

WUNDT ON

THE SCIENCE OF PSYCHOLOGY
AS THE EXPERIMENTAL STUDY
OF MENTAL ELEMENTS AND
THEIR CREATIVE SYNTHESIS

WILHELM WUNDT (1832-1920), German psychologist for nearly 35 years at the University of Leipzig, where he founded the first psychological laboratory, is almost certainly the first individual who deserves to be designated a psychologist in the modern sense. The preface to the first edition of *The Principles of Physiological Psychology*, published in part in 1873, begins with the arresting statement, "This work which I here present to the public is an attempt to work out a new domain of science."¹

He chose to refer to his approach to psychology as "physiological psychology," and it is necessary to make clear what he meant:

Physiological psychology is . . . 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*

There are thus two problems which are suggested by the title "physiological psychology": the problem of *method*, which involves the application of experiment, and the problem of a psychophysical *supplement*, which involves a knowledge of the bodily substrates of the mental life. For psychology itself, the former is the more essential; the second is of importance mainly for the philosophical question of the unitariness of vital processes at large. As an experimental science, physiological psychology seeks to accomplish a reform in psychological investigation comparable with the revolution brought about in the natural sciences by the introduction of the experimental method. From one point of view, indeed, the change wrought is still more radical: for while in natural science it is possible, under favorable conditions, to make an accurate observation without recourse to experiment, there is no such possibility in psychology. It is only with grave reservations that what is called "pure self-observation" can properly be termed observation at all, and under no circumstances can it lay claim to accuracy. On the other hand, it is of the essence of experiment that we can vary the conditions of an occurrence at will and, if we are aiming at exact results, in a quantitatively determinable way. Hence, even in the domain of natural science, the aid of the experimental method becomes indispensable whenever the problem set is the analysis of transient and impermanent phenomena, and not merely the observation of persistent and relatively constant objects. But conscious contents are at the opposite pole from permanent objects; they are processes, fleeting occurrences, in continual flux and change. In their case, therefore, the experimental method is of cardinal importance; it and it alone makes a scientific introspection possible. For all accurate observa-

tion implies that the object of observation (in this case the psychical process) can be held fast by the attention, and any changes that it undergoes attentively followed. And this fixation by the attention implies, in its turn, that the observed object is independent of the observer. Now it is obvious that the required independence does not obtain in any attempt at a direct self-observation, undertaken without the help of experiment. The endeavour to observe oneself must inevitably introduce changes into the course of mental events,—changes which could not have occurred without it, and whose usual consequence is that the very process which was to have been observed disappears from consciousness. The psychological experiment proceeds very differently. In the first place, it creates external conditions that look towards the production of a determinate mental process at a given moment. In the second place, it makes the observer so far master of the general situation, that the state of consciousness accompanying this process remains approximately unchanged. The great importance of the experimental method, therefore, lies not simply in the fact that, here as in the physical realm, it enables us arbitrarily to vary the conditions of our observations, but also and essentially in the further fact that it makes observation itself possible for us. The results of this observation may then be fruitfully employed in the examination of other mental phenomena, whose nature prevents their own direct experimental modification.

We may add that, fortunately for the science, there are other sources of objective psychological knowledge, which become accessible at the very point where the experimental method fails us. These are certain products of the common mental life, in which we may trace the operation of determinate psychical motives: chief among them are language, myth and custom. In part determined by historical conditions, they are also, in part, dependent upon universal psychological laws; and the phenomena that are referable to these laws form the subject-matter of a special psychological discipline, *ethnic psychology*. The results of ethnic psychology constitute, at the same time, our chief source of information regarding the general psychology of the complex mental processes. In this way, experimental psychology and ethnic psychology form the two principal departments of scientific psychology at large. They are supplemented by *child* and *animal* psychology, which in conjunction with ethnic psychology attempt to resolve the problems of psychogenesis. Workers in both these fields may, of course, avail themselves within certain limits of the advantages of the experimental method. But the results of experiment are here matters of objective observation only, and

the experimental method accordingly loses the peculiar significance which it possesses as an instrument of introspection. Finally, child psychology and experimental psychology in the narrower sense may be bracketed together as *individual* psychology, while animal psychology and ethnic psychology form the two halves of a *generic* or *comparative* psychology. These distinctions within psychology are, however, by no means to be put on a level with the analogous divisions of the province of physiology. Child psychology and animal psychology are of relatively slight importance, as compared with the sciences which deal with the corresponding physiological problems of ontogeny and phylogeny. On the other hand, ethnic psychology must always come to the assistance of individual psychology, when the developmental forms of the complex mental processes are in question.²

Wundt's position was that, insofar as his psychology drew upon experiment, it could properly be referred to as experimental psychology. Introspection is not sufficient; experiment is necessary for precise quantitative results. In spite of Kant's and Herbart's weighty pronouncements about its impossibility, Wundt made experimentation in psychology the basis for a science of psychology.

His decision to refer to his concept of scientific psychology as "physiological psychology" is sometimes misunderstood. It should be noted that he gives prime importance to the inspiration physiological *methods* were to him. He was very much aware that physiologists such as Müller and Helmholtz worked with methods that could be applied to psychological problems. But it so happens that physiological psychology is currently used to refer to the investigation of the interrelationship of physiological *and* psychological processes and structures. Wundt saw psychology as a separate science in which it was not necessary to refer to physiological processes. A case in point would be Fechner's findings. Wundt interpreted the results as the study of the relation of sensation and judgment, both psychological categories, and not as that between physiological stimulus and psychological sensation. Hence, his psychology was not physiological psychology in the current sense of that term. This does not mean he neglected physiological findings. Despite the lack of interaction, there was a close correspondence between psychological and physiological processes.

Toward the end of the excerpt, Wundt refers to sources of psychological knowledge that are not dependent on experimentation. While mentioned, child and animal psychology, in practice, were either disregarded or denigrated. "Ethnic psychology" or to use a more meaningful term, "cultural psychology" (the study of language, myth, and custom) was pursued vigorously, and he wrote a ten-volume tome on the subject. It indicated that he took the nonexperimental aspects of psychol-

ogy seriously, contrary to the opinion sometimes expressed. His work in this area became the forerunner of social psychology.

The various editions of the *Principles of Physiological Psychology*, which followed one another periodically for nearly four decades, was the vehicle for the integration of the research findings of his students in the Leipzig laboratory and elsewhere. Rather than report specific research results, we shall be content to give some conception of the overall nature of his psychology in terms of his search for the elements of conscious experience.

In our last chapter we have discussed the general and formal characteristics of consciousness. These have appeared to us in the scope of consciousness, in the different grades of clearness and distinctness of its content, and lastly, connected with this, in the relations of apprehension and apperception. The next question that immediately presents itself is: Of what kind is the specific content that appears to us in these forms? The answer to this question includes the task of explaining the ultimate parts of this content, that cannot be further disintegrated. Such ultimate parts are generally called elements. Now it is one of the first tasks of each science, that deals with the investigation of empirical facts, to discover the elements of the phenomena. Its second task is to find out the laws according to which these elements enter into combinations. The whole task of psychology can therefore be summed up in these two problems: (1) What are the elements of consciousness? (2) What combinations do these elements undergo and what laws govern these combinations?

In contradistinction to the elements of consciousness let us call any combination of such elements a psychological compound. The relation of the two to each other can be at once made clear by the examples that lie at hand. Let us return to our metronome. If we let one single beat work upon consciousness and then immediately arrest the pendulum, we have a psychological element. Such a beat cannot in general be further disintegrated if we, as can easily be done in such a case, abstract from the fact that we hear it from some special direction in space, &c. If, on the other hand, we let two beats work, they constitute at once a psychological compound. This becomes always more complex, the more such beats we combine into a row, and the more we increase this complication by different degrees of accentuation, as in the examples of $\frac{3}{4}$ and $\frac{4}{4}$ time described above. Such an element of consciousness as the single beat is called a sensation, a combination of elements into rhythms of more or less complicated constitution is called an idea. Even at the present time many psychologists use the word "idea" only for a complex that does not arise

from direct outward impressions, *i. e.* only for so-called "memory images." For ideas formed by outward sense impressions they generally use the word "perception." Now this distinction is psychologically of absolutely no importance, since there are really no valid differences between memory ideas and so-called sense-perceptions. The memory ideas of our dreams are in general quite as lively as sense impressions in the waking state, and it is for this reason that they are often held to be really experienced phenomena. The word "idea" denotes well the essential characteristic of all these complexes. The idea (Greek $\iota\delta\epsilon\alpha$) is the form or appearance of something in the outer world. In the same sense, as belonging to the outer world, we speak of the sensations and their complexes arising in our own body as organic sensations, because we locate them in our own body, *e. g.* the sensations of fatigue of our muscles, the pressure and pain sensations of the inner organs, &c. The relatively uniform elements of touch and organic sensations are distributed among the sensations of pressure, warmth, cold, and pain. In contradistinction to these, the special senses of hearing, seeing, smelling, and tasting present an abundance of sensations, each of which, according to its peculiar constitution, is called a quality of sensation. Each such quality is besides variable in its intensity. We can, for example, produce a certain beat in very variable intensities, while the quality remains the same.

In all these cases we meet with the same relations between sensations and ideas, as we saw in the metronome beats described above. Green or red, white or black, &c., are called visual sensations; a green surface or a black body is called a visual idea. The relation is exactly the same as between the single beat and the row of beats. Only in this case the combination of several sensations to an idea of a surface or of a body forces itself upon us much more directly, and it requires a very careful abstraction from this combination into an ideational complex, in order to retain the conception of a sensation. But we can vary our ideas of surfaces and bodies at will, while the colour remains the same. So at last we are forced to look upon this element, that remains the same in spite of all changes in the combinations, as a simple sensation. In the same way we consider a simple tone as a sensation of hearing, and a clang or chord, composed of several tones, as an auditory idea, and so on. If the tones follow each other in a melodious and rhythmical combination, then ideas of increasing complexity arise, and in the same manner several relatively simple visual ideas may be bound together into more extensive simultaneous or successive unities. The senses of sight and of hearing in especial form in this way a great variety of sensations and ideas, and they

do this in two ways—firstly, through the qualities of their simple sensations, and secondly, through the complications of ideas, into which these sensations may be combined. The simple scale of tones, from the deepest to the highest tone that can be heard, consists of an infinite gradation of tonal qualities, out of which our musical scale chooses only certain tones, which lie at relatively large distances from each other. Musical clangs are combinations of a number of such simple tonal sensations, and the so-called compound clangs increase this complicated constitution of the clangs by emphasising to a greater degree certain partial tones. The simple light-sensations form a more concise manifoldness, but one that stretches into different directions. Red, for example, on the one hand goes over by constant gradations into orange and then into yellow, and on the other hand we have just as many constant gradations from each of these colour-shades through the lighter colour-tones into white, or through the darker ones into black, and so on. The ideas of this sense are absolutely inexhaustible. If we think of the manifold forms of surfaces and bodies, and of the differences in distance and direction, in which we perceive objects, it is obvious that it is absolutely impossible to find any limit here. Thus the richness in sensations and ideas, which each of the senses conveys, stands in close relation to the spatial distance of the objects which they introduce into consciousness. The narrowest region is that of the touch and organic sense, where the impressions all refer to our own body. Then come the sensations of the two so-called chemical senses of taste and of smell. Even in man they have the important function of organs of help or protection in the choice of food, as is the case in the whole animal kingdom. The sensations and ideas of hearing stretch much further. By means of them the outer world enters into relation with our consciousness in language, song, and music. And last of all, the sense of sight, the sense of distance in the real meaning of the word, gives form and content to the whole picture of the outer world, that we carry in our consciousness.³

Immediately after this discussion of sensation as an element of consciousness, he goes on to discuss feelings as the other basic element of consciousness.

The emphasis that Wundt placed on the search for elements has sometimes led to a neglect of the fact that he saw the necessity for a principle of creative synthesis, that complex conscious phenomena could not be reconstituted out of an additive combination of the elements.

... 2. The *law of psychological resultants* finds its expression in the fact that every psychological compound shows attributes which may indeed

be understood from the attributes of its elements after these elements have once been presented, but which are by no means to be looked upon as the mere sum of the attributes of these elements. A compound clang is more in its ideational and affective attributes than merely a sum of single tones. In spacial and temporal ideas the spacial and temporal arrangement is conditioned, to be sure, in a perfectly regular way by the cooperation of the elements that make up the idea, but still the arrangement itself can by no means be regarded as a property belonging to the sensational elements themselves. The nativistic theories that assume this, implicate themselves in contradictions that cannot be solved; and besides, in so far as they admit subsequent changes in the original space-perceptions and time-perceptions, they are ultimately driven to the assumption of the rise, to some extent at least, of new attributes. Finally, in the apperceptive functions and in the activities of imagination and understanding, this law finds expression in a clearly recognized form. Not only do the elements united by apperceptive synthesis gain, in the aggregate idea that results from their combination, a new significance which they did not have in their isolated state, but what is of still greater importance, the aggregate idea itself is a new psychological content that was made possible, to be sure, by these elements, but was by no means contained in them. This appears most strikingly in the more complex productions of apperceptive synthesis, as, for example, in a work of art or a train of logical thought.

3. The law of psychological resultants thus expresses a principle which we may designate, in view of its results, as a *principle of creative synthesis*. This has long been recognized in the case of higher mental creations, but generally not applied to the other psychological processes. In fact, through an unjustifiable confusion with the laws of physical causality, it has even been completely reversed. A similar confusion is responsible for the notion that there is a contradiction between the principle of creative synthesis in the mental world and the general laws of the natural world, especially that of the conservation of energy. Such a contradiction is impossible from the outset because the points of view for judgment, and therefore for measurements wherever such are made, are different in the two cases, and must be different, since natural science and psychology deal, not with different contents of experience, but with one and the same content viewed from different sides... Physical measurements have to do with *objective masses, forces, and energies*. These are supplementary concepts which we are obliged to use in judging objective experience; and their general laws, derived as they are from experience, must not be contradicted by any single case of experience. Psychological measurements,

which are concerned with the comparison of psychological components and their resultants, have to do with *subjective values and ends*. The subjective value of a whole may increase in comparison with that of its components; its purpose may be different and higher than theirs without any change in the masses, forces, and energies concerned. The muscular movements of an external volitional act, the physical processes that accompany sense-perception, association, and apperception, all follow invariably the principle of the conservation of energy. But the mental values and ends that these energies represent may be very different in quantity even while the quantity of these energies remains the same.⁴

Wundt had marked out "a new domain of science," and before his death in 1920, had seen it meet the claim he had made in 1873, furnishing us with some of the reasons as to why he is often claimed to be the first modern psychologist. He founded the first laboratory, developed its methodological procedures, demarcated some of its area of content, and through his students, investigated many problems in the empirical science of consciousness. The nature of these research problems was not completely and clearly revealed in the excerpts. It will have to suffice to say that, in addition to sensation and perception, reaction-time, attention, feeling, and association, were the other major investigative areas.

BRENTANO ON ACT PSYCHOLOGY

FRANZ BRENTANO (1838-1917), German-Austrian philosopher, published his *Psychology from an Empirical Standpoint* in 1874, the same year that saw the complete publication of Wundt's *The Principles of Physiological Psychology*. Prophetic of the many later clashes between competing systems, he presented an alternative at the very outset of psychology as a science. The intent of his title is reinforced with the opening sentences of the foreword, in which he indicates that his "psychological stand point is empirical; experience alone is my teacher." But an empirical psychology is not necessarily an experimental psychology in the Wundtian sense. Instead, Brentano emphasized analysis of experience. Observation was his primary tool. Having spent part of his life as a Catholic priest, Brentano reached back to Aristotle as a major source for this view. He considered, as did Aristotle, that acts are the proper concern of psychology and that it follows that its task is relating the person, that is, the experienter, to the environment. We shall return to this issue after presenting an excerpt in which the distinction between the mental and physical is the setting for discussing this task:

Every idea or presentation which we acquire either through sense perception or imagination is an example of a mental phenomenon. By presentation I do not mean that which is presented, but rather the act of presentation. Thus, hearing a sound, seeing a colored object, feeling warmth or cold, as well as similar states of imagination are examples of what I mean by this term. I also mean by it the thinking of a general concept, provided such a thing actually does occur. Furthermore, every judgement, every recollection, every expectation, every inference, every conviction or opinion, every doubt, is a mental phenomenon. Also to be