nineteen individuals (and tolerably vigorous larvæ they were) alive in the lot which had experienced two years of famine, although every individual of the 149 hatched was carefully preserved and royally fed —a fact which goes to prove that the equipment at birth of many of these larvæ was inadequate.

The fact that some larvæ of starved ancestry have exhibited a superiority over their fellows, in surviving and recovering from hard conditions, is testimony for the existence of individual variations which can not be defined anatomically, and yet which serve as 'handles' for natural selective agents. Such variations might be called physiological variations, since it seems that the surviving larvæ must be those which are in best trim physiologically. These larvæ are able to make the most of the food offered to them. If competition were allowed, they would probably be the individuals which would cover the area most rapidly, securing whatever food there might be. But under our experimental conditions there was no competition allowed and yet certain precocious individuals made more grams of flesh and more yards of silk, than other larvæ furnished with the same amount of raw material under like conditions; that this was due to the possession by the former of certain congenital qualities of adaptability can scarcely be doubted.

6. As to the fertility of the variously fed lots; in so far as number of eggs produced is a measure of fertility, our records already demonstrate the fact that the better nourished are the more fertile. Furthermore, the economy in this matter practised by the starvelings is not merely numerical, quality as well as quantity of eggs being affected. In witness of this point may be recalled the story of the dying 1903 generation, produced from eggs of the starvelings of 1901 and 1902, which would seem to offer conclusive evidence that a famine suffered by the parents works its way into the germ cells so that most of their progeny have but a poor birthright.

A more exhaustive study of silkworm fertility and its correlation with anatomical variations and physiological vigor has been begun, and when it is carried to the point of indicating not only how many eggs are laid but how many eggs develop through larval and pupal stages into fertile adults, some clear light may be thrown upon such questions as that which arises concerning the precise ancestry of the survivors of our induced famine and the part these survivors will play in race history.

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Scientific Books.

Recent Psychological Literature.

The lack of an adequate history of the remarkable developments in psychology during the last quarter century has been keenly felt in many directions and not least by the psychologists themselves. The task of supplying this need is peculiarly difficult. For its successful accomplishment one must possess not only the rare gift of lucid and accurate exposition, but one must also be a competent philosophical scholar, with a considerable knowledge of biology in addition to a wide and exact acquaintance with the many phases of psychology itself. The fulfillment of these trying requirements has been in effect essayed by Guido Villa, of the University of Rome.* His book is not entitled a history, but in substance it is such, being an effort to give, in connection with comments upon the work of various authors, a correct impression of the general drift of contemporary psychology.

It must be admitted that the book is superior to anything else at the moment available. It represents an immense amount of patient en-

* 'Contemporary Psychology by Guido Villa' (translation by Harold Manacorda), Swan Sonnenschein & Co., London, 1903, pp. xv + 396.

deavor and it is marked throughout by an evident fairness of spirit, for all of which the writer deserves appreciation and credit. Moreover, it is, on the whole, clear, the author being at his best in dealing with the more philosophical aspects of his subject. The translator has done his work acceptably. Nevertheless the book suffers from several serious defects. Thus, for example, although much space is devoted to the description of Wundtian doctrine, the portrayal of the methods and results of experimental psychology is distinctly inadequate. No one could possibly gain from it a just conception of the scope and solidity of achievement of this branch of psychological work. Morbid psychology, animal psychology and the psychology of religion are even more gravely misevaluated. Needlessly distressing are the misprints which deface almost every page, distorting dates, rendering proper names in some cases almost unrecognizable, etc. An exasperatingly incomplete index furnishes the climax of this kind of annoyance.

Professor Royce has put aside his metaphysics long enough to write an admirable psychology, which is ostensibly constructed for teachers, but will undoubtedly find a much wider public.* Indeed, it will probably be only the better trained teachers who will successfully follow the text, for the author has written with something of his usual fullness and freedom, and the average pedagogue commonly demands his intellectual pabulum cut up in smaller pieces than those here offered. Several novel features appear in the construction of the book, which is extremely suggestive, and characterized throughout by a strong flavor of practical common sense.

In the first place, the author has abandoned the conventional lines of division of the psychological field into cognition, feeling and will. In their stead occur the categories of 'sensitiveness,' under which are included feeling and sensory discrimination: 'docility,' in connection with which we find discussions of the multifarious influences of past experience upon the consciousness of the present moment; and 'mental initiative,' under which we are confronted with those facts which indicate a factor of variation and individual peculiarity entering into our mental operations. These rubrics are in essence, perhaps, variants upon current usage rather than wholly original, but they undoubtedly serve to avoid certain perils to which the customary method of division is exposed and they facilitate the practical applications of a broadly pedagogical character which the author desires to make.

An entirely novel doctrine, so far as I am aware, is, however, advanced in connection with the theory of feeling. As is well known, pleasure and displeasure have long held sway as the sole rudimentary forms of feeling. Wundt has recently contended for two other elementary polar groups, *i. e.*, feelings of excitement and depression and feelings of tension and relief. Professor Royce proposes *two* fundamental groups, *i. e.*, pleasure and displeasure, restlessness and quiescence. Space does not permit an examination of the merits of this program. Suffice it to say, that the deficiencies of the pleasure-displeasure classification as usually advocated are increasingly evident, and in the reconstruction which appears to be immediately at hand Professor Royce's proposition may prove to be as near the mark as any. He seems to be unaware of the support afforded such a theory as his own by the physiological observations of Binet, Courtier, Vaschide, Thompson and the reviewer.

Another striking feature of the book is the attempt to connect the phenomena of mental initiative and variation with such organic reactions as those to which Loeb and others have given the name of tropisms. The point which our author wishes to make is the recognition of a type of spontaneity independent of the individual's own past experience and independent of the usual hereditary factors of the instinct variety. That the two groups of phenomena are analogous to one another hardly admits of doubt, but in identifying the two activities so closely Professor Royce has surely allowed his first enthusiasm to carry him

* 'Outlines of Psychology, An Elementary Treatise with Some Practical Applications,' by Josiah Royce, The Macmillan Company, New York, 1903, pp. xxvii + 392.

beyond the definite implication of the facts at present known. Save in the case of obviously morbid conditions there is never any such persistent adherence to impulses operating independent of, or counter to, the influence of the individual's past experience as that manifested by the true physiological tropisms. A genuine mental variation from type must be recognized and provided for in our psychology, but to do this it is neither necessary nor altogether permissible to invoke the tropism concept in an unmodified form.

Another agreeably written book for teachers comes from the hand of Dr. Judd.* It is practically a series of essays dealing with certain of the contact points between psychology and education. The keynote of the book is the principle of development through expression, which the author dwells upon in an illuminating way in its psychological and practical aspects. The elementary school problems centering about reading, writing and arithmetic are discussed in the light of this principle and a number of instructive and interesting experiments and observations are reported. The volume does not belong to an order of books in which startling originality is feasible, but it is informed throughout with admirable good sense; it is suggestive on specific concrete points and it is thoroughly intelligible to even the casual reader, so that it ought to be found a very useful addition to the resources of those for whom it has been prepared.

Experimental psychology has had its apologists and its popularizers. Professor Stratton is, however, the first to attempt on an extensive scale the exhibition of its bearings upon our general philosophical and intellectual interests. † His book, which is written in a forceful and attractive style, is addressed primarily to the intelligent and serious-minded person who cares to keep in touch with the scientific developments of his own day, especially the broader and more distinctly cultural implications of those developments. Experimental investigations (a number of them original) have been selected for discussion, which bear directly upon such problems as those of the existence of unconscious ideas, the nature and reality of personal identity, the character of time and space, the connection of mind and brain, etc. The exact procedure in typical psychological experiments is vividly described in connection with copious photographs and drawings, so that even the veriest tyro may obtain a correct impression of the technique in such work. The general treatment, although fresh, vigorous and independent in its temper, is conservative and trustworthy, following in the main the lines of commonly accepted theories. Although there may be some disappointment that the results gained from experiment do not speak with a tone of greater finality upon the philosophical problems to which they are applied, there can be no question that the author succeeds admirably in showing how they contribute their quota of novel and reliable evidence in favor of one or another of the possible solutions of such problems. By reason of its interesting collocation of material, not to mention its other excellencies, the book is likely to prove as valuable to psychologists as to those outside the strictly psychological pale.

Despite the independent status of psychology, it is still true that its logical bases as well as its history must always keep it close to philosophy. Especially is it true that now and again its fundamental presuppositions and assumptions must be examined and tested. No problem of this general character is more insistent than that of the relation between the mind and the body. Experimental psychologists have largely come to adopt the position of psychophysical parallelism as a tentative working basis, frankly recognizing its limitations and defects. In view of the utter instability of opinion manifested by the controversial literature of the subject, this practical attitude is not difficult to understand. Professor Strong has just rendered yeoman service by setting in order the various pros and cons

* 'Genetic Psychology for Teachers,' by Charles Hubbard Judd, D. Appleton & Co., New York, 1903, pp. xiii + 329.

† 'Experimental Psychology and its Bearing upon Culture,' by George Malcolm Stratton, The Macmillan Company, New York, 1903, pp. vii + 331.

upon the matter.* He brings wide knowledge, unbiased judgment and unusual critical acumen to his task, and the result is a work of marked distinction. The various contentions of automatism, parallelism and interactionism are successively examined, and after the expurgation of all fallacies, the residuum of uncontroverted doctrine is elaborated into the theory of psychophysical idealism—a theory closely akin to the panpsychism of Fechner, Clifford and others.

Psychophysical idealism inverts the materialistic view, in accordance with which the brain is the reality and consciousness a mere unsubstantial phenomenon, and maintains that the mind is the reality—the thing-in-itself—of which the brain is the phenomenal manifestation. This sounds at first like a very naïve form of subjective idealism, offensive to all persons of Dr. Johnson's persuasion and to many others less strenuous. And idealism it is, but by no means naive in the arguments upon which it is based, including, as these do, scholarly considerations of the nature of causation and the law of the conservation of energy, discussions of the pertinent facts in physiological psychology, etc. An adequate critical analysis of Professor Strong's theory is evidently out of the question at this time. It should not be forgotten, however, that theories of this type, while avoiding the crass incongruities of the common forms of materialism, the inconsistencies of interactionism and the inconclusiveness of parallelism, are nevertheless incessantly haunted by the ghost of solipsism. If the solipsistic position be accepted, it then requires a constant miracle, of the kind resorted to by occasionalism, to account for the orderliness of the physical cosmos upon which we are all so unanimously agreed. Whether Professor Strong has wholly avoided the treacherous solipsistic pitfalls, the reader must decide for himself.

JAMES ROWLAND ANGELL.

*'Why the Mind has a Body,' by C. A. Strong, The Macmillan Company, New York, 1903, pp. x + 355.

SCIENTIFIC JOURNALS AND ARTICLES.

The Journal of Comparative Neurology for October contains five papers, as follows: (1) 'The Neurofibrillar Structures in the Ganglia of the Leech and Crayfish, with Especial Reference to the Neurone Theory,' by C. W. Prentiss. Establishes fibrillar continuity between the nerve elements, confirming in this respect the conclusions of Bethe and Apáthy. (2) 'On the Increase in the Number of Medullated Nerve Fibers in the Ventral Roots of the Spinal Nerves of the Growing White Rat,' by Shinkishi Hatai. The total number of medullated fibers in the ventral roots of the adult is 2.7 times that of the rat ten days old, and at all ages the total number of medullated ventral root fibers decreases from the spinal cord toward the periphery. (3) 'On the Medullated Nerve Fibers crossing the Site of Lesions in the Brain of the White Rat,' by S. Walter Ranson. Operations on very young rats heal with no appreciable scar and the site of the lesions is crossed by medullated fibers. These are presumably entirely new axones, for the power of regeneration seems to be lost in the adult. (4) 'On the Density of the Cutaneous Innervation in Man,' by Charles E. Ingbert. About 79 per cent. of the medullated dorsal root fibers innervate the skin and 21 per cent. are afferent fibers from muscles and deep tissues. One cutaneous spinal nerve fiber innervates, taking the average of the entire body, 2.05 sq. mm. of the skin. (5) 'On a Law determining the Number of Medullated Nerve Fibers innervating the Thigh, Shank and Foot of the Frog—*Rana virescens*,' by Henry H. Donaldson. The nerve fibers entering the leg being considered as so many separate lines of connection with the several segments, are found to be distributed in accordance with the law that the efferent fibers are present in proportion to the weight of the muscle, and the afferent in proportion to the area of skin.

SOCIETIES AND ACADEMIES.

THE CONVOCATION WEEK MEETINGS OF SCIENTIFIC SOCIETIES.

THE American Association for the Advancement of Science, the American Society