THE POSITIVIST REPUDIATION OF WUNDT
KURT DANZIGER

Near the turn of the century, younger psychologists like Köhle, Titchener, and Ebbinghaus began to base their definition of psychology on the positivist philosophy of science represented by Mach and Avenarius, a development that was strongly opposed by Wundt. Psychology was redefined as a natural science concerned with phenomena in their dependence on a physical organism. Wundt's central concepts of voluntarism, value, and psychic causality were rejected as metaphysical. For psychological theory this resulted in a turn away from Wundt's emphasis on the dynamic and central nature of psychological processes toward sensationalism and processes anchored in the observable periphery of the organism. Behaviorism represents a logical development of this point of view.

I. PSYCHOLOGY AS SCIENCE

What makes the early years in the history of experimental psychology of more than antiquarian interest are the fundamental disagreements that quickly separated its practitioners. These disagreements frequently concerned issues that are not entirely dead even today because they involve basic commitments about the nature of the discipline which had to be repeated by successive generations, either explicitly, or, with increasing frequency, implicitly.

In the long run it is those historical divisions which involve fundamental questions about the nature of psychology as a scientific discipline that are most likely to prove illuminating. Such questions acquired great urgency during the last decade of the nineteenth and the first few years of the present century, for it was during this period that psychologists began to claim the status of a separate scientific discipline for their subject. In laying claim to the status of a distinct science, psychology had to proceed from some conception of the nature of science and show how it fitted into the system of the sciences. If there was to be a new division of labor among scientists that provided a place to be filled by the psychologist, this had to be justified in terms of the approach demanded by his subject matter. Was psychology to be a biological science or could it lay claim to a special position while still justified in calling itself scientific? Clearly, this depended not only on how one defined psychology, but also on how one defined science.

Two models were proposed to establish the kind of discipline that psychology was to become. First, there was Wilhelm Wundt's model of a psychology which had at most one foot in the camp of the natural sciences, and then there was the second model for which psychology was wholly a natural science. It was this second model which proved historically victorious. Thereby hangs a problem, for history, as everyone knows, is written by the victors. And so history has not been kind to Wundt's vision for psychology. In fact, if one is restricted to secondary sources in the English language, one can hardly find out what that vision was. Unfortunately, E. G. Boring's classic History of Experimental Psychology fails us completely on this point. Suffice it to say that it is very difficult to reconcile Boring's interpretation of Wundt's fundamental ideas with the original work, especially the larger and most important part of the original which
remains untranslated. This is not really surprising. It is apparent that Boring took his admired teacher, E. B. Titchener, as a guide in these matters, and Titchener practically made a career out of interpreting Wundt in his own highly idiosyncratic fashion.¹

Boring is more reliable on the alternative model for psychological science because here he is discussing his own intellectual roots. He identifies the proponents of the “new” psychology as a group whose most prominent members were Oswald Köllpe, Hermann Ebbinghaus, and Titchener, and he indicates that what these men had in common was a commitment to the new philosophy of positivism associated with the names of Ernst Mach and Avenarius.² But when we attempt to assess the significance of this new philosophical commitment for the historical development of psychology, Boring’s chapter is not of much help. First, Boring’s total lack of interest and understanding for Wundt’s philosophy of science (or any nonpositivist philosophy of science, for that matter) means that the fundamental issues which separated the two points of view are never allowed to emerge. The image is one of steady progress from philosophy to science in which Wundt has had his day because he is too philosophical and Mach provides the practical epistemology which good scientists can use. Second, Boring’s way of organizing historical material by personalities tends to obscure the topical foci around which individual positions clustered. Neither the text nor the notes convey anything of the historical confrontation between the Wundtian and the positivist alternative, a confrontation which caused one contributor to the debate to call his paper, “The Crisis in Psychology.”³

Finally, and most critical of all, there is the fact that Boring was himself deeply committed to the positivist philosophy of science whose influence on the early development of psychology is at issue here. But his is the commitment of the second generation: What had been for his teachers conclusions carefully arrived at and boldly asserted, have now become matters to be taken for granted, implicit certainties not open to debate or even worthy of mention. For the historiography of psychology the major consequence of this stance is that the dependence of psychological theory and method on prior philosophical commitments is lost from view. Because only one kind of philosophy of science is regarded as legitimate (or even conceivable), differences on scientific issues are not seen as the consequence of philosophical differences. This is a comforting attitude for those who have no wish to question fundamental assumptions, and that usually includes the conservative majority. When a particular philosophical commitment becomes characteristic of the mainstream of development in a certain field, it is usually so much taken for granted that it is not even identified by its practitioners. Boring was aware of this fact. At the end of his chapter on the tendencies represented by Mach, Avenarius, Köllpe, Ebbinghaus, and Titchener, he reflects on the lack of a name for this group because it simply became identified with psychological orthodoxy: “It never felt the need of any other name than ‘psychology,’ which it carried away from philosophy, when the two separated. The enemies of this orthodox psychology name it, but always in accordance with what they most dislike in it.”⁴ At the risk of earning the label of an enemy, it is proposed that the trend in question be identified by its fundamental commitments, those of the philosophy of positivism.

When it came to assigning a place among the sciences to psychology, Wundt proceeded from the basic distinction between Naturwissenschaften and Geisteswissenschaften which was so characteristic of German academic life. Thus he distinguished two kinds of psychology, physiological and experimental psychology, on the
one hand, and social or ethnopsychology, on the other. Wundt's basic position always remained the same: The field of psychology consists of two complementary halves, individual and social, for the interaction of the individual with the social environment is as much a basic datum as the simple existence of the individual. The two fields differ in their methods. Experimentation has no place in social psychology, while it plays a considerable role for individual psychology because it is a useful tool for investigating the simpler psychological processes. The complex products of these processes, however, have a social-historical character and must be investigated by the nonexperimental methods of social psychology which belong to the Geisteswissenschaften. It is clear, therefore, that psychology as a whole is not to be counted among the natural sciences, although, in part, it shares the method of experimentation with the latter.

The popular formula that Wundt's distinction between psychology and the natural sciences was based on the distinction between immediate experience and mediated experience represents a serious oversimplification. What was important was the consequence, deduced by Wundt, that the process of analysis had to lead to quite different results in natural science and in psychology. In his major methodological treatise, the Logik, Wundt discussed what he called "the mistaken transfer of the approach [Betrachtungsweise] of natural science to psychology." In a natural science, like chemistry, the aim is to explain compounds in terms of their elements and the external relations among the elements. The "essential difference between the approaches of the natural sciences and of psychology" lies in the fact that the latter deals with a form of synthesis that is "creative," that is, that produces new values and new meanings in immediate experience. The distinction between the conceptual world of natural science and psychology's world of immediate experience entails a very significant methodological difference. Whereas the former sees complex phenomena in terms of the interrelationships among their elements, the latter must concern itself with novel and irreducible contents.

A characteristic feature of Wundt's separation of psychology from the natural sciences is his distinction between physical and psychic causality:

The question, whether it is possible to indicate principles of psychic causality, which are equivalent to those physical principles expressed in causal equations, includes the question about the legitimacy of psychology as an independent discipline, which in turn includes the further questions about the significance of the Geisteswissenschaften in general. If there is nothing but physical causality, then the fate of all these disciplines is sealed. The existence of psychology in Wundt's sense depended on the acceptance of the notion of psychic causality. This notion, he claimed, was based on immediate experience, unlike physical causality, which was concerned with hypothetical conceptual forces. Two aspects of experience, in particular, constitute the basis of psychic causality: the nature of the connections among psychic elements, and the attribute of value which is characteristic of psychic formations. Neither the experience of the peculiar nature of psychic connections nor the experience of value can be derived from physiological (physical) causality; they are therefore manifestations of a different type of causality, that is, psychic causality. The latter is experienced, while physical causality is conceived.

The chain of physical causes and effects forms a closed system which obeys the law of the conservation of energy. Mental forces have no place in this system. But neither do physical causes have any place in the system of mental activity, except as an occasional
heuristic device to bridge temporary gaps in our knowledge of psychic causes. In principle, psychological events must be understood as the effects of psychological causes. The ultimate task of a science of psychology therefore becomes the explication of the principles which establish the fundamental manifestations of psychic causality, just as physical science is concerned with establishing the principles of physical causality. Wundt’s mature psychological texts, the Outlines and the later editions of the Grundzüge, both culminate in a statement of these principles as he saw them. In the present context it is not necessary to enumerate these principles — the point at issue between Wundt and his opponents did not concern the specific content of the principles of psychic causality but rather the question of whether it was the business of psychology to look for such principles at all.7

There is one feature of Wundt’s principles of psychic causality, however, which was closely related to the question of what kind of science psychology was to be. The two types of causality, according to Wundt, entail a crucial difference between the type of explanation characteristic of the natural sciences and that characteristic of the Geisteswissenschaften. Explanations in terms of physical causation lead to predictions, while explanations in terms of psychic causality are generally post hoc: “Thus, on the physical side it is possible to predict effects, in simple cases, from a combination of causes which has never before been observed; on the psychic side this is impossible, even in the simplest cases, for here prediction is only possible from like to like, which means that prediction is quite out of the question for all complex psychological processes.” 8

Even Wundt’s physiological psychology belongs only “half” to the natural sciences, for its task is also to mediate between the latter and the Geisteswissenschaften.9 His own evaluation of his contributions in this area was determined by his conception of the place of psychology in the system of the sciences. As a natural science, psychology has simply a supplementary role, but as a Geisteswissenschaft “it is once the most general mental science, and the foundation of all the others.”10

Typically, these Wundtian perspectives are not reflected in standard accounts of his role in the history of psychology. Though there may be some mention of the fact that Wundt also made certain contributions outside experimental psychology, the picture presented is one of addition or juxtaposition: in addition to his work in experimental psychology, he also wrote books on philosophy, psycholinguistics, and so on. What is lost from view here is that these other areas were crucial for defining Wundt’s view of the proper scope and limits of experimental psychology.

What the account offered in standard histories of modern psychology actually reflects is the perspective of the generation that followed Wundt, a generation that included some of his most prominent students. It was their philosophy of science, not Wundt’s, which became characteristic for the mainstream of academic psychology.

The “New Psychology” of Külpe, Mach, and Avenarius

The public event which signalled the turn from Wundt’s conceptions of the scope and nature of psychology was the appearance of Oswald Külpe’s Grundriss der Psychologie in 1893. Külpe was not merely Wundt’s assistant, he was a Privatdozent and looked after the psychology lectures at Leipzig during the periods when Wundt’s teaching activity was concentrated on philosophy. Wundt treated him as his right-hand man, and it appears that the instigation for Külpe’s book had come from Wundt who needed an introductory textbook for his large and steadily increasing classes. Nevertheless, when it appeared, the book was a considerable disappointment to Wundt.11
As soon as he could spare the time, Wundt wrote his own introductory text whose title is identical to Külepe's. This volume appeared three years later, in 1896. Külepe had left Leipzig for Würzburg in 1894. In that year Wundt published, in the Philosophische Studien (vol. 10), a lengthy monograph in which he attempted to clarify his key concept of "psychic causality" and to differentiate his position from that adopted by some of the younger generation of psychologists like Hugo Münsterberg. In 1895 Külepe published his Einleitung in die Philosophie in which he presented a much more explicit statement of his views on the nature of psychological science. The break was now complete. In the following year Wundt attacked Külepe's position in an important paper entitled "The Definition of Psychology." 12

In his introductory text of 1893 Külepe had been very careful to avoid explicit criticism of Wundt. This is hardly surprising in view of the dependence of Külepe's career on Wundt's goodwill at that point. Beyond that, it is very likely that genuine feelings of respect and loyalty which had been built up in a typically paternalistic relationship over a number of years strongly inhibited the expression of direct criticism on Külepe's part. The book clearly deviates from Wundt's position on some fundamental issues, but this fact is glimpsed explicitly only at the very end when Wundt's doctrine of apperception is openly questioned. However, all the respectful references to Wundt that characterize various parts of the text cannot hide the fact that the master's position is being subtly undermined.

The critical departure from Wundtian doctrine occurs at the very beginning of Külepe's book, where a discussion of the task of psychological investigation sets the stage for the whole enterprise. In common with Wundt, Külepe rejects the definition of psychology in terms of a special subject matter. Like all sciences, psychology must start with the "facts of experience," but what distinguishes it is that it studies these facts in their dependency on experiencing individuals. However, this concept of an experiencing individual is ambiguous, as Külepe immediately notes. We could take it to mean "the psychical individual," a creature of subjective processes and capacities, like feeling, attention, imagination, and so forth, or we could use it in the sense of a "corporeal individual," a biological organism, the seat of physiological processes. Külepe now takes the critical step of rejecting unequivocally the "psychical individual" as an explanatory principle for scientific psychology and opts instead for the "corporeal individual." This step is necessary for psychology to become what Külepe and his contemporaries wanted it to become — a natural science: "The objects of psychological enquiry would never present the advantages of measurability and unequivocality, possessed in so high a degree by the objects investigated by natural science, if they could be brought into relation only with the psychical individual." 13

The rejection of the "psychical individual" as a basis for explanation in psychology is of course equivalent to a rejection of the Wundtian notion of psychic causality. Psychic processes cannot be explained in terms of their dependence on other psychic processes, because there is no necessity in their interconnection: "Idea is not dependent upon emotion, nor emotion upon idea; a change in one is not necessarily followed by a definite change in the other. And ideas are not dependent solely upon one another; they come and go in our inner experience very much at random; their interconnections are for the most part not due to mutual influence, but obviously follow a law imposed upon them from without." 14 This "without" is the "corporeal individual," the living, physiological system; there are no "psychic causes." It follows from this that, apart from the necessary analysis of complex phenomena into their elements, the only remaining task of psy-
chological theory is "the proof of the dependency of mental phenomena upon certain bodily processes." 15

In his Introduction to Philosophy, which followed his Outlines of Psychology two years later, after his promotion and transfer from Leipzig to Würzburg, Külpe became more explicit about the source of his ideas on the definition of psychology and of psychological theory. That source is the philosopher Avenarius who had set forth his systematic ideas in the late 1880s and subsequently expressed himself in more detail on the nature of psychology. 16 In the history of philosophy the name of Avenarius is generally bracketed with that of Ernst Mach, the physicist who stated that his philosophical position coincided in all essential respects with that of Avenarius, 17 but whose style was incomparably more lucid and whose long-term influence was far greater. Külpe was very familiar with Mach's writings too, but it is clear that both he and Wundt took Avenarius, a professional philosopher, more seriously than they did Mach whom they must have regarded as something of an amateur in this field.

Mach and Avenarius are important figures in the mainstream of positivist philosophy. After Mach's death, the originators of logical positivism, whose direct influence extends to the present day, were to identify themselves as the "Ernst Mach Society," though they are better known as the Vienna Circle. What made the thought of Mach and Avenarius appear useful and attractive to psychologists of Külpe's generation was the fact that, unlike the earlier positivism of Auguste Comte, which had had no place for psychology at all, they developed a version of this philosophy which managed to combine a scientistic attitude with considerable respect for the status of psychology. Mach and Avenarius rejected the metaphysical dualism of the mental and the physical. As positivists they refused to go beyond what is given in experience; but we do not have two kinds of experience, physical and mental — experience is simply experience. The elements of our experience, however, can be studied from two points of view: We can study relationships among experiences that are independent of the particular biological system to which they belong — in that case we have the basis for physical science — or we can study relationships among experiences that depend on the particular biological system to which they belong — in which case we practice psychology. The difference between psychology and physical science is therefore not an essential difference; there is no reason why psychology should not aspire to a scientific status comparable to that of the physical sciences.

There is, however, an important proviso to this conclusion, and it concerns the very nature and definition of psychology as a science. The proviso is that scientific psychology should abjure all mentalistic explanatory concepts, for these are not part of our basic experience. Mach and Avenarius each emphasized different aspects of the nonexperiential nature of mentalistic constructs, but the effect is the same. Mach followed directly in David Hume's footsteps in demonstrating to his own satisfaction that the individual's experience of self is not an experience at all but simply a combination of sensations which in themselves are no more mental than they are physical: "The primary fact is not the ego but the elements (sensations) . . . . The elements constitute that I . . . . When I cease to have the sensation green, when I die, then the elements no longer occur in the ordinary, familiar association. That is all. Only an ideal mental-economical unity, not a real unity, has ceased to exist." 18 In other words, the experience of personal agency is illusory; it is simply a convenient way of combining certain sensations to which there corresponds no real entity. It follows that concepts involving the self as agent have no place in a scientific psychology. 19
Avenarius arrived at the same conclusion by emphasizing the limitations of our experience of other individuals rather than of self. Where Mach exhorts us to "give up the ego," Avenarius expatiates on the evils of "introjection." By this term he means the tendency to attribute mental entities to others. No one finds the mental processes of others given in his direct experience, and by going beyond experience and inventing the mental world of others we only land ourselves in the quagmire of philosophical dualism from which Avenarius's philosophy is designed to extricate us. For psychology the consequence is clear. It must investigate the dependence of experience on the individual, but it is the biological and not the psychic individual that is involved. This is exactly where Külpe picked up the thread from Avenarius, with his insistence on the "corporeal individual" as the source of psychological phenomena. For Avenarius, and for Külpe who follows his lead, scientific psychology has no use for mentalistic explanatory constructs. The rejection of such constructs is part of the positivist rejection of "metaphysics" and the restriction of science to what can be validated within direct experience.

Development of the Controversy

This line of thought was of course totally unacceptable to Wundt, and it stimulated him to launch a series of critical articles in the *Philosophische Studien*. In the first of these he restricted himself largely to a defense and clarification of his own views on the nature and importance of "psychic causality." The second paper contains a direct attack on Külpe, and finally he devoted over 300 pages to a detailed criticism of Avenarius's (and some aspects of Mach's) position. As far as matters of psychological interest are concerned, the theme that runs through all of Wundt's arguments is his conviction that the approach he attacks amounts to the subordination of psychology to biology: "Psychology has an independent task only if that which we call 'psychic facts,' 'mental processes,' and so forth, presents internal relationships which force us, at least in broad perspective, to conceive contents of psychic experience in terms of the contents of other psychic experience and thus to establish particular forms of psychic causality." Wundt saw the essential task for psychology in the establishment of principles which could be applied by the other *Geisteswissenschaften*, by linguistics, history, ethnology, and so on. But it could not do this unless it refused to become what Külpe and others were turning it into, a kind of "applied physiology." "First and foremost [psychology] must therefore interpret the psychic in psychic, and not in physical terms."

In Wundt's view, Külpe's approach to psychology was based on an erroneous overestimation of the scope of natural science, on the claim that the latter has a monopoly of knowledge *überhaupt*, not only the knowledge of objects, but also the knowledge of subjects. For Wundt this position constituted a threat to the future of the new discipline of psychology: "If knowledge of all of reality devolves upon natural science... then psychology finds its work done before it has started with it." However, there was no chance, in Wundt's opinion, that this attempt to physicalize psychology could succeed. Historically, natural science attained its status by abstracting from the subject, by avoiding subjective categories; it is absurd to expect it now to explain the very subject on the exclusion of which its status as science depends. It is true that certain very simple psychological phenomena can be accounted for physiologically, but it is an obvious logical error to use precisely those relations in which the specific character of the psychic is not prominent as a basis for conclusions about the general characteristics of the psychic. In this kind of reasoning the fundamental error of this position is revealed: to burden natural science with the explanation of those constituents of experience from which natural science has abstracted in principle.
The conflict that developed between Wundt and Külpe about the status of psychology as a natural science cannot be fully understood without noting an underlying divergence in their conception of the nature of science. Külpe had adopted from Mach and Avenarius what was subsequently to become known as the positivistic conception of science. According to this view, the fundamental task of science is observation and description, so as to provide the most economical summary of the relationships among experiences. Scientific theory is essentially a convenient summary of descriptions of observations; scientific laws involve the establishment of functional relationships among observables. The emphasis on the principle of economy in the formulation of scientific generalizations, especially in the writings of Mach, leads to a particular stress on the unity of science—it is uneconomical to switch fundamental concepts when we switch fields and disciplines. Unity of scientific conceptualization can be achieved if as much use as possible is made of the most abstract generalizations. The sciences can be arranged in a hierarchy, according to the abstractness of their generalizations, physics being the most abstract and therefore the basis for the others. At each point in the hierarchy we attempt to describe observations of functional relationships in the most economical, that is, most abstract manner. The relationships dealt with by physiology being more general than those dealt with by psychology, the latter should be reduced to the former as far as possible.28

Wundt recognized the close link between the concept of a hierarchy of sciences and positivist thought—he traced the concept to Comte and Herbert Spencer;29 further, he contrasted this concept with his own view according to which the relationship among the sciences involves a fundamental duality, expressed in the division, at one time used in England, between the natural and the moral sciences, or in the German division between Naturwissenschaft and Geisteswissenschaft. Wundt traced the origins of the German division to the Hegelian distinction between the philosophy of nature and the philosophy of spirit (Geist). What is involved here is the principle of the nonreducibility of the concepts of either set of sciences to those of the other set. There are two ways of analyzing experience, according to Wundt; either we can analyze experience as it presents itself immediately, or we can analyze it mediately in terms of preconceived categories like momentum, force, energy, and so forth. The former is the path taken, not only by psychology, but by the Geisteswissenschaften in general; the latter is of course the approach characteristic of the natural sciences. This notion, that physical science is based on the prior construction of a conceptual network which imposes its own structure on experience itself, is one which occurs very early in Wundt’s thinking.30 It is of course very much at variance with the positivist view of scientific concepts as economical descriptions of observed relationships; in the one case the stress is on the observational-descriptive character of science, in the other case it is its constructive-axiomatic character that is emphasized.31

The opposing views about the relationship between scientific theory and observation are closely tied to diverging estimates of the role of experimentation in scientific psychology. As early as the original version of his Lectures on Human and Animal Psychology, Wundt had recognized limitations on the application of the experimental method to psychology: “Feeling and striving are too firmly enclosed by the boundaries of the subject, their causes are generally hidden from objective investigation, so that the experiment no longer finds a place here.”32 With the development of his characteristic philosophy of science Wundt’s estimate of the role of experimentation in psychology tended to become much less sanguine than it had been in his early works. Also, the basis
for setting limits to the experimental method changed from substantive to formal considerations. In the first edition of the Logik the realm of the psychological experiment covers the investigation of the facts of individual consciousness in relation to their coexistence and succession, "and never extends beyond this simple task." 33 Questions about psychological development and complex psychological processes, as involved, for example, in symbolic activity, cannot be answered by means of the experimental method.

The younger generation of psychologists did not share Wundt's skepticism. Ebbinghaus's extension of the experimental approach to the study of memory clearly gave expression to and encouraged their faith in the universal applicability of experimentation. In his textbook Külpe states: "So that in principle there is no topic of psychological inquiry which cannot be approached by the experimental method. And experimental psychology is therefore fully within its rights when it claims to be the general psychology of which we propose to treat." 34 A few years later these sentiments were to receive a far-reaching practical expression in the form of the experimental work of the Würzburg School carried out under Külpe's direction. This work provoked Wundt to a direct counterattack in which he castigated the Würzburg attempts at applying the experimental method to the study of complex thought processes as "pseudo-experimentation." 35 As far as Wundt was concerned, such complex psychological processes were beyond the reach of experimentation in the sense in which natural science understood that term. The procedures adopted by Külpe's Würzburg School did not deserve the name of experimentation and their results were no more worthy of being accepted as a serious contribution than were the results of uncontrolled introspection which to Wundt had always been abhorrent.

This controversy has been noted by some historians of psychology, usually in passing. Its real significance, however, can be appreciated only if we do not regard it as having been caused by the phlegm of a cantankerous old man, but if we recognize its roots in the split that had developed between Wundt and Külpe in the previous decade. Their conflict about the limits of experimental method in psychology was a direct outcome of their different philosophies of science and of their definition of the scientific scope of psychology. If psychology is defined purely as a natural science, then the method of experimentation, characteristic of the natural sciences, becomes coextensive with psychology. If, on the other hand, psychology is essentially a Geisteswissenschaft, albeit one with certain definite links to the natural sciences, then its use of the experimental method will be regarded as legitimate only as far as these links go, but no farther. In contrast to this, the positivist philosophy made no distinction between two kinds of experience, two kinds of knowledge, mediate and immediate. For positivism, all knowledge worthy of the name was of the same type and whatever did not conform to this type was fiction, imagination, or fantasy. The definition of this singular kind of knowledge was provided by the data and methods of natural science. Among these methods experimentation was clearly paramount, therefore psychology could aspire to knowledge of complex mental processes only insofar as it succeeded in subjecting them to experimental investigation.

The Widening of the Controversy: Dilthey, Ebbinghaus, Titchener

The fundamental divergence of opinion in regard to the definition, scope, and methods of psychology was not limited to Wundt and his most distinguished student. The significance of the Wundt-Külpe rift can be fully appreciated only if it is seen in the context of other contemporary polemics around similar issues. In 1894, the year of Wundt's monograph on "psychic causality" and of the first Avenarius paper on the subject matter of psychology, Wilhelm Dilthey published his "Ideas on Descriptive and Analytical
Psychology.” In that work the eminent methodologist of the *Geisteswissenschaften* attempted to settle accounts with the naturalistic tendency in psychology and to sketch the foundations of a very different kind of psychology required by the cultural sciences. Dilthey saw the experimental psychology of his time as part of the older tradition of “explanatory psychology,” dedicated to deriving the facts of human action and experience from a limited number of analytically hypothesized elements. He traced this tradition to Herbart, the two Mills, and Spencer and observed that the experimental techniques introduced by Fechner and Helmholtz greatly enhanced its power and influence. However, Dilthey noted with approval that Wundt, the most eminent representative of a systematic and self-conscious experimental psychology, had found it necessary to abandon the established tradition of “explanatory psychology.” Wundt's principles of creative synthesis and psychic causality explicitly run counter to the Mill-Spencer tradition of psychological analysis and elementarism. Dilthey did not doubt the applicability of the analytic tradition to certain simple psychological processes; what he (and Wundt) objected to was the claim that this approach could be validly extended to complex psychological products and functions and that it constituted the necessary basis for all of psychology.

Dilthey expressed the belief that as the movement represented by Wundt developed strength, so the influence of the analytic “explanatory” tradition in psychology would decline. It is clear that he was too optimistic about the prospects for Wundt’s direction, for it proved to be quite unacceptable to most of the younger generation of psychologists. Dilthey’s paper became the target of a highly polemical reply by Ebbinghaus, much of which was not so much a defense of analytic psychology as an attack on Dilthey’s alternative of a descriptive psychology of value structures.

In the present context one key point of Ebbinghaus’s position is of special relevance. Ebbinghaus correctly interpreted Dilthey’s critique as an attack on the conception of psychology as a natural science. However, in Ebbinghaus’s view, Dilthey had an old-fashioned understanding of science — he seemed to equate the general approach of natural science with the special case of mechanics, a science based on the assumption of the qualitative and quantitative equivalence of causes and effects. Perhaps mechanics was indeed the model for a psychologist like Herbart, but this was no longer true for later experimental psychology. Ebbinghaus credited Mach with the demonstration that what made an investigation scientific is not its use of mechanistic explanation but its concerns with functional relationships among observables. Thus, the law of association, for the kind of psychology that Ebbinghaus defended, does not claim anything about the nature of psychological forces but simply notes that a previous conjunction tends to lead to the reproduction of one idea when another is present. Ebbinghaus’s reply to Dilthey involved the argument that while a science of psychology modeled on Newtonian physics may be vulnerable to the latter’s criticisms, this was not true for a science of psychology modeled on Machian physics.

Ebbinghaus, like Külpè, tended to fall back on a Machian philosophy of science when addressing himself to fundamental questions about the status and subject matter of psychology. In his systematic textbook, the *Grundzüge*, he associated himself with the definition of psychology given in Külpè's *Outlines* of 1893 and with the position advocated by Mach in the *Analysis of Sensations*. He pointed out that this position must not be misinterpreted as involving a limitation of psychology to “phenomena of consciousness,” rather it means that psychology is concerned with the dependence of the world of experience on an individual. For Külpè's awkward expression of the “corporeal
individual." Ebbinghaus substituted the more elegant term "organism," a variant that would quickly come into general use: "[Psychology] treats of those structures, processes, relations of the world whose peculiarity is essentially conditioned by the constitution and functions of an organism, an organized individual." What is important here, and what was of course unacceptable to Wundt, is that the "organized individual" is conceived exclusively as a biological organism and not as an agent producing cultural values. Ebbinghaus rather lamely defended Külpe against Wundt by saying that the study of experiences which share the quality of dependence on the individual is not equivalent to the study of experiences in their dependence on the individual. Wundt mistakenly attacked the latter variant while Külpe only meant to maintain the former position. This, of course, does not speak to the major issue at stake, whether psychological theory is to recognize psychological causes in its attempts at explanation, or whether it is to restrict itself to physical causes or the mere recording of functional relationships.

Ebbinghaus was not the only one of the historically important group of younger psychologists who sympathized with Külpe's Machian and anti-Wundtian position. Titchener, perhaps directly through his close association with Külpe, adopted the positivist philosophy of science and its definition of the place, methods, and aims of psychology. Although Titchener exhibited a certain diffidence about expressing himself explicitly on these fundamental issues, Boring, who was certainly in a position to know, tells us, "The teaching of Mach and Avenarius seems to have been ingrained even into Titchener's everyday thinking." While it is certainly not difficult to discern the implicit Machian philosophy that underlies Titchener's discussions of theoretical issues in psychology, he reserved his elaborated statement of that position for his magnum opus, the Systematic Psychology which was never completed. The only parts which he did in fact write were those dealing with the nature of science and the definition of psychology, topics on which his mind had been made up long before. But because these chapters were supposed to introduce the more concrete sections that were never written, they rested among his papers until they were finally published posthumously.

For Titchener, the aim of science, and therefore of psychology, was description. He based himself on Mach's characteristic statements that "the grand universal laws of physics, such as apply indiscriminately to material, electrical, magnetic and other systems, are not essentially different from description." Explanatory concepts, insofar as they have any value, are simply economical descriptions; there is no psychic causality, any more than there are real physical forces, and science cannot go beyond the observation and description of the elements of experience and their connection. Wundt's view of science as essentially a conceptual, constructual activity is emphatically rejected. As a consequence, Titchener had no use for Wundt's definition of the relationship of psychology and natural science and, like Külpe, turned to Avenarius for his own definition. Psychology studies experience as dependent on "the biological individual." Titchener understood very well that when Avenarius and Mach speak of the individual in this context they cannot and do not mean the individual as a knowing subject, because the latter is merely a convenient fiction that refers to certain combinations of sensations (see Mach on the ego). The individual of positivist psychology has to be the biological organism. Therefore, Titchener always rejected the notion that psychology dealt with "private" experience any more than any other branch of science. Psychology could only live up to its claim to the status of a science if it rejected any attempt to study experience in relation to a knowing subject or agent. As long as the only subject it recognized was the biological organism, the limitations on the universal validity of its observations were simply a func-
tion of the variability of these organisms (itself open to scientific investigation) and had nothing to do with the alleged "private" nature of its data.44

Titchener necessarily had to reject Wundt's principle of psychic causality which formed the cornerstone of the latter's system. "It is clear that we cannot regard one mental process as the cause of another mental process," he states in his Textbook;45 the collection of psychological data by itself is analogous to old-fashioned natural history — it must lack the unity and coherence imparted by the kind of guiding principle that biology has in the form of the law of evolution. Wundt, of course, had offered his laws of psychic process to provide just such unifying principles.46 For Titchener, however, "the explanatory principle for psychology must be looked for beyond, and not within, the world of dependent experience. Physical science, then, explains by assigning a cause; mental science explains by reference to those nervous processes which correspond with the mental processes that are under observation." 47 If psychology was to regard mental data solely in their "dependent" aspect, if mental facts could never explain anything, and if the biological organism provided the only source of explanatory principles for psychology, then it is hardly surprising that psychologists listening to Titchener found themselves wondering why they should bother with mental data at all. Indeed, by dropping them they would do no more than follow the path of progress that Titchener had indicated — psychology would transcend the "natural history" level of mental observation and become a real science.

II. CONSEQUENCES FOR PSYCHOLOGICAL THEORY

The redefinition of the place and task of psychology entailed by the widespread adoption of the positivist philosophy of science had profound repercussions on psychological theories in almost every subfield of the new discipline. Far from being merely a philosophical quibble, the redirection of scientific commitment had very specific consequences for psychological theory and research.

Apperception

The most obvious instance of this is provided by the theory of apperception which had held the central place in Wundt's entire psychological system and which was simply buried by post-Wundtian, Machian psychology. This involved a widespread redirection of psychological research and explanation. Wundt's theory of the nature and process of apperception combined two features that have been of far-reaching importance in the history of psychology. First, it expressed Wundt's dynamic standpoint, the attitude which caused him to characterize his own system of psychology as "voluntaristic." The basis of mental life was to be found not in the passive response to impression, nor in the reproductive play of associations, but in the activity of selective attention and discriminative judgment. He conceived of this activity as a real force, an "aboriginal energy" which first expressed itself in impulsive movement. Second, the doctrine of apperception expressed the decidedly "centralist" bias of Wundt as opposed to the "peripheralism" of some of his contemporaries. In accounting for the products of mental activity, whether in the form of voluntary movements or in the form of conscious content, his inclination was to play down the role of sensation and to emphasize the role of centrally generated processes. The central apperceptive process dominated everything — even in the sphere of movement, voluntary movement provided the basis for involuntary movement and not the other way around. For such alleged triumphs of peripheralism as the James-Lange theory of emotion he had nothing but scorn.48
For a positivist psychology, the Wundtian doctrine of apperception was clearly unacceptable. Insofar as it postulated a psychological force or agency it smacked of metaphysics and was incompatible with the Machian view of science. Külpe's *Outlines* of 1893, which so carefully avoided an open break with Wundt, eventually worked up to a rejection of the latter's central idea that active apperception involved a psychological principle quite different from mere association: "But we can discover no good reason for regarding it [i.e., active apperception] as a really new form of connection, as incapable of subsumption (at least in principle) to the familiar laws of reproduction." 49 Külpe did not deny the observations that had led to the theory of apperception, but he felt (at least in his Machian phase) that any central selective process could be accounted for by the effects of past association without requiring the introduction of a new principle of psychological activity.

Ebbinghaus adopted a similar position. He admitted that the phenomenon of attention was "a regular embarrassment for psychology," but he rejected Wundt's voluntaristic theory of apperception as an unscientific attempt to cope with the problem. He preferred to regard the observed effects of the central selecting mechanism as a product of separate, precisely determinable factors rather than as the expression of a single central process which seemed to him to imply the activity of some kind of homunculus.50 He also objected to Wundt's formulation on heuristic grounds, for the assumption of underlying causal processes makes Wundt's formulations cumbersome without constituting an aid to empirical observation. In this respect Ebbinghaus followed a crucial maxim of the Machian philosophy of science, the principle of economy. Scientific theories, being simply summaries of observations and practical guides to further experimentation, can serve their tasks best by being kept simple and avoiding the introduction of additional concepts. It was no doubt Ebbinghaus's commitment to this principle that led him to eliminate the category of "choice" as a criterion for identifying a new kind of central process. For Ebbinghaus, therefore, the determinants of voluntary attention were constituted by the sum of existing specific reproductive tendencies, whereas Wundt's theory of apperception had sought to express the conviction that the central process involved in choice behavior was irreducible to any combination of specific action tendencies but involved the emergence of a new level of functioning.

The Wundtian theory of apperception proved more of a problem for Titchener than it did for Ebbinghaus who had no interest in trading on Wundt's reputation. Although he could not accept Wundt's philosophy of science, Titchener obviously derived great satisfaction from playing the role of Wundt's disciple in psychology. His way of resolving the ambiguity of this position was to subject Wundt's theories to a systematic reinterpretation so as to remove or trivialize their basic incompatibility with the classical British tradition in psychology and with Titchener's Machian philosophy of science. While a systematic comparison of Titchener's Wundt with Wundt's Wundt would be tangential to the present discussion, certain themes are worthy of note. In particular, it is clear that Titchener did not find the core of Wundt's voluntaristic apperception theory, the notion of a centrally acting "psychic causality," any more palatable than did the early Külpe, Ebbinghaus, or Meumann. Titchener's characteristic attitude emerged early. In 1894 Walter Pillsbury was working on a doctoral thesis under Titchener in the area of apperception. He recollects that they decided to replace Wundt's concept of apperception as "an active force" with a different usage by which apperception became "the name for an observed interaction and not for a force. The suggestion was made that Wundt could be interpreted to mean something of this kind and used apperception as the equivalent of
This Machian tour de force was to set the tone for Titchener's later "interpretations" of Wundt. By the time Titchener's Textbook appeared, apperception hardly merits a mention and is quickly dismissed with the sentence: "It is a question, however, whether there is any real gain in the introduction of the term." Indeed, if we are to limit ourselves to "observed interaction" without reference to the underlying dynamics, then the term does become pointless and might as well be replaced by "attention." It is noteworthy that Titchener's lectures on that subject treat the topic in terms of elementary feelings and sensations, completely ignoring the fact that for Wundt the key to the whole area lay in the concept of psychic causality, specifically the principles of psychic resultants and psychic relations. With the abandonment of such concepts, which appear "metaphysical" from the point of view of a Machian philosophy of science, the problem of attention must indeed reduce to a question of sensory and affective elements.

Feeling

The question of elements also became crucial in the area in which Titchener's usual strategy of quiet "reinterpretation" of Wundt would not work, the psychology of feeling. That Titchener argued at length against Wundt's tridimensional theory of feeling is well known. What was behind this controversy? The empirical evidence was, as usual, equivocal and could be interpreted to favor various points of view. It depended on which lines of evidence one chose to trust and which pattern of explanation one preferred; and these choices and preferences were in turn determined by one's commitment to one or other philosophy of science. On the methodological side the difference between Wundt and Titchener followed a direction that was highly characteristic of their approach to psychological investigation in general. Two lines of evidence existed in the area of feeling: introspective evidence, and evidence from the analysis of patterns of physiological activity accompanying feeling. Wundt's tridimensional theory had been developed in the light of the psychophysiological studies of Lehmann, Mentz, and Kiesow. Titchener, on the other hand, dismissed this kind of evidence as irrelevant to the psychology of feeling and preferred to rely entirely on introspective evidence. His original paper on the subject was severely criticized by Wundt as constituting a flagrant misuse of the introspective method, a regression to the prescientific kind of introspection whose products are simply the result of suggestion and of preestablished opinions. Wundt remained skeptical in the face of Titchener's more systematic use of introspection in this area, regarding the data as worthless because of the overwhelming effect of either the experimenter's or the subject's preexisting prejudices and beliefs.

Wundt took essentially the same stand in regard to the investigation of complex feelings (and almost all feelings are complex) as he was to take in regard to the investigation of complex cognitive processes by the Würzburg School a few years later. The experimental method comes up against its limits in the face of these complex processes, and introspection is worse than useless when it attempts to analyze such complexes into what are supposed to be their elements: "As it is quite impossible to separate the ideational and feeling components of any complex experience by means of mere introspection it is hardly possible that anything else should emerge from this method but what one already knows or believes one knows." Up to a point, one can try to deal with this problem by using physiological observations to provide an objective anchor for the introspective reports, but this will only work in "comparatively simple cases." There is a special problem in the area of feeling because of the difficulty of giving an adequate account of feelings through the verbal medium. Wundt considered music to be a "pure language of
feeling," and he believed that its very existence demonstrated that such feelings "lack the ability to be fixated verbally." 59 Psychology, as usual, must therefore substitute the comparative and historical study of mental products for the experimental study of individual reactions when dealing with complex mental processes. But even in an experimental study of simple cases of feeling, introspection plays a decidedly subordinate role.

The weak point of the Machian or positivist philosophy of science was of course its naiveté in regard to the role of conceptual predispositions in the determination of experience. It wanted to make experience the test of all conceptual categories, overlooking the fact that conceptual categories have a nasty habit of predetermining whatever enters experience. For example, Avenarius's point of departure, the "factually given" (tatsächlich vorgefunden) aspect of the "natural" view of the world, was no more factual and natural than any other aspect of experience ordered in terms of conceptual categories, as Wundt was quick to point out. Similarly, Titchener's appeals to his (or his students') introspective experience as though this constituted a final evidential basis free of all preconceptions strikes the modern reader, as it struck Wundt, as decidedly naive. A later generation was to attribute the weakness of Titchener's foundations to his reliance on introspective experience. If "public" experience were substituted for the latter, the positivist ideal of a completely reliable, completely factual observational base could be attained. The behaviorist revolt did not question Titchener's positivist ideals. On the contrary, it adopted them with enthusiasm; it simply considered that the wrong path had been chosen to reach them. If we adopt the usual distinction between reformations that seek to change means and revolutions that involve a change of ends, then the switch from Titchenerian introspectionism to behaviorism must be characterized, not as a revolution, but as a reformation within the broader movement of positivist psychology.

Turning from questions of method to the substantive issues in the analysis of feeling, the difference between Wundt, on the one hand, and Külpe, Titchener, and Ebbinghaus, on the other, came down to the questions of whether experiences of excitement-depression and tension-relaxation were to be regarded as aspects of feeling or were to be attributed to organic sensations. Wundt favored the former alternative, the Machian psychologists, the latter. Although Titchener actually seems to have believed that the issue could be decided empirically, it is obvious that we are dealing with a conceptual preference which expresses more fundamental commitments. One issue which is involved here is the centralist-peripheralist question to which we have already alluded in the context of the theory of apperception. Wundt, as has been noted, was wont to emphasize the role of central processes. Feeling was such a process, and in fact he regarded it as the product of the activity of the central apperceptive function.60 By greatly extending the scope of the affective process, beyond mere pleasure and pain, Wundt was, as usual, placing the emphasis where he felt it belonged, in the sphere of central processes.

By contrast, the urgent message of Mach's Analysis of Sensations had been that the central experiencing, feeling, willing subject was a myth, that there was nothing there except combinations of sensations: "It is out of sensations that the subject is built up." 61 In later editions Mach uses James's theory of emotion to illustrate his point. The psychological thrust of Mach's "antimetaphysical" stance was clear — complex central processes were not to be accepted as possessing an irreducible reality but were to be reduced to combinations of simple elements, which, in terms of the prevailing tradition, were identified with sensations: "Thus, perceptions, presentations, volitions, and emotions, in short the whole inner and outer world, are put together, in combinations of varying evanescence and permanence, out of a small number of homogeneous elements. Usually, these elements are called sensations." 62 Accordingly, sensations came to play a
role of overwhelming importance in Machian psychology. Well over half of the substance of Kulpe's 1893 text, as well as of Ebbinghaus's 1897 text, is devoted to the topic of sensation, although they were intended as general introductions to psychology. The contrast with Wundt's countertext, the Grundriss of 1896, is quite striking. It is only a partial explanation of this curious imbalance to suggest that Kulpe and Ebbinghaus were solely interested in treating topics for which experimental evidence was available; the discussion of more complex processes in the remainder of their texts shows that they regarded sensations as the basis for practically the whole of psychology.

Their disagreements with Wundt about the nature of feeling are a reflection of this outlook. Wundt had produced his dimensional analysis as a way of coping with the qualitative complexity of feeling that defied analysis into elements. The Machian psychologists, on the contrary, reduced feeling as such to pleasure and pain and attempted to account for other aspects of feeling in terms of organic sensations. There can be little doubt that they were prompted to do this by their distrust of central guiding processes, which they regarded as quasi-metaphysical, and by their desire to explain as much as possible by means of simple and concrete processes with an identifiable material correlate. Thus, "organic sensations" became a kind of Machian substitute for those complex central processes which seemed to have no place in a strictly positivist psychology. Titchener sums it up: "Now I personally believe that the organic sensations play an important part, not only in feeling and emotion, but in many other departments of the mental life: in the formation of sensory judgments, in the mechanism of memory and recognition, in motives to action, in the primary perception of the self." In historical perspective, the most important aspect of the sensationist doctrine was the shift in the basis of psychological analysis and explanation from complex central processes to elementary processes with a concrete material source at the periphery of the nervous system. This turned out to be one of a number of theoretical preferences which Watsonian behaviorism was able to share with Machian introspectionism.

Elementism

The sensationism of the early Machian psychologists was doubly motivated by their philosophy of science. Not only did sensations seem to be free of the suspicion of "metaphysics," they also provided the most obvious means for psychology to comply with Mach's famous principle of economy in scientific theorizing. As scientific concepts could not refer to any real world behind the world of appearances, their sole purpose was to summarize observed relationships in the most parsimonious manner possible. This meant avoiding the multiplication of concepts to describe different sets of data — the same concepts should be used to describe the largest possible range of phenomena. In its application to psychology, this principle manifests itself in one or other form of reductionism. The overriding importance which the principle of economy attained in the Machian version of the positivist philosophy of science dictated that the same kind of elementary concept should be used to account for all levels of phenomena, the complex as well as the simple. In Titchener's words, "If modern psychology is to be termed sensationistic, that is not because it is wedded to sensation. It must mean simply that psychology prefers to work with as few tools as possible, and that sensation alone, or sensation and affection together, seem to give it all that it requires for the work of analysis." Wundt's principles of psychic causality, among other things, offended the Machian principle of economy. But then Wundt argued directly against Mach that one should not elevate this principle to the point where it implied the metaphysical assertion that nature
prefers simple means. While the simpler account may sometimes be convenient, it does not follow that it is bound to be the true one.

This issue in the philosophy of science is closely linked with the diverging beliefs of Wundt and of his immediate successors about the role of psychological analysis. One of Wundt's original criticisms of Külpe's book was that it seemed to limit the task of psychology to the analysis of the content of consciousness into its elements, and that it paid little attention to the much more important task of exploring the role of psychic causality in psychological development. Külpe's elementism is faithfully reproduced in Titchener's first book: "The first object of the psychologist" is there said to be "to ascertain the nature and number of the mental elements." Secondly comes synthesis, which involves the "laws which govern the connection of the mental elements," but the main purpose in studying synthetic connections is to check on the correctness of past analyses and to facilitate future analyses. One of the pervasive differences between Wundt and Titchener relates to the role played by elementary analysis in their systems. For the latter, analysis into elements became the ultimate scientific task, for the former, it was a limited, preliminary, and subsidiary task in terms of the goals of psychology as a whole:

Thus, in the area of psychology, to an even greater degree than in that of natural science, analysis into elements is a merely preparatory business that is inadequate in terms of the whole character of psychic structures. For all the more important psychological tasks it must be supplemented by causal analysis [Wundt means psychic causality] and the synthesis of psychic phenomena which is closely connected with it.

In this connection Wundt speaks of the impossibility of reducing complex mental contents to their elements and their external interconnections. Those who fail to recognize this impossibility "overlook the essential difference of the attitude of natural science and that of psychology." The former is concerned with elements and their connections, but the latter has to become involved with the "internal relationships" of part and whole which create new meanings and new values that are not contained in the elements and their external connections. Empirically, the best illustration of what Wundt had in mind is to be found in psycholinguistics, to which he devoted a great deal of time and interest. The meaning, the value of a sentence cannot be derived from the meaning of the verbal elements and the laws of syntax.

**Social Psychology**

Among the many differences that divided Wundt and his Machian successors none is more striking than that which involved their divergent attitudes toward the social and cultural components in the individual's mental life. Wundt invested such a large proportion of his energies in problems of "ethnic" or cultural psychology because he believed that here one dealt, not with a different subject, but with another side of mental activity that had to complement individual psychology if one was ever to achieve an understanding of mental life as it truly existed. He felt that relevance to the social life of man provided the final test of the foundations on which one had built one's individual psychology, and he expected that in the not too distant future experimental psychology would take a back seat compared to the study of social psychological problems.

By contrast, the Machian psychologists literally had no time for social psychology. In their rare and brief references to the topic it is mentioned as a possible field of application for individual psychology, certainly not as a complementary discipline of equal dignity and importance. The difference in perspective is quite striking. Where Wundt
came increasingly to evaluate the progress of psychology in terms of its contribution to the understanding of man's social and cultural life, the Machian psychologists judged that progress solely against the criterion of their special model of scientific activity. That model prescribed the analysis of experience into elements which could be concretely identified and related to the biological organism; it banished central directing processes that defied such analysis and restricted theory to the most economical (reductionistic) description of observed connections. Such a model was peculiarly helpless in the face of the complexities of social life; it required the gross reduction of that life to a few manipulable elements to adapt it to the prescriptions of the model, but that was the work of a later generation of psychologists reared in the positivist tradition.

The discrepancy between Wundt and the Machian group on the question of social psychology was closely linked to the difference in their conception of the interrelationship among the sciences to which we have already referred. The positivist conception of this interrelationship has always been hierarchical, so that there is a great difference in the attitude of the psychologist to the biological sciences on the one hand and to the social sciences on the other. Biology occupies a more fundamental place than psychology in the hierarchy of the sciences, the social sciences a less fundamental place. Therefore, the psychologist must attempt to relate the content of his discipline to the relevant aspects of biology, and he has to take as his point of departure the fact that he is dealing with biological organisms. It is this relationship that anchors psychology in the natural sciences. Moreover, the principle of scientific economy or parsimony demands that the less fundamental sciences should aim to produce generalizations that can be treated as instances of the broader laws of the more fundamental sciences. But towards the social sciences psychology has no such obligation because here it is in the position of the more fundamental science, and it is no more necessary for the scientific psychologist to bother with the social sciences than for a good biologist to concern himself with psychology. Wundt, as we have seen, had a different conception of the interrelationship among the sciences, a dualistic conception, in which psychology as a whole belonged essentially with the cultural sciences and had to be very concerned about its ability to contribute to the work of the other disciplines in this group.

More specifically, this difference of orientation led to the disappearance, in the new positivist psychology, of a central category of Wundt's system, the category of value. When Wundt discussed the basis of his psychological system, the concept of psychic causality, he generally pointed out that the operation of this principle manifests itself in the creation of new values. The products of "creative synthesis" are not merely distinguished from their precursors by greater complexity; they involve the appearance, in experience, of new values not contained in the components. The world of immediate experience, which for Wundt constituted the subject matter of psychology, was very much a world of values, and in this respect was fundamentally different from the world of natural science which had of course abstracted from the experience of value. This concern with the emergence of values in experience is a major factor in the Wundtian conception of psychology as a Geisteswissenschaft.

The Road to Behaviorism

To the new generation of positivists such preoccupations must have seemed excessively philosophical. Their rejection of the Wundtian category of immediate experience was at least partly motivated by their distrust of those aspects of that experience which involved values and meanings. Such aspects seemed to have no place in the strictly scientific psychology of experience they were trying to build. For the most part, their at-
titude was one which was given practical rather than elaborate theoretical expression, as in Ebbinghaus's famous attempt to eliminate value and meaning in the form of the nonsense syllable. It was Titchener who eventually became rather explicit about the fundamental shift in attitude that had taken place. He did this by introducing the category of "existential experience," which he considered to be characteristic of science. What he means by this is what is left of experience when purpose, value, social utility, in short, meaning, have all been removed. According to this metaphysic, there lies beyond the world of ordinary human experience another world of "sheer existence," available to us through scientific observation which "pierces the overlay of interpretation" to reveal a world of "facts," "a world scoured clean of belief and inference and all such evaluative accretion." Wundt would have regarded such a world as a product of an abstracting intellect, an instance of mediated experience which could not form the basis of psychology; for Titchener, it was the only legitimate world for the psychologist.

Boring saw that the inescapable result of his teacher's philosophy of science was a form of behaviorism. The basis of psychological science is not "actual experience" but "real experience" which is derived from the former by a process of inference or conceptualization. Sensations are in fact "systematic constructs" which form the mediating categories that transform actual into real or scientific experience. Once Titchener had recognized that the world of "sheer existence" was an abstracted, constructed world, it really became impossible to continue to believe that the reality of the building blocks of this world could be established by observation, introspective or otherwise. The only reality the elements of this world could lay claim to was a Machian, pragmatic reality. "The new logic asserts that sensations exist if the conception of their reality proves a fruitful hypothesis for a scientific psychology." But if the world of sensations is itself the result of reflection, then the rug is pulled out from under Titchenerian introspective psychology for which that world provides the foundation. "Both consciousness and unconsciousness are inferred," states Boring, thus relegating consciousness to the status of an intervening variable, which is exactly the position accorded to it in E. C. Tolman's neobehaviorism.

It is not only that the world of what Boring calls "the new psychology of content," is an inferred world, it is also a world constructed in a certain image. "Historically science is physical science. Psychology, if it is to be a science, must be like physics . . . . The ultimate abandonment of dualism leaves us the physical world as the only reality." The "consciousness" which appears as a term in this final version of Machian psychology has the same kind of relation to ordinary consciousness as the "intelligence" of intelligence testers has to the popular understanding of that term. They are not the same thing at all. Boring's "consciousness" is something that is completely defined in terms of a limited number of physical dimensions, such as extensity (ultimately measured in centimeters), protensity or duration (measured in seconds), intensity (measured in decibels, etc.), and finally, quality, measured along the dimensions traditionally used to study primary sensory discrimination. Physical science is explicitly used as a model in the construction of these dimensions. There is, of course, no room in this "consciousness" for the experience of meaning or value. "A complete knowledge of the psychology of sensory data would be an approximately complete knowledge of consciousness." Such matters as meaning and purpose clearly do not belong to this psychology of consciousness, and therefore they are relegated to the area of behavioral response. Titchener had legislated sensation to be devoid of meaning; meaning appeared by the addition of a "context." But that addition, as Boring quite correctly concludes, is simply the response of the organism to the original
sensation. Because the addition of "context" is itself frequently not a conscious act, "the test of such a meaning can only be behavioural." 83 Meaning is a matter of discriminatory response, and Titchener's context theory of meaning finally fathers behaviorism. Knowledge and purpose become "habit mechanisms," 84 and value is a matter of preferential response.

The victory of behaviorism, from its first self-conscious announcements to its capture of the main citadels of American psychology, was accomplished with extraordinary speed. If this was a "scientific revolution" it must surely be the fastest revolution known to the history of science! Indeed, it has frequently been observed that the gospel of behaviorism fell on ears that had been very well prepared to receive it. The role that functionalism played in that regard needs no elaboration. But it may well be that from a wider perspective the role of positivist sensationalism must be judged to have been of more fundamental importance.

Such judgments depend on the level of generality at which a theory such as behaviorism is examined. Any scientific theory involves a hierarchy of assumptions and associated prescriptions at various levels of abstraction. The point, however, is not that more and less abstract concepts exist side by side but that the same concept has both a more specific content as well as a base of more abstract assumptions that usually remain implicit. Thus, the prescription that all psychological phenomena are to be analyzed into stimulus and response elements is a specific instance of the more general prescriptions that complex psychological events consist of elements and that these elements are to be such as can be described in a physical "thing" language. Now, the concepts of behaviorism have a rather specific level whose content will vary with the particular version of the doctrine one happens to be dealing with, but they also involve more abstract prescriptions which are shared by all the varieties of behaviorism as well as by many psychological theories that might not be self-consciously behavioristic. These abstract prescriptions are derived from a positivist philosophy of science. The distinctive feature of most twentieth-century psychology lay in the fact that positivism became its form of scientific orthodoxy. 85 Therein lies the historical importance of the positivist reform of psychology which we have traced to the efforts of a group inspired by Mach around the turn of the century. Their work is of interest, not only because it establishes a real historical link between Machian positivism and the mainstream of academic psychology, but also because it expresses rather directly certain basic preconceptions which later generations simply took for granted. The important role played by Machian positivism at the period when psychology formed its self-conception as an independent discipline also explains the peculiar susceptibility of psychology to subsequent infusions of positivist philosophy in the form of operationism and logical positivism. 86 No other science showed this effect; no other science had started off by defining its aims in a framework of positivist philosophy. Among his fellow physicists Mach's philosophy of science remained the object of considerable controversy and never gained general acceptance. 87

What behaviorism did contribute was the strong practical interest of American psychology. For the purpose of manipulating individuals in the context established by real social institutions the older, descriptive form of psychological positivism was indeed useless. But, in taking this turn, behaviorism was actually restoring the positivist philosophy of science to its traditional role. Because of its emphatic rejection of any possible role for science in providing insights into a real world behind appearances, this philosophy was left with only two ways of justifying scientific activity. One was to justify
science in terms of the satisfaction it gave to its practitioners and a small circle of cognoscenti, the scientific equivalent of \textit{l'art pour l'art}. The other, and far more popular, alternative was to justify science in terms of its practical usefulness. Both themes are actually to be found in Mach's writings, although, understandably, the public emphasis on the theme of practical usefulness has always far outweighed the other theme. Positivism has been the favorite philosophy of those who wished to justify science in terms of its usefulness for achieving established social goals. However, for many individual psychologists it also proved to be a convenient philosophy for reconciling a public justification of scientific activity in terms of social usefulness with a private justification in terms of personal satisfaction, a pattern that has been greatly encouraged by the internal structure and the external relationships of psychology as a profession.\textsuperscript{88}

It was the professionalization of psychology that also completed the repudiation of Wundt which had been taken such a long way by the first generation of Machian psychologists. Wundt strongly opposed that professionalization,\textsuperscript{89} which hardly helped to persuade the younger men that his fundamental attitudes were compatible with their concerns. He counselled extreme caution in the face of pressures to turn psychology into an applied science. He perceived, correctly, as it turned out, that the predominance of practical interests would have a decisive influence on the methods, the goals, and the concepts of the discipline.\textsuperscript{90} As regards methods, they would become more crude so that they might be used by unsophisticated technicians working in circumscribed settings. The social institutions within which psychology was applied would impose their own biases on the subject; for example, psychology in education would be pushed into intellectualistic problem formulations and away from the dynamic bias of Wundt's voluntarism. Finally, psychological concepts would become defined in ways narrowly determined by the practical context of their application, and here Wundt pointed to the example of the new work on intelligence which seemed to him to involve a revival of faculty psychology. Hardly anyone listened to him by now. Wundt and his philosophy were clearly out of step with the way psychology was going.

It is true that this was largely attributable to the fact that the world of the twentieth century suggested tasks to which he could not respond and created interests with which he could not sympathize. At the same time, it must be recognized that his system had been a failure, even on its own terms. Had his achievement been more convincing, his repudiation might not have proceeded quite so smoothly. His attempt to retain a place in psychology for the concept of value led, in practice, to a schematism that probably reminded not only Max Weber of the nineteenth-century faith in progress. His insistence on the dynamic foundation of psychological phenomena, which he called his "voluntarism," was not supported by concrete research on drives and motives, although verbally he stressed their importance. His notion of psychological analysis, although supposedly subordinated to his synthetic concepts, was not intrinsically determined by these concepts, thus leading to a number of inconsistencies. Most damaging, however, was his failure to endow his concept of psychic causality with the kind of content that might open up new perspectives for others. The principles of psychic causality which he enumerated remain rather empty abstractions. In his determination to avoid the errors of the associationists, who had mistaken logical relationships for psychological relationships, he did not recognize that the notion of psychic causality was doomed to sterility unless linked to categories of subjective meaning.

The idea of psychic causality was reformulated in various ways by a number of twentieth-century psychologists who stood outside the positivist mainstream. The princi-
ple of Pragmance, for example, is a principle of psychic causality, formally not dissimilar to the kinds of principles Wundt developed. Kurt Lewin’s concept of the life space, in which only psychological forces could have psychological effects, is a further development of the idea, and theories of cognitive balance and dissonance represent some of its more recent incarnations. Freud committed himself to psychic causality with the principle of psychic determinism which came to play such a central role in his system. But none of these later attempts to provide psychology with its own form of causality appear to have owed anything to Wundt’s treatment of the topic.91

Nevertheless, the clash between Wundt and the positivists remains historically instructive. It foreshadowed the most general, the most significant line of division among psychologists during the years to come. That division was based on conflicting philosophies of science. On the one hand, there were those whose conception of the nature of science was essentially Machian and for whom psychology was part of a hierarchical system of the sciences in which the aim of explanation was the reduction of each level of generalization to the next, more fundamental, level. On the other hand, there were those who regarded science as aiming at more than the economical formulation of functional relationships and whose affirmation of a specifically psychological level of causality, in whatever form, opened doors to the humanistic disciplines. This division was marked by successive attempts to reformulate the theories of the second type in terms that were acceptable to the positivist ethos, attempts that necessarily deprived those theories of their essential content and changed them into something far removed from the original conception. (Attempts to reformulate Freudian theories in behaviorist terms represent extreme examples of this trend.) This sterile process was largely determined by the fact that in psychology positivism had become identified with scientific orthodoxy. Those who found themselves outside the positivist pale were often hampered by a failure to appreciate the real nature of the division which, of course, involved much more than strictly psychological questions. In this respect they might have profited from Wundt’s remarkable insights into the nature of the issues raised by psychology’s status as a science.

Notes


2. At least he notes the Machian position of Külpe and Titchener; for some reason he does not make it explicit that Ebbinghaus adopted the same position. See Edwin G. Boring, A History of Experimental Psychology, 2d ed. (New York: Appleton-Century-Crofts, 1950), chap. 18.


4. Boring, Experimental Psychology, p. 431. Boring’s notion of orthodoxy excludes a major part of European experimental psychology, including the majority of Wundt’s disciples, the most prominent of whom formed the so-called second Leipzig school — men like Krueger, Wirth, and Sander.
5. This division appears as early as the Vorlesungen über die Menschen- und Tierseele of 1863 and receives its systematic treatment in the long section on "the logic of psychology" in the Logik (1883). As was his custom, Wundt returns to the topic on a number of occasions, notably in a paper on the division of the sciences in the fifth volume of Philosophische Studien, in his Introduction to Philosophy of 1901, and in subsequent editions of the Logik. Everything that Wundt wrote on the subject contradicts Boring's bald claim that "to Fechner and Wundt scientific meant experimental" (Boring, Experimental Psychology, p. 321).


9. See, for example, the introduction of the third edition of the Gründzüge der physiologischen Psychologie (Leipzig: Engelmann, 1887).

10. Wilhelm Wundt, Outlines of Psychology (Leipzig: Engelmann, 1896), p. 17. Wundt also considered psychology to be of relevance to philosophy, especially in the area of ethics.


14. Ibid., p. 3.

15. Ibid., p. 6. It is worth noting that many aspects of Külpe's position had been anticipated by Hugo Münsterberg (Beiträge zur experimentellen Psychologie [Freiburg: Mohr, 1889]), against whom Wundt directed his remarks in his 1894 paper on psychic causality. Münsterberg, however, based his conception of psychology as a natural science on an extreme form of philosophical dualism which gained no adherents among psychologists. Nevertheless, his conception of psychology had a profound influence on the formulations of many psychologists who contributed to the rise of behaviorism, like Knight Dunlap, Margaret Floy Washburn, E. B. Holt, and R. M. Yerkes (see Knight Dunlap and Margaret Floy Washburn in Murchison, Autobiography, vol. 2). Münsterberg's role in the history of modern psychology, which has been the victim of several of Boring's strongest biases, very much requires reassessment.


17. In the fifth edition of his classic Analysis of Sensations, Ernst Mach writes: "As to the views of Avenarius, the affinity between them and my own is as great as can possibly be imagined where two writers have undergone a different process of development, work in different fields, and are completely independent of one another." (Ernst Mach, The Analysis of Sensations [New York: Dover, 1959], pp. 46-47). Avenarius had already acknowledged the existence of this special affinity. In the present context it is interesting to note that Mach gives special emphasis to the convergence of his views and those of Avenarius in regard to matters psychological: "But it is to our agreement in the conception of the relation between the physical and the psychical that I attach the greatest importance. For me this is the main point at issue. It was by means of his psychological articles that I first became convinced of this coincidence between Avenarius and myself" (ibid., p. 50).

18. Ibid., pp. 23-23.

19. Mach writes: "All special psychical causality disappears," and "... the assumption of a special psychical agent appears to me to be a presupposition which is unfortunate and can only do harm by making investigation difficult" (ibid., pp. 54-55). And again: "... the phenomena of volition must ... be explained by means of the physical forces of the organism alone" (ibid., p. 171).

20. Many of the ideas advanced by Gilbert Ryle in his well-known The Concept of Mind (London: Hutchinson, 1949) bear more than a superficial resemblance to points made by Avenarius.

21. Külpe was an individual of very diverse interests which he was strikingly unable to integrate during his relatively short scholarly life. Consequently, he never adopted any particular position for very long, and soon turned against Mach's positivism. In the 1890s, however, he was clearly to be counted among the adherents of the new philosophy of science and exerted considerable influence on its behalf. It is the Külpe of this period that we are concerned with here, not the later Külpe. Nevertheless, it is noteworthy that the work of the Würzburg School was inspired by the search for a new Machian "element" when the hitherto recognized elements were found to be inadequate.

22. Wundt, "Über psychische Kausalität."


25. Wundt, "Über die Definition der Psychologie," p. 34.

26. Ibid., p. 15.

27. Ibid., p. 33.

28. In terms of his general prescription, Mach recognized the practical need for introspection, "although my ideal of psychology is that it should be purely physiological" (Mach, Sensations, p. 340).


31. In this respect Wundt's position is closer to certain modern approaches, for example, Edwin A. Burtt, The Metaphysical Foundation of Modern Science (London: Routledge and Kegan Paul, 1925; Herbert Butterfield, The Origins of Modern Science 1300-1800 (London: Bell, 1957); Alexander Koyré, Newtonian Studies (Chicago: University of Chicago Press, 1968). Wundt's emphasis on the fact that natural science is only possible by virtue of a prior abstraction from the immediate experience of the human observer sometimes receives extreme expression in the assertion that his psychology is much closer to being a strictly empirical discipline than the natural sciences which "everywhere require the assistance of metaphysical concepts," Logik, vol. 3, p. 250.


34. Külpe, Outlines, p. 12.


39. Ibid., p. 7.

40. Ernst Meumann, another of Wundt's assistants who found the master's system excessively "metaphysical," was another likely source of influence. He eventually published his criticisms of "psychic causality" and related conceptions and was duly rebutted by Wundt in 1904 (see Wilhelm Wundt, "Empirische und metaphysische Psychologie," Kleine Schriften, vol. 2 [Leipzig: Engelmann, 1911]). The high tide of scientism at the turn of the century left its mark on a number of Wundt's most promising students.


43. Ibid., p. 63. Among English-speaking psychologists, Titchener was somewhat unusual in taking his philosophy of science from Mach at first hand. The more common channel for these ideas was provided by Karl Pearson, whose Grammar of Science (London: Walter Scott, 1892) closely followed Mach, and who was respected by psychologists for his contributions to statistics, themselves highly consonant with his philosophy of science. Thorndike probably provides the best illustration of this line of positivist thought in psychology. See Geraldine M. Joncich, The Sane Positivist: A Biography of Edward L. Thorndike (Middletown, Conn.: Wesleyan University Press, 1968).

44. Titchener, Systematic Psychology, pp. 136-137.


46. For example, in the last chapter of the Grundriss of 1896.

47. Titchener, Textbook of Psychology, p. 41.

48. In later editions of Analysis of Sensations Mach praised the peripheralism of William James and Hugo Münsterberg against centralist notions like those of Wundt and Helmholz (Mach, Sensations, 1959, p. 173). William James greatly admired Mach and agreed with many of his ideas, notably as they related to the biological function of knowledge (including science) and phenomenalism. Although James was hardly a consistent Machian, it was those aspects of his ideas that converged with Mach's notions which
seem to have had the greatest appeal for most of his psychological readers. See also Paul Tibbetts, "The Doctrine of 'Pure Experience': The Evolution of a Concept from Mach to James to Tolman," *Journal of the History of the Behavioral Sciences* 11 (1975): 55-66.


57. Titchener's "data" were in part based on the introspective jottings made by a student while going about his daily business!


59. Ibid., p. 214.

60. The "Gefühlszentrum" is regarded as being identical with the "Apperzeptionszentrum." See Wilhelm Wundt, *Völkerpsychologie*, vol. 1 (Leipzig: Engelmann, 1900), p. 62.


62. Ibid., p. 22.

63. Although Mach himself had been inclined to regard even pleasure and pain as sensations, the Machians among the psychologists recognized that they must be given a special status. The reason, as Ebbinghaus points out (Grundzüge, p. 543), lies in their role as determinants for the movements of the organism, including, in the case of man, the movement of ideas. Pleasure and pain therefore constitute the non-eliminable residue of complex central selecting and directing processes.

64. Titchener, *Lectures*, p. 159.


66. Wundt, "Über naive und kritischen Realismus."


68. Ibid., p. 15.


70. Ibid., p. 271.

71. Looking back on his achievement at the end of his life, Wundt arrives at the following succinct statement of his essential endeavour: "Whereas physiology believed it had to restrict itself to the strictly delimited area of sensation, it became my aim, on the contrary, to show, wherever possible, how the elementary processes of consciousness, sensations and associations, everywhere already reflected the mental life in its totality." Wilhelm Wundt, *Erlebtes und Erkanntes* (Stuttgart: Kröner, 1920).


73. In the preface to the third edition of the *Logik*, Wundt, 1908.

74. It is profoundly misleading to consider Mach an "ancestor" of Gestalt psychology, as is sometimes suggested (for example, Boring, *Experimental Psychology*, p. 590). For Mach, the sensation of the whole was simply an additional element added on to the elements that constituted the parts, a view that is the precise antithesis of the Gestalt doctrine about the relationship of parts and wholes. In their search for respectable ancestry some Gestalt psychologists occasionally read things into Mach that were not really there.

75. This was one reason for Wundt's emphatic rejection of anything resembling the doctrine of "mental chemistry" (see *Logik*, vol. 3, p. 270 ff.).

76. From the point of view of a new systematic sociology, Max Weber took issue with Wundt's conception of the appearance of value in cultural experience. While Weber agreed that values were of fundamental importance in social life, he treated them relativistically; Wundt's approach, with its notion of a hierarchical development of objective values, Weber considered to be an expression of the nineteenth-century belief...

77. It is noteworthy that this is one point on which Titchener explicitly disagrees with Avenarius, who attempted to use phenomenal experience as a starting point, which would include the experience of value, because he wished to avoid the crude metaphysics of a position like Titchener's.


80. Ibid., p. 7.

81. Ibid., pp. 6, 8.

82. Ibid., p. 31.

83. Ibid., p. 222.


86. Some psychologists continued to draw their inspiration from the earlier Machian positivism, and this entailed certain differences among the schools of behaviorism. B. F. Skinner, at any rate, has always been clear about the status and antecedents of his behaviorism: "To me behaviorism is a special case of a philosophy of science which first took shape in the writings of Ernst Mach, Henri Poincaré and Percy Bridgman." See B. F. Skinner in Edwin G. Boring and L. A. Lindzey, *A History of Psychology in Autobiography*, vol. 5 (New York: Appleton-Century-Crofts, 1967).


90. Wundt, "Über reine und angewandte Psychologie."

91. Quite recently there has been a revival of interest in Wundt's formulations in the areas of psycholinguistics, emotion, and cognition. In many respects his approach has stood the test of time far better than that of his successors. See especially Arthur L. Blumenthal, *The Process of Cognition* (Englewood Cliffs, N. J.: Prentice Hall, 1977).