



WILHELM WUNDT

PRINCIPLES OF

PHYSIOLOGICAL PSYCHOLOGY

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EDWARD BRADFORD TITCHENER

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## Author's Preface to the First Edition

THE work which I here present to the public is an attempt to mark out a new domain of science. I am well aware that the question may be raised, whether the time is yet ripe for such an undertaking. The new discipline rests upon anatomical and physiological foundations which, in certain respects, are themselves very far from solid; while the experimental treatment of psychological problems must be pronounced, from every point of view, to be still in its first beginnings. At the same time the best means of discovering the blanks that our ignorance has left in the subject matter of a developing science is, as we all know, to take a general survey of its present status. A first attempt, such as this book represents, must show many imperfections; but the more imperfect it is, the more effectively will it call for improvement. Moreover, it is especially true in this field of inquiry that the solution of many problems is intimately bound up with their relation to other groups of facts, facts that often appear remote and disconnected; so that the wider view is necessary, if we are to find the right path.

In many portions of the book I have made use of my own investigations; in the others, I have at least tried to acquire an independent judgment. Thus, the outline of the anatomy of the brain, contained in Part I, is based upon a knowledge of morphological relations which I have obtained by repeated dissection of human and animal brains. For part of the material employed in this work, and for frequent assistance in the difficulties which such a study offers, I am indebted to the former Director of the Heidelberg Anatomical Museum, Professor Fr. Arnold. The finer structure of the brain, as revealed by the microscope, is, of course, a subject for the specialist; all that I have been able to do is to compare the statements of the various authors with one another and with the results of the gross anatomy of the brain. I must leave it to the expert to decide whether the account of the central conduction paths, as drawn from these sources in chapter iv., is, at least in its main features, correct. I am fully conscious that, in detail, it requires to be supplemented and emended on many sides. Still, it receives a certain confirmation from the fact that the functional derangements induced experimentally by the extirpation and transection of various parts of the brain are, as I seek to show in chapter v., readily explicable in terms of the anatomical plan. Most of the phenomena here described I have had frequent opportunity to observe in my own experi-

ments. In chapter vi. I have brought together the results of my *Untersuchungen zur Mechanik der Nerven und Nervencentren*,<sup>1</sup> so far as these relate to the question—which is one of psychological importance—regarding the nature of the forces operative in the nervous elements.<sup>2</sup>

Parts II and III are concerned with the topics that first drew me, many years ago, to psychological studies. When in 1858 I began to work upon my *Beiträge zur Theorie der Sinneswahrnehmung*,<sup>3</sup> German physiology was dominated, almost exclusively, by nativistic conceptions. My principal purpose in writing that work was to demonstrate the insufficiency of current hypotheses regarding the origin of our spatial ideas of touch and sight, and to discover a physiological basis for a psychological theory. The views there set forth have since found general acceptance among physiologists as well as among psychologists; though in the form which they have usually taken in the physiologies they could, perhaps, hardly hold their own against a rigorous criticism. I hope that, in the present work, I have succeeded in showing the inadequacy of modern physiological empiricism, as well as the relative justification for nativism and the necessity with which both conceptions alike point to a more profound psychological theory. The hypothesis of specific sensory energies, which is really a survival from the older nativism, has, in my opinion, become untenable, despite the convenient explanation it affords of a large body of facts. My critical treatment of this subject will, no doubt, call forth many objections. But if the facts are viewed as a whole, the cogency of the argument will hardly be disputed.

The investigations of Part IV,<sup>4</sup> especially the experiments on the appearance and course in consciousness of the sensory ideas aroused by external impressions, have occupied me for fourteen years, though, it is true, with many interruptions, due to other work and to the necessity of procuring appropriate apparatus. The first results were presented, as early as 1861, to the Natural Science Conference at Speyer. Since that time a number of notable papers on the same subject have been published by other investigators. No one, however, has hitherto turned these results to account for a theory of consciousness and of attention. I have here sought to give this important chapter of physiological psychology at any rate a tentative systematic setting.

Finally, I would ask the reader, when he comes upon polemical passages directed against Herbart, to remember that my criticisms are, at the same time, a proof of the importance which I attach to the psychological works

<sup>1</sup> Erlangen, 1871. A second volume followed later: Stuttgart, 1876.—Translator.

<sup>2</sup> Chapters iv. and v. of the previous editions represent chapters v. and vi. of the present edition. What was formerly chapter vi. now becomes chapter iii.

<sup>3</sup> Leipsic and Heidelberg, 1862.—Translator.

<sup>4</sup> Now Part V.

of this philosopher. It is to Herbart, next after Kant, that I am chiefly indebted for the development of my own philosophical principles. So with regard to Darwin; while I have, in one of the concluding chapters, opposed Darwin's theory of expressive movements, I need hardly say that the present work is deeply imbued with those far-reaching conceptions which, by his labours, have become an inalienable possession of natural science.

W. WUNDT.

HEIDELBERG, *March*, 1874

## Author's Preface to the Fifth Edition

WHEN this book first came before the world, nearly eight and twenty years ago, the status of the science for which it hoped to prepare a place was very different from that of the physiological psychology of to-day. At that time only one successful attempt had been made—in Fechner's *Elemente der Psychophysik*—to throw the light of an exact procedure upon philosophical problems that might, in the last resort, be regarded as psychological. Fechner apart, the adventurer of an 'experimental psychology' <sup>1</sup> was still reduced, in most instances, to borrow what he could from other disciplines, especially from the physiology of sense and nervous system. To-day all this is changed; there is pouring in from all sides—from the psychological laboratories proper, from neighbouring disciplines, from every science that comes into contact with psychological problems—an amount of expository material that, even now, is hardly calculable. At that time the investigator who sought to employ accuracy of method in any question of psychology was challenged at every point, by philosophy as by natural science, to prove that his endeavours were legitimate. To-day these doubts are hardly to be feared. But, to offset our advantage, there have appeared within psychology itself strongly divergent tendencies, some of which cover profound differences of principle regarding the problems and aims of the science, and the paths that it should pursue.

From edition to edition of the present work, as I have attempted to adapt each successive revision to its altered circumstances, these changes of the times have been to me a source of ever-increasing difficulty. Hence, when the need arose for this fifth edition, I was strongly inclined to close my account with the book, and to leave it in the form which it had finally taken, unsatisfactory as I now felt that form to be. But, tempting as the idea was for many reasons, there was one paramount objection. The former edition contained many passages which I could not allow to pass as an adequate expression of my present convictions: for I would be the last to refuse, in the onward endeavour of our youthful science, to learn all that I can from new experiences, and in their light to better my theories. I resolved, accordingly, at least to put the book into such a shape that these discrepancies should, so far as possible, be done away with. However, I soon found that this plan could not be carried out; the result would

<sup>1</sup> This phrase appears to have been introduced by Wundt; see *Beiträge*, 1862 Vorrede, vi.—Translator.

be, after as before, a book that, in all probability, should satisfy the reader as little as it satisfied myself. And so, almost unawares, the new edition has become practically a new work. My principal purpose in this thorough recasting of the material has been not so much to give a complete survey of the entire literature of the subject, in its manifold branches,—the numerous journals that are now published in the interests of experimental psychology render this an easy task for any one who will undertake it,—as rather to present, in more adequate form and (where it seemed desirable) with greater detail of proof than had appeared in previous editions, those experiences and those interpretations of experience which had come to me in the years of helpful association in research with all the younger investigators who have worked in the psychological laboratory at Leipsic. In its present form, therefore, the book is intended, first and foremost, to serve the purpose not of a compilation, but of an exposition of my own experiences and convictions; though I have, of course, everywhere made grateful use of whatever I could take from the works of others.

Although the text has been curtailed to the utmost, where curtailment was possible,—particularly by the omission of a number of argumentative passages, directed against opinions and theories, current in philosophy or in the older psychology, which may now be regarded as obsolete,—the change of programme has brought with it an increase in the bulk of the work. The two volumes of the previous editions have now become three. Volume ii. will contain the conclusion of the doctrine of mental elements, and the theory of ideas; volume iii., Parts dealing with emotion and voluntary action and with the interconnexion of mental processes, together with a closing chapter of philosophical import.<sup>1</sup> Dr. W. Wirth has undertaken the preparation of an index of names and subjects, to be included in this last volume.<sup>2</sup> I have also to thank Dr. Wirth for assistance in reading the proof-sheets.

W. WUNDT.

LEIPSIK, *February*, 1902.

<sup>1</sup> The present volume contains the Introduction and Part I, On the Bodily Substrate of the Mental Life. The remaining Parts are entitled as follows: Part II, Of the Elements of the Mental Life; Part III, Of the Formation of Sensory Ideas; Part IV, Of the Affective Processes and of Voluntary Actions; Part V, Of the Course and the Connexions of Mental Processes; Part VI, Final Considerations.—Translator.

<sup>2</sup> Now (1903) published separately.—Translator.



## Translator's Preface

WHEN I went to Leipsic in 1890, I carried with me a completed translation of the third (1887) edition of the *Grundzüge der physiologischen Psychologie*. I spent nearly a year upon its revision, and did not mention it to the author until the late summer of 1891. Professor Wundt took my presumption very kindly; but the fourth edition was already on the horizon, and my manuscript was never offered to a publisher.

I had not, however, given up the idea of a translation. As soon as other engagements allowed—at the end of 1896—I set to work upon the edition of 1893. The work was finished, except for final revision, in 1899. But I found, on going over the first volume for the press, that certain chapters, especially those dealing with embryology and neurology, must be corrected and brought up to date. A year went by, with nothing to show for it but the writing of footnotes and additional paragraphs; and when I was again ready, the fifth edition was in prospect for the immediate future.

I fear that—apart from my rather dearly bought experience, which should have profited me something—the present translation is the worst of the three. I might plead in excuse that one does not undertake the task of translating a large work for the third time and in mature life with the enthusiasm that one brings to it as a young student. I might also plead that the publishers, disappointed in the matter of the fourth edition, and naturally anxious, in any event, to bring out the translation as soon as possible after the appearance of the original, have put some little pressure upon me, though always of the friendliest kind, to get the work done out of hand. On the whole, however, I prefer to rest my case upon the difficulties of the book itself. Wundt's style has often, of late years, been termed diffuse and obscure. I should not care to call it either of these things; but I am sure that it is difficult. It has, perhaps, in a somewhat unusual degree, the typical characteristics of scientific German; the carelessness of verbal repetitions, the long and involved sentences, the lapses into colloquialism, and what not. It has, besides, two special difficulties. The one is intrinsic: Wundt, if I read him aright, has always had the habit of thinking two or three things at once, of carrying on certain secondary trains of thought while he develops his central idea; and the habit has grown upon him. The consequence is that his use of connecting particles, of parentheses, of echo clauses, is now always complex, and at times extra-

ordinarily complex. The reader who opens the *Physiologische Psychologie* at haphazard, and runs through a paragraph or two, will think this statement exaggerated. If he will try not to understand, but to translate, and to translate not a page, but a chapter, its truth will be borne in upon him. I had hoped to use, for the present translation, certain parts of my former manuscript. But a new opening or closing sentence, even a new set of connectives, changes the whole colour of the German, and so demands a new phrasing, oftentimes a new vocabulary, from the translator. I soon found that my previous work was more of a hindrance than a help, and relegated it to the waste-paper basket. The second special difficulty in Wundt's style has also grown with the years; it is his increasing tendency to clothe his ideas in conceptual garb, to write in a sort of shorthand of abstractions. I have never thought him, for this or for the other reason, obscure; the meaning is always there, and can be found for the searching. But there are many and many passages where a half-way literal English rendering would be unintelligible; where one is forced, in translating, to be concrete without losing generality; and in cases like this the translator's lot is not a happy one.

The present volume covers the first 338 pages of the German work, or the Introduction and Part I: On the Bodily Substrate of the Mental Life. The German pagination is printed, for convenience of cross-reference, in the page-headings of the translation. For reasons stated in their place, I have included a section from the fourth edition which the author has omitted. I have also added an index of names and subjects.

E. B. TITCHENER.

CORNELL HEIGHTS, ITHACA, N.Y.

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## INTRODUCTION

### § 1. The Problem of Physiological Psychology

THE title of the present work is in itself a sufficiently clear indication of the contents. In it, the attempt is made to show the connexion between two sciences whose subject-matters are closely interrelated, but which have, for the most part, followed wholly divergent paths. Physiology and psychology cover, between them, the field of vital phenomena; they deal with the facts of life at large, and in particular with the facts of human life. Physiology is concerned with all those phenomena of life that present themselves to us in sense perception as bodily processes, and accordingly form part of that total environment which we name the external world. Psychology, on the other hand, seeks to give account of the interconnexion of processes which are evinced by our own consciousness, or which we infer from such manifestations of the bodily life in other creatures as indicate the presence of a consciousness similar to our own.

This division of vital processes into physical and psychical is useful and even necessary for the solution of scientific problems. We must, however, remember that the life of an organism is really one; complex, it is true, but still unitary. We can, therefore, no more separate the processes of bodily life from conscious processes than we can mark off an outer experience, mediated by sense perceptions, and oppose it, as something wholly separate and apart, to what we call 'inner' experience, the events of our own consciousness. On the contrary: just as one and the same thing, e.g., a tree that I perceive before me, falls as external object within the scope of natural science, and as conscious contents within that of psychology, so there are many phenomena of the physical life that are uniformly connected with conscious processes, while these in turn are always bound up with processes in the living body. It is a matter of every-day experience that we refer certain bodily movements directly to volitions, which we can observe as such only in our consciousness. Conversely, we refer the ideas of external objects that arise in consciousness either to direct affection of the organs of sense, or, in the case of memory images, to physiological excitations within the sensory centres, which we interpret as after-effects of foregone sense impressions.

It follows, then, that physiology and psychology have many points of contact. In general, there can of course be no doubt that their problems are distinct. But psychology is called upon to trace out the relations that obtain between conscious processes and certain phenomena of the physical life; and physiology, on its side, cannot afford to neglect the conscious contents in which certain phenomena of this bodily life manifest themselves to us. Indeed, as regards physiology, the interdependence of the two sciences is plainly in evidence. Practically everything that the physiologists tell us, by way of fact or of hypothesis, concerning the processes in the organs of sense and in the brain, is based upon determinate mental symptoms: so that psychology has long been recognised, explicitly or implicitly, as an indispensable auxiliary of physiological investigation. Psychologists, it is true, have been apt to take a different attitude towards physiology. They have tended to regard as superfluous any reference to the physical organism; they have supposed that nothing more is required for a science of mind than the direct apprehension of conscious processes themselves. It is in token of dissent from any such standpoint that the present work is entitled a "physiological psychology." We take issue, upon this matter, with every treatment of psychology that is based on simple self-observation or on philosophical presuppositions. We shall, wherever the occasion seems to demand, employ physiology in the service of psychology. We are thus, as was indicated above, following the example of physiology itself, which has never been in a position to disregard facts that properly belong to psychology,—although it has often been hampered in its use of them by the defects of the empirical or metaphysical psychology which it has found current.

Physiological psychology is, therefore, first of all *psychology*. It has in view the same principal object upon which all other forms of psychological exposition are directed: *the investigation of conscious processes in the modes of connexion peculiar to them*. It is not a province of physiology; nor does it attempt, as has been mistakenly asserted, to derive or explain the phenomena of the psychical from those of the physical life. We may read this meaning into the phrase 'physiological psychology,' just as we might interpret the title 'microscopical anatomy' to mean a discussion, with illustrations from anatomy, of what has been accomplished by the microscope; but the words should be no more misleading in the one case than they are in the other. As employed in the present work, the adjective 'physiological' implies simply that our psychology will avail itself to the full of the means that modern physiology puts at its disposal for the analysis of conscious processes. It will do this in two ways.

(1) Psychological inquiries have, up to the most recent times, been undertaken solely in the interest of philosophy; physiology was enabled, by



the character of its problems, to advance more quickly towards the application of exact experimental methods. Since, however, the experimental modification of the processes of life, as practised by physiology, oftentimes effects a concomitant change, direct or indirect, in the processes of consciousness,—which, as we have seen, form part of vital processes at large,—it is clear that physiology is, in the very nature of the case, qualified to assist psychology on the side of *method*; thus rendering the same help to psychology that it itself received from physics. In so far as physiological psychology receives assistance from physiology in the elaboration of experimental methods, it may be termed *experimental psychology*. This name suggests, what should not be forgotten, that psychology, in adopting the experimental methods of physiology, does not by any means take them over as they are, and apply them without change to a new material. The methods of experimental psychology have been transformed—in some instances, actually remodelled—by psychology itself, to meet the specific requirements of psychological investigation. Psychology has adapted physiological, as physiology adapted physical methods, to its own ends.

(2) An adequate definition of life, taken in the wider sense, must (as we said just now) cover both the vital processes of the physical organism and the processes of consciousness. Hence, wherever we meet with vital phenomena that present the two aspects, physical and psychical, there naturally arises a question as to the relations in which these aspects stand to each other. So we come face to face with a whole series of special problems, which may be occasionally touched upon by physiology or psychology, but which cannot receive their final solution at the hands of either, just by reason of that division of labour to which both sciences alike stand committed. Experimental psychology is no better able to cope with them than is any other form of psychology, seeing that it differs from its rivals only in method, and not in aim or purpose. Physiological psychology, on the other hand, is competent to investigate the relations that hold between the processes of the physical and those of the mental life. And in so far as it accepts this second problem, we may name it a *psychophysics*.<sup>1</sup> If we free this term from any sort of metaphysical implication

<sup>1</sup> The word was coined by Fechner; see his *Elemente der Psychophysik*, 1860, i. 8. In this passage, Fechner defines psychophysics as an "exact science of the functional relations or relations of dependency between body and mind, or, in more general terms, between the bodily and mental, the physical and psychical worlds"; and his main object in the *Elemente* is, accordingly, to establish the *laws* that govern the interaction of mental and bodily phenomena. It is clear that we have implied here the metaphysical assumption of a substantial difference between body and mind; we can hardly conceive, in any other way, of the existence of such a borderland, with facts and laws of its own. Fechner himself, however, rejected this substantial difference, for theoretical reasons; so that in strictness he could hardly have raised objection to such a purely empirical formulation of the problem of psychophysics as is given in the text. Cf. the concluding Chapter of this work.