§ 335. Simplification by multiplication, addition, and subtraction.

An impatient Briton might be tempted to call this "simplification to the death," but after calmly perusing the whole he might be induced to confess that he had said so in his haste. The last three chapters deal with applications of determinants: one is arithmetical, and is mainly concerned with continuants and magic squares—a rather invidious juxtaposition; one is algebraical, and gives the determinantal solution of a set of simultaneous linear equations; and the last is geometrical. A very valuable feature of the book is a *résumé* in 40 pp. of all the definitions and theorems given in the preceding 410 pp. No one but a most enthusiastic and painstaking teacher would have thought of adding such an admirable abstract.

The next book on our list might have been more accurately described as a *very* elementary treatise: it must have been intended for pupils with exceedingly little algebraical training. The first 18 pp. are occupied with determinants of the second order, and they are followed by 33 pp. treating of those of the third order. It may be safely affirmed that the pupil who requires 18 octavo pages to teach him the theory of such abstruse functions as determinants of the second order would do well to redirect the expenditure of his mental energy. The book is carefully and accurately written, and there is a wealth of simple exercises in it, worked and unworked.

Dr. Kaiser's pamphlet is of the same ultra-elementary character—considerately restricted, however, to 23 pp. On a former occasion (*NATURE*, vol. xxix. pp. 378, 379) we drew attention to the fact that a new Introduction of this kind appears every year in Germany, and that of late they have not been improving. We merely notify, therefore, that this is the production for 1884.

The preparation of a new edition of Salmon's "Modern Higher Algebra" has been entrusted to Mr. Cathcart. It contains about 40 pp. of new matter, the chief increase arising from the expansion of the chapter on "Applications to Binary Quantics" into *two* chapters, the first with the old title, and the second headed "Applications to Higher Binary Quantics." The changes made on the portion which deals with determinants are slight, and consist chiefly in the insertion here and there of well-chosen examples.

OUR BOOK SHELF

The Three First Years of Childhood. By Bernard Perez. Edited and translated by Alice M. Christie. With an introduction by James Sully, M.A. (London: W. S. Sonnenschein and Co., 1885.)

THE earliest years of infancy are of importance to two classes of inquirers—to the educator who knows how much evil results from the wrong treatment of young children, and to the evolutionist who, rejecting the *tabula rasa* of Locke, looks to infancy as the time freest from any effect of artificial training. In the study of other *men's* minds the observer is as likely as not to be purposely deceived by them, whereas deceit is an accomplishment which few infants have attained to.

Mr. Bernard Perez seems well to combine these characters. He is an educator who has published various works on school matters, and he describes man as an animal which ought to be reasonable, while he is not necessarily so, as criminal scandals and the success

of bad novels prove. He notes that the preponderating elements in a child's will are impulsiveness and stubbornness, incapability of fixed attention, qualities most opposed to the temperament of philosophy and discipline. Much of his book is advice to practical educators, whom he urges to study the manifestations of infancy and to endeavour to lead their youngest pupils by example and not check their behaviour by authority; their intellect should be helped, not controlled. He specially points out the danger of deceit before even the youngest of children.

But, on the other hand, there is little of the tone of the pedagogue in his book. Far more is it a book of suggestion than one teaching with authority, and it will encourage the spirits of fruitful doubt and inquiry in the mind of every reader. He enters heartily into the teaching of modern science, even to using the argument that infants have not certain sensations *because* they would be of no use to them at that age; and, thinking it necessary to caution his readers against leaving everything to hereditary dispositions and powers. He urges the importance of comparing early human life with animal life, thus making cats, dogs, birds, and babies more interesting than before. We may enjoy his book without accepting the teaching that human language has grown out of such involuntary signs as laughter, sobs, and screams, afterwards performed voluntarily. No doubt these involuntary sounds are of more use to an infant than more sober utterances, and have therefore become innate and involuntary, while language is an artificial acquirement. We think that few who have watched their vigorous antics will feel sure that a state of equilibrium, a passive state of health, or even that of moderate and appropriate exercise in moving their limbs, is the most enjoyable sensation to infants, though this latter pleasure is sufficient to explain many actions of infants for which our author seeks a deeper reason. On the other hand, we think that the moral sense has become more deeply impressed than he suggests, and is far from entirely the result of approbation and disapprobation.

Attention and vivid perception seem strangely shaken up in his remarks; the latter faculty explains the dislike which children have to hearing a tale repeated with variations. They have indeed got it all "by heart."

Mr. Sully, in his very suggestive introduction, raises the question, Who is best qualified to follow up this delicate business of observing and rightly explaining all the movements and utterances of such young objects? Neither father, mother, nurse, nor doctor is completely qualified for the study. Mr. Sully concludes that the father and mother must conjointly undertake the work, the cooler intellect of the one checking and steadying the close and loving knowledge of the other. Let us suggest that an elder sister is most likely to succeed, and thus indicate a path to intellectual usefulness and even eminence well fitted for a lady's sphere. It will elevate every little labour from drudgery into a scientific study of variations and resemblances of the greatest importance, and add immensely to the interest of nursery life in a large family. On such observations may be based, by herself or by more ambitious philosophers, theories of racial varieties, of biology, and of education. Sir W. Hamilton points out that the study of the human mind requires no scholarship or costly apparatus, and the principal acquirement necessary for success in the study we suggest is a little close knowledge of one's own thoughts and feelings. In recording observations Darwin's golden rule must always be strictly adhered to: Theorise freely—every other observer will help to demolish anything that will not hold water, and whether true or not it may be a suggestive hypothesis. Be most scrupulous as to recording as a fact anything not strictly correct; no one can disprove it, and it may throw back the reception of a useful truth for a generation.

W. ODELL