he had a simple comfortable cottage and a garden. He delighted to work, both in and out of the house, and this gave him his exercise. He was rather stout and he knew that he needed exercise to keep his weight down. He therefore indulged in walking, bicycling and finally in motoring, and he managed to keep fairly well. But, after his retirement in 1916, his health failed. His strength gave out and his courage also. He did not dare to take his car out of the garage, and his walks were very short. I saw him in May, just before he went to Maine, and thought he seemed more like his old self. He even talked of taking up his work again. It was not to be. I heard nothing from him after that. And then came the despatch announcing his rather sudden and entirely unexpected death. He was buried at Amherst, a place that meant so much to him—where he had spent his college years and for some time had had a summer home.

IRA REMSEN

WILHELM WUNDT, 1832–1920

THE death of Wundt removes the foremost figure of our academic world: a great man of science, a philosopher of repute, a prolific writer, a personality of extraordinary influence. Psychology, the science with which his name is permanently connected, was fortunate both in the date of his birth and in the length of his life. He came into the world a full decade later than Helmholtz and Virchow and Du Bois and Leuckart, Huxley and Tyndall and Spencer, the standard-bearers of science in the middle of the nineteenth century; so that, while his work and theirs overlapped, he still reaped the benefit of their pioneer labors. His length of days and the maintenance of his intellectual vigor not only enabled him to round off his manifold tasks—we all rejoice that the "Völkerpsychologie" is done, as we all rejoiced when Spencer published the final part of his "Synthetic Philosophy"—but also gave a much-needed stability to the young science of experimental psychology, whose name he coined and whose interest lay always nearest to his heart.

Wundt's outward life was uneventful. After a half-dozen years of study, principally in medicine, at the universities of Tübingen, Heidelberg and Berlin, he settled down as docent (1857) and assistant professor (1864) of physiology at Heidelberg, where Helmholtz held the chair of physiology from 1858 to 1871. In 1874 he was called as professor of philosophy to Zurich, and in 1875 was chosen in preference to Horwicz (who nowadays reads the once famous *Analysen?*) as professor of philosophy at Leipzig. Here he remained till the end of his life, gathering in his harvest of academic honors: the rectorship of his university, the honorary citizenship of the town, the order *pour la mérite,* the title of *wirklicher Geheimrat* of the kingdom of Saxony. He lived the simple family life of the older German tradition, and his days passed with the regularity of clockwork: the morning he spent on his current book or paper; then came the *Sprechstunde;* then, after the midday meal, his solitary constitutional in the park; then the formal visit to the laboratory; then the lecture; and then an informal gathering in the laboratory again. Wundt was an effective lecturer, and made no use of notes, though he always carried in his pocket a scrap of paper upon which notes had been made. He was devotedly cared for by his wife and, after her death, by his daughter, "meiner treuen Gefährtin im Urwald der Mythen und Märchen." His son turned some years since from philology to philosophy, and has written a valuable work upon Greek ethics.

Under these outward conditions, simple and sheltered, Wundt carried on his varied literary activities. If I were asked to pick out the most original and constructive items of his published work, I should name in the first place his "Beiträge zur Theorie der Sinneswahrnehmung" (1862), a rounded series of researches upon tactual and visual perception which contains in germ the doctrine of the later and better known *Physiologische Psychologie.* I should name, secondly, the *Untersuchungen zur Mechanik der Nerven und Nervencentren* (1871–1876), a solid bit of

experimental investigation, quoted with respect by later physiologists. I should name, thirdly, the second part (Methodenlehre) of the "Logik" (1883 and later), which carries on the work of Mill and Jevons, but far outranks its predecessors in depth of insight and range of positive knowledge. I should name, fourthly, the highly characteristic "Psychologismus und Logizismus" of 1910; Wundt was at his best, constructively and historically, when he had been spurred into action by the success of what he thought a scientific heresy And I should name, last, the little "Einführung in die Psychologie" (1911), a book in which Wundt's consummate mastery of his subject and the sweep and freedom of his style bring him as near as he ever came to the popular conception of a genius.

I have not included in this list the "Grundzüge der physiologischen Psychologie." Every one knows that Wundt founded, in 1879, the first laboratory of experimental psychology; and every one knows that the *PP*, as his students have dubbed it, is the standard work of reference for that science. The book was, no doubt, born of a great idea; and it is, without question, indispensable to the psychologist. But I do not think that it is a great book; that, in the very nature of the case, it could hardly be. Its one serious rival, Brentano's "Psychologie vom empirischen Standpuncte," which saw the light in the same year (1874), is great both in conception and so far as it goes—it goes only half-way to its appointed goal—in execution; as late as 1907 Brentano had published only two minor corrections of his original text. But Wundt was attempting an impossible task; the welding of a highly imperfect nerve-physiology to a rudimentary experimental psychology. He approached it with full scientific equipment and with no small measure of literary skill; the result, none the less, was inevitably an encyclopedic handbook of the two disciplines rather than a single physiological psychology. So it comes about that Brentano's "Empirical Psychology" stands to-day as it stood nearly fifty years ago, while the *PP* has lumbered through edition after edition, hardly even aiming at system before the fifth (1902–3), and still badly needing system in the sixth and last (1908–11). The demand for these editions proves that the book is, as I said just now, indispensable to the working psychologist, and we can not be too grateful to Wundt for the time and labor spent upon the successive revisions. It would be a pity, however, if he were to be judged by a work which, characteristically thorough and painstaking as it is, still represents only one side, and that perhaps the least original, of his efforts on behalf of experimental psychology. The Wundt who organized the Leipzig laboratory, and who wrote or directed the investigations that fill the twenty volumes of the "Philosophische" and the ten of the "Psychologische Studien," is larger than the Wundt of the familiar book.

The long series of editions proves, of course, that the *PP* has appealed to a far wider circle than that of the professional psychologists. Wundt, indeed, has always been singularly successful with his literary ventures. We expect that a class-text, if it survives the first crucial year, will be often reprinted; but we do not expect that three-volume works on ethics and logic, to say nothing of a "System der Philosophie" which expresses its author's personal convictions in highly abstract terms, will again and yet again demand revision and reissue during their writer's lifetime. Such, nevertheless, has been Wundt's fortune. Most astonishing of all is the career of a semi-popular book, translated into English under the title "Lectures on Human and Animal Psychology": first published in two volumes in 1863, it achieved its sixth edition, as a single volume, in 1919. Not that there is any real reduction in size!—that has not been Wundt's habit. On the contrary: the lectures of the original edition that dealt with social psychology have simply been excluded, and their modern equivalent published separately, in the ten large volumes of the "Völkerpsychologie."

So we are brought to this tremendous achievement of Wundt's old age. He published the first two volumes, on Language, in

1900, when he was already nearly seventy; he published the concluding volume, on Civilization and History, in 1920. The intervening volumes deal in turn with Art, Myth and Religion, Society and Law. The whole undertaking grew out of Wundt's early conviction that psychological experiment breaks down on the far side of perception and memory, so that the processes of thought and of constructive imagination must be studied by other than experimental means. Hence a "Völkerpsychologie" is, for him, the direct continuation and supplement of experimental psychology. We may dispute his standpoint: we may question whether experiment fails where he makes it fail, and we may question further whether his own social psychology is not rather an application of his individual psychology to the data of social anthropology than the path to a discovery of new psychological principles. We may doubt also whether the time is ripe for generalization, whether there is not more to be gained by intensive labor. But no one who reads the book can fail to pay his tribute of admiration to its unfailing vitality, to its masterful ordering of detail, to its theoretical consistency. The "Kultur und Geschichte" ends on a somewhat forced note of optimism, beneath which there sounds—as how should there not?—a steady undertone of strained perplexity. Yet it is only here and there that the attentive reader discerns a momentary lapse either of style or of logic; the intellectual freshness is maintained to the end.

The significance of Wundt's whole work, if one tries to sum it up in a sentence, lies in the fact that he is the first considerable figure in the history of thought to attack the problems of science and philosophy from the psychological standpoint. Wundt was a born psychologist; and if others before him had a similar temperament, they had not the same opportunity. Wundt himself struggled into psychology, and never shook himself entirely free either of past philosophical systems or of the all-too-logical biology of the first Darwinian time. But he grew with the years: the last edition of the "Physiologische Psychologie" is better psychology than the first. He has often been compared with Herbert Spencer; he himself would prefer to be considered a modern follower of Leibniz. Neither comparison satisfies. Wundt was unique, and we shall not look upon his like again.

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ON THE DETERMINATION OF GEOCHRONOLOGY BY A STUDY OF LAMINATED DEPOSITS

In Science of September 24, 1920, a highly esteemed geologist[1] has honored the Swedish expedition now studying some of the laminated clay deposits of North America with a discussion of its aims and work which seems to call for some reply.

The main purpose of our expedition may be stated as being less the hope of making new discoveries than a first attempt to apply to the late Quaternary deposits in North America the theories that have been developed in Sweden by many years of extensive investigations. There by systematic measurements of certain periodically laminated layers of late Quaternary age we have succeeded in establishing a real, continuous and exact time scale and not merely determinations applicable to isolated localities. Of course many and serious difficulties have been met, and it has taken much time—more than forty years—to overcome them all. The latest and most important progress was my discovery, five years ago, that the variation in thickness of annual layers deposited at different places along the same ice border could be identified, even at the greatest distances from which measurements were obtained, local errors being absent. This indicated a common, general climatic cause. If it can be shown that similar annual variations occur on both sides of the Atlantic, as far as the extension of one and the same climatic zone [can be assumed], it means that the cause must be sought in

[1] Fairchild, H. L., "Pleistocene clays as a chronometer," Science, N. S., Vol. 52, p. 284, 1920.