About the other tendency spoken of, possibly the least said the better. Yet, when theory is being attacked for being open and conscious of itself, it is well to point out the sort of crude theory which lurks behind the very denunciations of empiristic philistinism. Many of the papers in the *Pedagogical Seminary* contain hints of valuable points of view, which, if worked out, might bring some order into the dreary mass of facts, reports and syllabus returns; but no, facts must speak for themselves; we may put them in tables, and if a curve, a holy curve, can be drawn, that is rich, though it bar the way to thought. Let no man think beyond the confines of the curve. If a general principle be enunciated let it be with that positive conviction and assurance of demonstration which curve- and table-evidence avail to produce. No hesitation here: "You know or you don't know, and that's the end of it!"

Can curves apply themselves? Can tables digest themselves? Can the teachers be benefited by purchasing tables and curves and scanning them with the fine frenzy into which the more inexperienced of them are being worked? To be concrete, what is the scientific value of the Worcester collection of observations on imitation? Value they may have, of course, if confirmed and interpreted; but who can interpret such facts except by resorting to general hypotheses which are openly and avowedly theoretical? And further, I submit that no results which are not gathered avowedly under the critical eye of interpretation can ever afterwards be available at all. Professor Sully's book seems to me to illustrate the way a man may be led astray by the use of just such results as those of which I speak.

J. M. B.

Memory and its Cultivation. By F. W. EDRIDGE-GREEN, M.D., F.R.C.S. New York, D. Appleton & Co. 1897. Pp. 311.

This work, which forms one of the recent volumes of the International Scientific Series, deals with the subject of memory both from a scientific and from a practical point of view. Although more than two-thirds of the book are given to the theoretical exposition in the first part, yet the treatment throughout seems to be determined with reference to its bearing on the problem of the training of memory.

On the basis of the distinction between sensory and motor nerves, the author divides the phenomena of memory into two great groups,

Monthly, January, 1898. Stanley says in the paper cited: "As to the method of investigation, the questionnaire mode of popular reports is evidently a crude and very tentative form."

sensory and motor; the sensory group including "the memory of all ideas, emotions and other processes of the mind arising out of the sensory memory impressions." Under the two great groups come the special memories which are developed in each case owing to special intensification of certain portions of the general memory. Both sensory and motor memories are constituted by impressions, *i. e.*, modifications of the protoplasm of the cells in the memory centres, and associations between the cells so modified. The memory of internal impressions differs only in this, that the memory is modified not by external impressions, but by internal impressions originated in the higher parts of the brain. "The mind is made up of a number of faculties, each of which responds to certain impressions, and influences the mind as a whole to seek after those impressions and to avoid their negatives." There are perceptive faculties and intellectual faculties; the former respond to external stimuli, while the latter have to 'convey certain impressions from the sensory memory to the mind.' They agree, however, in this, that "for each faculty and for each individual, a psycho-physical series can be constructed and, according to the units of this series, ideas of resemblance or dissimilarity between impressions will be obtained." A large faculty invariably implies a powerful memory; it is the function of each faculty to perceive the impressions of which the memory is made up. We require then to know what the faculties are. Of classifications of faculties, that given by the phrenologists is "certainly the best system extant, as far as the discovery and definition of ultimate faculties is concerned." Modifying this system in a few particulars the author next proceeds to state and define 37 ultimate faculties, which include faculties of sensory perception, of composite perception, reason and imagination, of motor organization, and lastly of propensities and emotions. Special prominence is given to the author's theory of color perception. The idea underlying this extended treatment of faculties is that the reader may be enabled to observe himself and note the relative strength of the different tendencies and abilities in his character, and, on the basis of this, learn how he may most easily, by the use of one or other, secure a distinct and intense impression of some given subject matter.

Dr. Edridge-Green argues strongly against the theory that the cerebral seat of memory is the same as that of perception. One line of proof is found in pathological cases where there is loss of a definite kind of memory, but no corresponding loss of power in the corresponding faculty. Another objection to the theory rests on the contention that if it were true then each particular faculty would remember

separately its own impressions; thus in a complex visual perception we should have separate memories for color, form, size and comparison, since there are separate faculties for each of these phenomena. To the author's mind it is much more simple and reasonable to suppose sensory and motor memories stored up together, each group in its own centre. He considers that the thalami optici are appropriate centres for sensory memory, while the corpora striata subserve the motor memory. Positive evidence in favor of this hypothesis is given in the chapter on localization of memory. The centre for sensory memory must have a relatively independent physiological existence; the thalami optici fulfil this requisite, in addition to supplying a basis for the distinction of perception and memory. It is true that in a report on 50 cases of disease of basal ganglia which is referred to, no defect of memory was reported. But then, Dr. Edridge-Green notes, in no case were both thalami optici diseased and the defect of memory might have been overlooked.

It will be seen from the foregoing summary that the account of memory presented in this volume is undertaken from a physiological standpoint. There is no clear conception of the relation of the impressions to the mind which perceives them by means of the various faculties of which it is made up; the impressions are conveyed to the mind by faculties which are now called faculties of mind and now faculties of brain. It is no more satisfactory to find a scheme of faculties presented as a scientific explanation. This is not merely out of place as a psychological statement; it vitiates also the author's reasoning in regard to the localization of memory, in leading him to suppose that the theory which he opposes logically implies separated memories corresponding to separate faculties. A locally separate organ of memory does not seem specially to facilitate the physiological explanation of retention and of the thoroughgoing connection of presentative and representative elements in mental life.

The most important chapter in the first part is that dealing with remembrance, recognition and recollection. Three laws are given for remembrance—involuntary revival—which may be briefly stated as follows: (1) impressions tend to revive those of a similar character; (2) revival of one impression by another leaves the two separate unless the revival is accompanied by conscious recognition of similarity; (3) revival of one component of an impression tends to the revival of the remaining components. In regard to the first, careful attention is given to the conditions by which the intensity of the reviving or revived impressions and the consequent memory are determined. The second

law is used to explain cases where mere unthinking repetition of an impression leaves no clear and exact memory. Recognition, the conscious association of impressions according to the second law, may be either direct or labored. Recollection is a voluntary process of recall, stimulated not by perception but by idea; it also presents two forms, instantaneous and labored. There are many valuable observations in this chapter, but the treatment would have been more clear and thorough if the whole explanation had been brought more into line with processes ordinarily recognized in the psychology of association.

Chapters on the connection of motor and sensory memories, on memory in the lower animals, and on variations in memory, normal and pathological, occupy 61 pages of the book. Nowhere does the author give a hint of the work done by Ebbinghaus and those who have followed in the path opened up by him. Such an omission has no justification.

In the second part on the cultivation of memory, Dr. Edridge-Green gives a number of practical rules for the improvement of memory. In the preface he states that they have enabled him to learn a subject in about a fifth of the time formerly taken. A few of the rules may be briefly indicated. Let the first impression be as intense and distinct as possible, but not too detailed. Revise what has been learned as frequently as possible and without reference to the original source. Bring an impression into connection with former impressions where possible; when a new subject is being taken up form relations with something similar in former experience and connect all the members in a series closely together. Use by preference the largest faculty, use as many faculties as possible, and employ each faculty when the mind is fresh and the nervous force is abundant. Interesting suggestions are also made as to various systems by which dates, events, etc., can be committed to memory by means of words and phrases. The rules and suggestions here given may be of great service to many who have not reflected on the best means for utilizing the memory power which every one possesses in varying form and degree.

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In Sachen der Optischen Tiefenlokalisation. HILLEBRAND. *Zeitsch. f. Psych. u. Phys. der Sinnesorg.* Bd. XVI., pp. 71-151.

Hillebrand is a supporter of Hering's theory of space-perception. In Vol. VII. of the *Zeitschrift* he reported an elaborate series of ex-