

lies have been published, together with attempts at explanation of their significance, which for the most part have left a good deal to be desired. Testut's work on this subject, published in 1884, has been the only at all systematic account. The present one, however, supersedes it, both from its greater scope and from its more philosophic spirit. The work of analyzing the variations of each muscle, of grouping together the observations of others and discussing the comparative anatomy, has been most thoroughly done, so that the book is indispensable to all workers in this branch of anatomy.

At the end of the second volume are the general considerations, treating among other things of the classification and significance of anomalies. We should say, in the first place, that, though Le Double occasionally uses the word *anomaly*, he has chosen *variation* as the correct one, holding that the former implies a knowledge of all the laws and of the fixity of species, which last he evidently does not believe in. He rejects unity of plan as any explanation, though he quotes a really eloquent passage from Geoffroy Saint-Hilaire in support of it. On the other hand, he is not only more conservative, but more philosophic than those who would call all anomalies atavistic. As Poirier has written: "Lorsqu'un auteur, pour expliquer le muscle présternal de l'homme, remonte ou descend jusqu'au serpent, il court grand risque de n'être pas suivi." Le Double points out that in this respect Macalister has done him an injustice by classing him among those of this set.

His system divides variations into three classes: First, regressive, reversive, atavistic and theromorphic; second, progressive ones; third, monstrosities. The last word is not used in quite the ordinary sense, but rather to include such muscles as cannot be made to fit into the other classes. He believes that their number will steadily diminish with the progress of the departments of science bearing on the question.

It is very hard to find two men in accord on the significance of anomalies, but at least the day of those who would call everything atavism and resent criticism is on the wane. On the other hand, a satisfactory explanation of many points is wanting. Without

quite agreeing with Dr. Le Double, we wish to call attention to an excellent piece of work that is a true contribution to the facts of anatomy.

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The New Psychology. By E. W. SCRIPTURE. London, Walter Scott; New York, Charles Scribner's Sons. 1897. (Contemporary Science Series.) Pp. xxiv+500. Price, \$1.25.

Dr. Scripture here gives us an account of the work which has been carried on in the psychological laboratories. After a general treatment of the methods, he presents, under various heads, the technique and results of a wide range of experiments, and has helped out the narrative by a plentiful use of illustrations. There is also an historical sketch of the rise of experimental research in psychology, together with a chapter on the present state of the work in various lands, to which Professor Binet has contributed some interesting pages on past and present conditions in France. Binet is evidently pleased that the study of hysteria and hypnotism is yielding to an interest in 'aphasia, arithmetical prodigies, memory, the superior intellectual functions, and also the organic and motor functions connected with intellectual states.' He believes 'that French psychology will long continue in this path, on which he entered about 1890.' The book closes with an appendix containing a number of mathematical tables and formulæ.

In the general grouping of experiments Dr. Scripture has taken new and, on the whole doubtful ground. He has attempted to make psychology speak the language of physics by dividing experiments into those involving Time, Energy and Space. The division entitled 'Energy' is the rag-bag into which everything is thrown that doesn't readily fall under 'Time' or 'Space.' The scheme is an awkward one, and if it gives some borrowed feeling of scientific exactness it can only be at the expense of clear thinking in the purely psychological field. Classification is, at best, a thankless task; but since it has to be done it would seem best to group experiments more according to the mental process we are really investigating than according to the object on which this process plays. For instance, from a psychological stand-

point there is a deeper kinship between an experiment on the discrimination of space-intervals and one on the discrimination of time-intervals than there is between the latter and experiments in simple reaction-time. And yet in the author's arrangement the mere difference in the object separates the various experiments on discrimination by nearly the thickness of the book, while the time elements bring reaction experiments close to those on the estimate of time-intervals, although the mental processes investigated in these experiments are as different as can be.

But it is when interpreting experimental results that the author shows to least advantage. If one were to generalize on the character of the new movement in psychology from such writings as this, one might say that the 'New Psychology' is woefully lacking in psychological insight. There is tireless nicety in gathering 'facts,' only to make slovenly generalizations which these facts do not warrant. Emerson could have pointed to this as another illustration of his wide law of compensation. If the older psychology was deficient on the side of exact experiment, the new seems too often wanting in any clear notion of what the experiments prove.

Many illustrations of this could be gathered from the book, but the single instance of tap-time must suffice. The rapidity with which taps can be given on an electric key is assumed by the author to indicate the rate at which we can make separate acts of will. In truly scientific work, however, it would seem appropriate that the same exactness which is displayed in recording and counting the taps should also be used in determining whether these separate movements of the finger are really due to separate acts of will. To the present writer, at least, the maximum rate of tapping seems to be obtained by a peculiar muscular tension which is preserved (it is true) by an act of will, but the separate oscillations of the finger are no more indicative of distinct acts of will than a sustained rigidity would imply a separate volition for each unit of time the contraction was maintained. Let us, by all means, have the spark-method and full tables of mean variation and all else that scientific accuracy may require,

but let us not neglect the weightier matters of the law.

But, in spite of these and other defects, the volume gives a really valuable account of the more mechanical side of the experimental work, and contains in small compass much that had never been gathered into any single book. So that Dr. Scripture has done good service in collecting and arranging all this material. It is to be regretted that the author's unfortunate manner will, in too many cases, prevent even his account of laboratory contrivances, in which he is at his best, from getting the hearty recognition which the reader would otherwise be sure to give.

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Traité élémentaire de mécanique chimique, fondée sur la Thermodynamique. By P. DUHEM. Paris, A. Hermann. 1898. Vol. II. Large 8vo. Pp. 378. Price, paper, 12 fr.

In treating the subject of chemical equilibrium one can classify the matter according to components and subdivide according to variance, or one can reverse this, classifying according to variance and subdividing according to components. The first method is well adapted to books on qualitative equilibrium, in which the object is to get a clear view of the behavior of a system as a whole. In books on quantitative equilibrium it seems more rational to group like equations together, and for that reason it is better to discuss all nonvariant systems and then all monovariant systems. Since this second method has not yet been adopted by any one, it is perhaps not surprising to find that Duhem has chosen the other in preference. The present volume, the second of the series, treats of the laws describing one-component systems and the systems which can be made from these by addition or subtraction of heat or work. This last statement may not be clear without some explanatory comment. If we start with solid ammonium chlorid we certainly have a one-component system, and this is not altered by the fact that the vapor given off by this substance is composed chiefly of ammonia and hydrochloric acid. If we are not to make any distinction between a substance which dissociates in the vapor phase and one