would have followed. We must not, however, forget the warning which Rosmini gives us, more than once, concerning his stages of cognition. He only gives us the order in which they commence; but, when once commenced, they go on through all the other periods, increasing in power and widening in application. Moreover, the acts of the understanding are always excited by some stimulus external to themselves, and depend on this stimulus; and hence, when particular stimuli come late, we shall find the corresponding cognitions belonging to earlier orders coming into being alongside of cognitions belonging to the later orders.

But what of the practical application of all this? some of our readers may ask. Well, Rosmini himself answers, "I am a thinker, a psychologist. You good people of practice and experience must make the practical application of my principles for yourselves." But being human, as well as a psychologist, he cannot altogether refrain: he gives us some of his own 'practical applications;' and of these, some are very striking and suggestive, and some of — well, very moderate utility. "The object of instruction," Rosmini tells us, "is to bring the young to know, and it may therefore be called the art of properly directing the attention of the youthful mind." "There are always three distinct parts of instruction," he tells us elsewhere: "(*a*) that which serves to increase in the mind of the pupil the number of cognitions he has gained in the preceding order, and to make them more perfect; (*b*) that which enables the pupil to pass from the order of cognition in which he is, to the next higher order; and (*c*) that which serves to exercise and perfect the pupil in the knowledge belonging to the order he has just reached." He adds that it is evident that the language and style of the teacher should vary according to the order of cognition attained by the child. All language that goes beyond that order is wasted; or, worse still, it will produce confusion. In treating of the first order of cognition, he points out that nature has placed perception as the foundation of the whole immense pyramid of human knowledge, and that perception therefore should be the foundation of all human education. "Nature herself leads the child to observe every thing, and to experiment on every thing; but all these experiments and perceptions are unconnected and desultory. The earliest office of the educator, therefore, consists in regulating the child's observations and experiments, so as to lead him to perceive and to perfect his perceptions." The application of this is little more than hinted at, but enough is given to show how strikingly alike Rosmini and Froebel were with regard to the earliest childhood, though each worked independently and in complete ignorance of the views of the other. Indeed, one of the chief advantages of studying Rosmini's system is the added strength and clearness and meaning which it so frequently gives to the plans of Froebel, who, as a practical teacher, stands a head and shoulders taller than his Italian contemporary. Nor is Rosmini's psychology always equal to Froebel's. He has, for instance, some strange views on language, which, but for Prof. Max Müller's championship of very similar ones, would come upon us not only as novel, but also as startling. Rosmini holds that "by language we form our ideas," and that "man could not have invented that part of language which expresses abstractions." But, what is far more disconcerting to a teacher, is to find him stating that "one of the fundamental principles which should govern the instruction given, from first to last, is to consider language as the universal instrument provided by nature for the intellectual development of man," and to see, in the application, that this means that education is to be mainly a training in the use of words. Still, undoubtedly many of the practical hints he gives for the teaching of reading and writing will be found valuable, though they are applied somewhat prematurely; and much that he says on the use of music, and on picture-teaching, is highly suggestive. On the whole, however, we are inclined to think that teachers will be most struck with, and set most value on, the exposition given of the gradual development of the moral sentiment, — "based as upon a rock, on the great fact, that, rooted in the depths of the child's nature, there is a primary necessity of growing respect and love to whatsoever intelligent being he comes to know," — and with this, step by step, the corresponding gradual training. We have met with nothing elsewhere so soundly reasoned, so clearly expressed, and so practically suggestive; though here, again, the general line pursued is the same as that pursued by Froebel.

For the present we will say no more. But we hope we have said enough to prove to teachers that 'The Ruling Principle of Method' is a book to be studied with pleasure and profit. And, though some of us may be inclined to pronounce the system as rather logical than psychological, we shall all of us gain by coming in contact with a mind so eminently clear and reasonable, and so full of human kindliness.

T. Macci Plauti Captivi. With Introduction and Notes. By W. M. LINDSAY, M.A. Oxford, Clarendon Pr. 16°.

Anglice Reddenda; or, Extracts for Unseen Translation. (Second Series.) Selected by C. S. JERRAM, M.A. Oxford, Clarendon Pr. 16°.

FROM the Clarendon Press comes a very neat little edition of the 'Captivi' of Plautus, by Mr. W. M. Lindsay, intended as a companion to the 'Trinnummus' of Messrs. Freeman & Sloman of the Westminster School, where the plays of Plautus have been frequently exhibited by the scholars with much dramatic and archæological success. The only fault to be found with those exhibitions, however, is their practice of ignoring the musical element, that must undoubtedly have been an important feature in the original production of the Plautine plays. In fact, the ancient divisions of the comedies were effected solely by the musical passages, or 'Cantica;' and in the manuscript the name of the musical performer at the first exhibition of the play is often given in the title, or, rather, after it. In the present edition of the 'Captivi,' Mr. Lindsay has very properly called attention to this fact, which even careful students of the Roman drama are too apt to overlook; and his remarks, although unduly brief, will be instructive to the young student, for whom this little book is intended. Within the limits which the editor has marked for himself in the preface, he has done very excellent work, availing himself of the most recent German research, and giving notes, that, while useful to the schoolboy, are often very suggestive to the more mature scholar. Mr. Lindsay properly regards the Plautus lecture as affording "the best opportunity for teaching the etymology and structure of Latin words," and he has therefore given this side of the subject particular attention in the notes. The book may be unreservedly commended as being precisely what it professes to be, — an edition of the 'Captivi' that will "enable boys of the higher forms to read with intelligence and interest a play which, more than any other of Plautus, may suitably be put into a school-boy's hands."

The reading of Greek and Latin at sight is deservedly becoming an important part of the preparatory training for college, both in England and our own country. The advantages of an ability to read an ordinary classical author without the aid of a dictionary are so obvious as to need no comment, and, as they impress themselves more and more upon our instructors, a much-needed reform will gradually come about. One may hope to see the day when college-examinations will test not only the memory, but the genuine knowledge, of the student, and when the object will be to discover not merely how much he knows of some particular author, or portion of an author, but of the language as a whole. Already sight-reading of easy Greek and Latin has become a part of the required entrance-examinations at Yale and Harvard, it has for some time held a prominent place in the classical instruction at Columbia, and the time is not far distant when it will form one of the important tests of all our leading colleges. Mr. C. S. Jerram of Trinity College, Oxford, already well known as the author of several useful publications, has just sent forth a volume of extracts for sight-reading, bearing the imprint of the Clarendon Press, and entitled 'Anglice Reddenda.' It supplements a much simpler work issued some years ago, and is intended for students who may reasonably be supposed to have acquired a somewhat extensive vocabulary. The extracts are about equally divided between Greek and Roman authors, and are admirably selected so as to interest and entertain as well as to instruct. It may be doubted, however, whether such excerpts as odes from