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ELEMENTS

OF

PHYSIOLOGICAL PSYCHOLOGY

*A TREATISE OF THE ACTIVITIES AND NATURE
OF THE MIND*

FROM THE PHYSICAL AND EXPERIMENTAL POINT OF VIEW

BY

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PREFACE.

THERE can be no doubt that an important movement in psychology has arisen in recent times through the effort to approach the phenomena of mind from the experimental and physiological point of view. Different students of psychological science will estimate differently both the net result already reached by this effort and the promise of further additions to the sum of our knowledge from continued investigation of the same kind. Some writers have certainly indulged in extravagant claims as to the past triumphs of so-called Physiological Psychology, and in equally extravagant expectations as to its future discoveries. On the other hand, a larger number, perhaps, have been inclined either to fear or to depreciate every attempt to mingle the methods, laws, and speculations of the physical sciences with the study of the human soul. These latter apparently anticipate that some discovery in the localization of cerebral function, or in psychometry, may jeopard the birthright of man as a spiritual and rational being. Or possibly they wish to regard the soul as separated, by nature and with respect to its modes of action, from the material body in such a way as to render it impossible to understand more of the one by learning more about the other.

As a result of some years of study of the general subject, I express with considerable confidence the opinion that there is no ground for extravagant claims or expectations, and still less ground for any fear of consequences. In all cases of new and somewhat rankly growing scientific enterprises, it is much the better way to waive the discussion of actual or possible achievements, as well as of welcomed or dreaded revelations of new truth, and proceed at once to the business on hand. It is proposed in this book to follow this better way. It will be the task of the book itself to set forth the assured or alleged results of Physiological Psychology; and this will be done at

every step with such degree of assurance as belongs to the evidence hitherto attainable upon the particular subject discussed. With declamation, either in attack or defence of the "old psychology," of the "introspective method," etc., one may dispense without serious loss.

The study of the phenomena of consciousness by the method here proposed necessarily requires some acquaintance with a considerable circuit of sciences which are not usually all alike closely allied. The number of scholars who can form opinions with equal freedom and confidence in all of these sciences is very small. Moreover, since all *psycho-physical* laws are supposed—as the very term indicates—to govern the correlations of phenomena of consciousness with phenomena of the nervous system, a peculiar mystery belongs to much of the domain within which psycho-physical science is compelled to move. These facts may fitly, on the one hand, excite caution in the writer; and, on the other hand, excuse him for many inevitable failures to set forth with perfect definiteness and confidence the conclusions he has to propose. Much will be said that must be accepted as provisional, as only probably true. Much room must also be made for conjecture and speculation. What is most important, however, is that conjecture should not be put forth as ascertained fact, or speculation as unquestioned law.

It would have been a great assistance to me if I had had more predecessors in the path which I am to take. But with the exception of Wundt's masterly work (*Grundzüge der physiologischen Psychologie*, second edition in 1880), no one book has attempted to cover, even in a summary way, the entire ground. The number of monographs, however, which have dealt with individual questions subordinate to, or part of, the main inquiry is very great. These two facts also render the attempt at a general survey of Physiological Psychology for readers of English both peculiarly attractive and peculiarly difficult. I can only indulge the hope that I have done something toward breaking this path and rendering it easier and more secure, both for myself and for others, in the future.

The investigators and authors to whom I am under obligations for material upon the various questions discussed, or statements made, in this book are by no means all mentioned by name. Of course, much of what is said on the structure of the nervous system, and on the phenomena of sensation and perception, has already become part of that general fund of facts and laws which belongs alike to all students of the subject. But by quoting certain author-

ities in the text, and by a few (in comparison with the number which might have been cited) references in foot-notes, I have connected some of the discoveries and views of modern psycho-physical science with their authors. These may serve somewhat as guide to those persons who wish to pursue such studies still further.

I am under particular obligations to Dr. James K. Thacher, Professor of Physiology in the Yale Medical School, for valuable assistance in that description of the Nervous Mechanism, its structure and functions, which the First Part of the book contains. If I have escaped the mistake of assuming to teach more than is really known upon this subject, it has been in large measure due to his friendly and skilful guidance. Valuable assistance has also been received from Russell H. Chittenden, Professor of Physiological Chemistry, and Charles S. Hastings, Professor of Physics—both of the Sheffield Scientific School.

The method and arrangement of the book have been chosen so as to fit it for use, both as a text-book by special students of the subjects of which it treats, and also by the general reader who is interested in knowing what results have been reached by the more modern—and even the latest—psycho-physical researches.

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