

Psychological Bulletin

A HISTORY OF INTROSPECTION

EDWIN G. BORING

Harvard University

A proper but cumbersome title for this article would be "The History of the Availability of Consciousness to Observation in Scientific Psychology." If conscious experience can be said to exist, then the question arises as to whether modern psychology ought not to take into consideration its data, as indeed it used always to do. Thus my paper might even be called "What Became of Introspection?" One common answer to that question would be that introspection was not viable and so gradually became extinct. Another answer, however, is that introspection is still with us, doing its business under various aliases, of which *verbal report* is one. The former statement about the failure of introspection is approximately true of that introspection which flourished under Titchener at Cornell in 1900-1920, whereas the latter statement about camouflaged introspection is accepted by the modern positivists who hold that the concept of conscious experience has meaning only when it is defined operationally.

DUALISM

The belief in the existence of conscious mind in man is very old, as old as philosophy and as old as the belief in the immortality of the soul, the immortality of that part of a person that is not his mortal body. Thus it has come about that something conscious is usually one term in a dual-

ism, like mind *vs.* matter, the rational *vs.* the irrational, or purpose *vs.* mechanism. There have been psychological monists, like La Mettrie (44), the materialist, who argued in 1748 that man is a machine and who got himself consequently into theological trouble, but even he was more concerned with reducing to their bodily bases the mental states that dualism had already established than in describing man without benefit of dualism.

Inevitably the doctrine of immortality and the old-time importance of theology played a role in psychology. The words for soul and mind are not distinguished in French and German (*l'âme, Seele*) nor are the Greek and Latin words (*psyche, nous; anima, mens*) as distinct as the English translations. It was the faculty of reason that carried with it the right to immortality, and Descartes, a devout Catholic, gave men rational souls, made of unextended immortal substance, and maintained that animals are mortal irrational automata (20). Thus Descartes became an important ancestor in both the dualistic (conscious, introspective) line of descent, and in the objective (mechanistic, reflex, tropistic) line.

British empiricism fixed dualism and the concept of consciousness upon psychology. Locke, Berkeley, Hume, Hartley, Reid, Stewart, Thomas Brown, the two Mills, and

Bain, all were concerned in different ways with how the mind gets to know about the external world. Thus they recognized the basic mind-matter dichotomy. Presently there came also into the hands of these philosophers the doctrine of association which dealt with the synthetic relations among the items of mind or consciousness (8, pp. 157-245). There never was—nor is there now—a good word for this immaterial term of the mind-matter dichotomy. James was complaining about that in 1890 (32, I, pp. 185-187). Mostly the word was either *mind* (*Seele*) or *consciousness* (*Bewusstheit*). Nineteenth-century psychology formulated the dichotomy as psychophysical parallelism, and that doctrine was so firmly impressed upon psychological thinking that the American operational revolution of the present century came about only with the greatest difficulty.

It would not be profitable to go into great detail here about the history of the belief in what we are calling *consciousness*. The existence of consciousness seemed for many centuries to be an obvious immediate datum, the basic undeniable reality of one's own existence. "Cogito, ergo sum," said Descartes. James summed the matter up (32, I, p. 185):

Introspective Observation is what we have to rely on first and foremost and always. The word introspection needs hardly to be defined—it means, of course, looking into our own minds and reporting what we there discover. *Every one agrees that we there discover states of consciousness.* So far as I know, the existence of such states has never been doubted by any critic, however skeptical in other respects he may have been. That we have *cogitations* of some sort is the *inconcussum* in a world most of whose other facts have at some time tottered in the breath of philosophical doubt. All people unhesitatingly believe that they feel

themselves thinking, and that they distinguish the mental state as an inward activity or passion, from all the objects with which it may cognitively deal. *I regard this belief as the most fundamental of all the postulates of Psychology, and shall discard all curious inquiries about its certainty as too metaphysical for the scope of this book.*

In general the philosophers, physiologists, and physicists who founded the new experimental psychology in 1850-1870—Fechner, Lotze, Helmholtz, Wundt, Hering, Mach, and their associates—were psychophysical parallelists who would have subscribed to this view of James' (8, pp. 261-356). Psychology—even the new "physiological psychology"—was essentially the study of consciousness, and its chief method was introspection. Physiology came in because these parallelists believed in "no psychosis without neurosis" (Huxley's phrase, 30, 1874) and thus could employ the apparatus of the physiological laboratory to control stimuli and to record the effects of neural events.

About introspection (*innere Wahrnehmung*) there was, however, some question. There is a long history of opinions on the manner in which the mind observes its own processes, one that begins with Aristotle and Plato and carries on to the present. Eisler has abstracted the views of eighty-four writers on the subject, from Aristotle to the beginning of the present century (21, III, pp. 1735-1742). Locke, founding empiricism, held that all ideas—that is to say, the contents of the mind—come from experience either by sensation, which provides knowledge of the external world, or by reflection, which is the inner sense and provides knowledge of the mind's own operations. Neither sensation nor reflection, however, was regarded by the early empiricists

as a process subject to error. The belief grew up that to have conscious experience is also to know that you have it, and thus ultimately Wundt, basing his new systematic physiological psychology upon British empiricism, defined introspection as immediate experience (98, pp. 1-6). The facts of physical science, he thought, are mediated and derived by inference from immediate experience, which in and of itself is immediately given and constitutes the subject matter of psychology. This view suggests that Wundt thought that introspection cannot lie, but actually there was an inconsistency there, for the Wundtian laboratory put great emphasis upon training in introspective observation and in the accurate description of consciousness.

Brentano wrote in 1874: "The phenomena inwardly apprehended are true in themselves. As they appear . . . so they are in reality. Who then can deny that in this a great superiority of psychology over the physical sciences comes to light?" (12, I, pp. 131-203). Against this view, James remarked: "If to *have* feelings or thoughts in their immediacy were enough, babies in the cradle would be psychologists, and infallible ones" (32, I, p. 189). The classical objection to the *ipso facto* adequacy of the immediate was raised by Auguste Comte, the founder of positivism, who noted that introspection, being an activity of the mind, would always find the mind introspecting and never engaged in the great variety of its other activities (17, p. 64). Actually Comte's argument was, however, much more than this quibble, which could have been answered by the statement that introspection is not a procedure but merely the recognition that knowledge, when given, exists as knowledge. Comte was complaining, as did

twentieth-century behaviorists, that introspection is unreliable, that it results in descriptions which often cannot be verified, and that in many other ways it fails of the positive character that science demands.

J. S. Mill answered Comte's quibble by asserting that introspection is a process and requires training for reliability. It is not strictly immediate, Mill thought, for it involves memory—immediate memory, perhaps; yet immediate memory is not the datum itself and comes with a chance for error in it (53, p. 64). On this whole matter, see James' excellent discussion (32, I, pp. 187-192). Mill's point is reinforced by the modern realization that it is almost impossible to distinguish between anesthesia and immediate anterograde amnesia: a man whose memory lasts only one second is so crippled in capacity for introspection as to be practically as unconscious as any reacting organism or machine.

CLASSICAL INTROSPECTION

We may regard that introspection as classical which was defined by fairly formal rules and principles and which directly emerged from the early practices in Wundt's laboratory at Leipzig. Of course, there were no immutable rules for introspection. The great men kept disagreeing with one another and changing their minds. Nevertheless there was a body of opinion which was in general shared by Wundt, by Külpe before he left Leipzig, by G. E. Müller at Göttingen, by Titchener at Cornell and by many other less important "introspectionists" who accepted the leadership of these men. Stumpf at Berlin held to less constrained principles, and Külpe's later doctrine of introspection after he had gone to Würzburg was opposed by Wundt and Titchener.

Classical introspection is the com-

mon belief that the description of consciousness reveals complexes that are constituted of patterns of sensory elements. It was against this doctrine that Külpe at Würzburg, the behaviorists under Watson and the Gestalt psychologists at Wertheimer's initiative revolted. Introspection got its *ism* because these protesting new schools needed a clear and stable contrasting background against which to exhibit their novel features. No proponent of introspection as the basic method of psychology ever called himself an *introspectionist*. Usually he called himself a *psychologist*.

Wundt, undertaking to establish the new psychology as a science, turned to chemistry for his model. This choice landed him in elementism, with associationism to provide for synthesis. The psychological atoms were thus sensations and perhaps also feelings and images. The psychological molecules were preceptions and ideas (*Vorstellungen*) and the more complex combinations (*Verbindungen*). Because Wundt changed his views from time to time about images and feelings, the sensation became the example of the sort of stuff that appears in a good description of consciousness. Thus, half a century later, we find Titchener concluding that *sensory* is the adjective that best indicates the nature of the contents of consciousness (85, pp. 259-268). In this way Wundt fixed both elementism and sensationism upon introspection, and introspectionism in the proper laboratories always yielded sensory elements because that was "good" observation. It seems reasonable to suppose that laboratory atmosphere and local cultural tradition did more to perpetuate this value than did any published admonitions about observation.

Although Wundt defined the sub-

ject matter of psychology as immediate experience (97; 98, pp. 1-6), he did distinguish introspection (*Selbstbeobachtung*) from inner perception (*innere Wahrnehmung*). Inner perception might be self-validating, but it was not science. Wundt insisted on the training of observers. Even in the reaction experiment Leipzig observers had to be trained to perform the prescribed acts in perception, apperception, cognition, discrimination, judgment, choice, and the like, and to report when consciousness deviated from what had been called for. Thus it is said that no observer who had performed less than 10,000 of these introspectively controlled reactions was suitable to provide data for published research from Wundt's laboratory. Some Americans, like Cattell, had the idea that the minds of untrained observers might also be of interest to psychology, and later a bitter little quarrel on this matter developed between Baldwin and Titchener (8, pp. 413 f., 555). For all that, Wundt's notion of what constitutes proper introspection was much more liberal than is generally supposed, for he left room in formal introspection for retrospection and for indirect report. He was much less flexible in respect of the elements and their sensory nature.

What happened next to introspection was the acceptance of the conception that physics and psychology differ from each other in points of view but not in fundamental materials. Mach in 1886 argued that experience ("sensation") is the subject matter of all the sciences (48), and Avenarius a few years later that psychology views experience as dependent upon the functioning of the nervous system (he called it the "System C") and physics as independent of the action of the nervous

system (3). Presently, after the two men had agreed that they agreed, they had great influence upon Külpe and Titchener who were both then at Leipzig. In his textbook of 1893 Külpe accepted this distinction by point of view (41, pp. 9-13), but Titchener is the person who emphasized it most. In 1910, he was saying that the data of introspection are "the sum-total of human experience considered as dependent upon the experiencing person" (79, pp. 1-25), and later he could write the formula:

Introspection = psychological
(clear experience → report),

which means that introspection is the having of clear experience under the psychological point of view and the reporting upon it also under the psychological point of view (83, pp. 1-26). Substitute physical for psychological, and you have the formula for physics. The stock example for introspection is the illusion, the case where perception differs from stimulus-object in some respect. For perception experience is regarded just as it comes, dependent upon the perceiving of the perceiving person and thus the action of his nervous system. For the physical account of the object, however, the perceiver must be abstracted from and the physicist has resort to measurement and other physical technics. Titchener held to this distinction by point of view all his life (85, pp. 259-268).

It was Külpe who split Wundt's psychological atom, analyzing sensation into its four inseparable but independently variable attributes: quality, intensity, extensity, and duration (41, pp. 30-38). Titchener later held to this view which served to tighten rather than to loosen the constraints of atomism upon introspective psychology (6, pp. 17-35).

One of the most thorough discussions of introspection was provided by the erudite G. E. Müller in 1911 (55, pp. 61-176). Müller was more liberal than Wundt and left room for all the indirect and retrospective forms of introspection. Being primarily interested in the application of introspection to memory, he distinguished, for instance, between the present recall of the past apperception of a past event and the present apperception of the present recall of a past event, an important distinction, since present apperception can be interrogated as to detail whereas past apperception has become fixed and no longer subject to exploration.

It was Titchener who placed the greatest constraints upon introspection by his requirement that the description of consciousness should exclude statements of meaning. At first Titchener had perception in mind and called the report of meanings the *stimulus-error*, insisting that trained observers by taking the psychological point of view would describe consciousness ("dependent experience") and attempt no statements about the stimulus-objects ("independent experience" as given by the point of view of physics) (5; 79, pp. 202 f.). After Külpe had claimed to find imageless (non-sensory) thoughts in the consciousnesses of judgment, action, and other thought processes, Titchener broadened his criticism to an objection against the inclusion of any meanings at all in the data of introspection (80). He was arguing that straight description (*Beschreibung, cognitio rei*) would yield the kind of sensory contents that had become standard in classical introspection, and that inferences about conscious data (*Kundgabe, cognitio circa rem*) are meanings which do not exist as do the observed sensory processes (81,

82). Thus his psychology has even been called *existential psychology*, because he believed that the meanings, occurring as inferences, lack the positive character of sensations and images, the existential data (85, p. 138).

It was never wholly true that introspection was photographic and not elaborated by inferences or meanings. Reference to typical introspective researches from Titchener's laboratory establishes this point (28, 58, 25, 64, 59, 16, 31). There was too much dependence upon retrospection. It could take twenty minutes to describe the conscious content of a second and a half and at the end of that period the observer was cudgeling his brain to recall what had actually happened more than a thousand seconds ago, relying, of course, on inference. At the Yale meeting of the APA in 1913, J. W. Baird with great enthusiasm arranged for a public demonstration of introspection with the trained observers from his laboratory at Clark, but the performance was not impressive. Introspection with inference and meaning left out as much as possible becomes a dull taxonomic account of sensory events which, since they suggest almost no functional value for the organism, are peculiarly uninteresting to the American scientific temper.

Classical introspection, it seems to me, went out of style after Titchener's death (1927) because it had demonstrated no functional use and therefore seemed dull, and also because it was unreliable. Laboratory atmosphere crept into the descriptions, and it was not possible to verify, from one laboratory to another, the introspective accounts of the consciousnesses of action, feeling, choice, and judgment. It is not surprising, therefore, that Külpe, Watson and

Wertheimer, all within a decade (1904–1913), reacted vigorously against the constraints of this idealistic but rigid pedantry.

DESCRIPTION OF THE IMPALPABLE

What came to be called *systematic experimental introspection* developed at Würzburg in 1901–1905 under Külpe's leadership (8, pp. 401–410, 433–435). Külpe, influenced like Titchener toward positivism by Mach, had gone from Leipzig to Würzburg with the conviction that experimental psychology ought to do something about thought. The new experimental psychology could handle sensation, perception and reaction, and Ebbinghaus in 1885 had added memory to its repertoire. Wundt had said that thought could not be studied experimentally, but Külpe, a positivist, was convinced that all you had to do was to get observers thinking under controlled conditions and then have them introspect upon the thought process.

There followed a brilliant series of papers by Külpe's students: Mayer and Orth on association (1901), Marbe on judgment (1901), Orth on feeling (1903), Watt on thought (1905), Ach on action and thought (1905). Every one of these investigators found what we have called classical introspection inadequate to his problem. Mayer and Orth could describe the associated trains of images that run on in thinking but could discover from introspection no clue as to how thought is directed toward a goal (50). Marbe found judgments forming readily in terms of images, but got from introspection no hint as to how or why they were formed (49). Feeling resisted Orth's introspective analysis and he was obliged to invent a vague term, *conscious attitude*, to describe the affective life. Certainly feelings did not

appear as sensations or images to his observers (60). Watt and Ach worked independently and came to mutually consistent conclusions. Watt, to make introspection more efficient, invented fractionation. He split up the psychological event under investigation into several successive periods and investigated each by itself, thus reducing the amount of memory and inference that were involved in the introspective report. Still the essential in thought eluded him, until he realized that the goal-directedness of thinking is predetermined by the task or instruction—the *Aufgabe* he called it—which the observer accepted before the individual thought process got under way (92). Ach developed the concept of the *determining tendency* as the unconscious guide which steers the conscious processes along a predetermined course to solve whatever problem thought is directed upon. He also elaborated fractionation with chronoscope control and coined the phrase *systematic experimental introspection*. The determining tendency itself is unconscious, but the conscious processes which it directs seemed to Ach's observers not to be describable in the terms of classical introspection, that is to say, in images and sensations. Ach therefore invented the term *awareness* for these vague and elusive contents of consciousness and his observers learned to describe their consciousnesses in terms of impalpable awarenesses (*unanschauliche Bewusstheiten*) (1).

The Würzburgers thought they had discovered by introspection a new kind of mental element, but the *Bewusstheit* never gained the accepted status of a sensation or an image. Instead the Würzburgers were said to have discovered imageless thought, and many persons argued that the

school had failed because its finding was negative: thoughts were not images, but what actually were they? Titchener, however, believed he knew. He said that these Würzburg thoughts were in part conscious attitudes which are vague evanescent patterns of sensations and images, and in part meanings and inferences which ought to be kept out of psychology as the *Kundgabe* which is not true description (80). We, with the perspective of forty years upon us, see that the main contribution lay in the realization of the importance of the unconscious *Aufgabe* and determining tendency. The course of thought is unconsciously determined: that is a conclusion which fitted the *Zeitgeist* of the period of its discovery, when Freud too was discovering that motivation is ordinarily not available to introspection.

Külpe's conclusion was, however, different. He believed that the impalpable awarenesses had been established as valid data of consciousness and he called them *functions* to distinguish them from the sensations and images of classical introspection, which he called contents (43). *Funktionen* and *Inhalte* are two kinds of conscious data that make up what has been termed the bipartite psychology of Külpe's later days. In this choice Külpe was combining the introspection of Wundt with the introspection of Brentano. He was also making easier the coming protest of Gestalt psychology against Wundtian introspection.

AWARENESS OF MENTAL ACTIVITY

Meanwhile nearly all the philosophers and psychologists were dualists and most of the psychologists were also psychophysical parallelists. If you believe in conscious events as dependent upon brain events but wholly separate and different from

the brain events, then you must believe in some kind of introspection or inner perception whereby you obtain your evidence about the mental events. The behavioristic monism of the twentieth century was unknown in the nineteenth. A belief in some kind of introspection was general in psychology and also in common sense.

The appeal to introspection was especially important in the case of act psychology, which claimed that a careful and unbiased examination of the mind shows that it does not consist of stable contents like images and sensations, but of acts directed intentionally upon an object or of activities striving purposively toward a goal (8, pp. 439-456, 715-721). We have already seen that Brentano defended introspection as self-validating. He was the representative of intentionalistic act psychology who was contemporary with Wundt, and who thus posed the dilemma between Wundt's contents and his own acts (12), a dilemma of which Külpe, as we have just noted, seized both horns. Brentano influenced the philosopher James Ward in his subject-object conative psychology of 1886, revised in 1918 (87), and Ward influenced McDougall, who, in spite of having once defined psychology as the science of behavior, elaborated a purposive psychology in 1923, a system that made purpose and striving a characteristic of all mental activity (51).

In Germany, Stumpf, stimulated by Brentano's sponsorship of psychic acts and by Husserl's argument for phenomenology as the simplest description of experience (29), came to the conclusion that Wundt's kind of introspection yields the data of phenomenology but that psychology proper consists rather of Brentano's acts or, as Stumpf called them, *psychic functions* (76). Thus it is cor-

rect to say that by 1915 both Stumpf and Külpe believed in two kinds of introspective data: on the one hand, Stumpf in phenomena and Külpe in contents, and, on the other, both of them in functions (acts). Külpe was inclined to think that the functions were observed retrospectively (*rückschauende Selbstbeobachtung*), the contents immediately (*anschauende Selbstbeobachtung*) (43, pp. 42-45).

Except for Titchener and his satellites, American psychology tended all along to be practical and functional in the Darwinian sense. As such it was destined to become behavioristic. It is interesting, therefore, to note that early American functional psychology of James, Dewey, Angell, and the Chicago school was introspective. Organisms have acquired consciousness because of its adaptive function, the argument ran. When the smooth course of habitual action is interrupted by external events, then "in steps consciousness," said James Angell, to solve the organism's problem (2; 9, pp. 276-278). It is because functional psychology regarded the data of consciousness as essential to an understanding of the adjustment of man to his environment that Watson, founding behaviorism, declared that he was as much against functional psychology as against introspectionism.

PHENOMENOLOGICAL DESCRIPTION

The next protest against the constraints of classical introspection came in connection with the founding of Gestalt psychology—by Wertheimer, we generally say, in his paper of 1912 on seen movement (94). Wertheimer was working on the conditions of visually perceived movement. You can see movement when no stimulus object moves, as when stimulus displacement is discrete. Seen movement is thus a con-

scious, not a physical, event. Classical introspection would have required the description of perceived movement with reference to conscious contents, or mental processes, or images and sensations, or perhaps the attributes of sensation. Wertheimer thought, however, that any such reference or analysis would be a supererogation. Perceived movement can be recognized as itself and its conditions studied; why bother then with the Leipzig hocus-pocus? Since seen movement can thus be accepted immediately as an identifiable phenomenon, Wertheimer called it Φ —the " Φ -phenomenon." In 1912 the notion of phenomenology was in the air. Husserl had used the term for the free unbiased description of experience ("being") (29) and Stumpf had picked it up (76). Thus Köhler and the other Gestalt psychologists came always to speak of the data of direct experience as *phenomena*, avoiding all the words that were associated with classical introspection. Later it was such *phenomenological observation* that became a technic to displace *introspection* (8, pp. 601–607).

This Magna Carta of phenomenology presently released a great deal of good research, most of it on problems of perceptions. In G. E. Müller's laboratory Katz's work on brightness constancy (34) had even preceded Wertheimer's, and Rubin's classical study of figure and ground (68) came soon after. There began a long series of investigations of the laws of perceived form, studies which introduced new descriptive concepts for the phenomena, like *organization* and *articulation*, and new functional concepts, like *closure*, *transposition*, and *object constancy* (8, pp. 611–614).

Nearly all these perceptual studies have been performed in an atmosphere of dualism. You try to find

the stimulus conditions or else the brain pattern that is necessary and sufficient for the perception. Wertheimer, Köhler, and Koffka have all supported the concept of *isomorphism*, the hypothesis that the field pattern of the perception corresponds topologically to the field pattern of the underlying events in the brain, and, while neither Gestalt psychology nor experimental phenomenology requires isomorphism as a basic concept, nevertheless isomorphism requires some kind of dualism, and thus the phenomena become one term in its psychophysiological correlation. Köhler's great book on *Physische Gestalten* in 1920 supported this view (36).

As Gestalt psychology waxed, classical introspection waned. Wertheimer's paper on phenomenal movement was in 1912 (94). Külpe died in 1915. Köhler worked with apes on the island of Teneriffe during World War I and applied the new phenomenological principles in the description of their psychology (35). Koffka's students were busy publishing papers on perception. Wundt died in 1920, the year that Köhler published *Physische Gestalten* (36). In 1922 Köhler went to Berlin to succeed Stumpf. The Gestalt psychologists had started a new journal devoted to their interests in 1921, *Psychologische Forschung*, and Wertheimer used its early pages to make the case against classical introspection (94). Koffka restated the case in English for Americans in 1922 (38). Titchener died in 1927. Köhler's *Gestalt Psychology* appeared in 1929 (37), and Koffka's *Principles* in 1935 (39). It is reasonable to say that phenomenological observation had won out over classical introspection by 1930.

Under Hitler's influence the Gestalt psychologists who remained pro-

ductive all came to America. There the victory of phenomenology, made easier by Titchener's death, was no great triumph, for other strong forces were operating to swing American psychology toward behavioristics. Nevertheless, phenomenology remained, not only respectable, but stimulating and useful in initial attacks upon many psychological problems, as Gibson's recent phenomenological study of the visual world shows (26). So here we come to a case where introspection, under an alias, can be said to be still practiced, provided the word *introspection* is not restricted to its Leipzig-Cornell meaning.

PATIENTS' PROTOCOLS

The emphasis which modern psychopathology places on the unconscious creates for it a complementary concern with the conscious. Thus psychoanalysis stresses the importance to therapy of bringing repressed ideas from the unconscious into consciousness. The analysand, bubbling free associations on the couch, is certainly giving the analyst information about his consciousness (*Kundgabe*) though he remain far from the use of classical introspection. When and how, we may ask, did psychopathology get itself concerned with the content of consciousness?

Nearly always the first evidence of what we now call mental disease lies in abnormal conduct, in maladaptive behavior. The abnormal person, witch or patient as the case may be, first calls attention to himself by queer or alarming conduct. The obvious symptoms that require social action, remedial or protective, are usually not reports of visions or complaints about voices, but such deviations from standard behavior as

inconvenience others. Nevertheless psychopathology, which grew up surrounded by a belief in dualism, was never primarily behavioristic. There was for it always the presumption that a witch is conscious, even though the devil might have taken possession of her will, and later that the hallucinations and delusions of the hysterical patient are conscious phenomena. Subjectivism, always implicit in these symptoms, was not very often explicit before the end of the nineteenth century.

Zilboorg's account makes it clear how the idea of mental derangement began in the conception of demoniacal possession (96, 99). For these possessed people and for the fools, except in those cases where they were honored, the therapy consisted of discipline, threats, fetters, and blows, none of which actually had much value except to relieve those who administered the punishment. Even the Renaissance, which is said to have "discovered man," did not free these unhappy victims of an intolerant theological self-assurance, until at last the reaction toward humane treatment arrived with Pinel and his successors early in the nineteenth century. During the seventeenth and eighteenth centuries you get as subjective data the reports of melancholy (sometimes ending in suicide), of passions, of deliriums ("errors of reason"), of fantasies, of cholers, humors and madness, of spleen, vapors and hysterical distempers, of love as a cause of mental disability. An incubus might be a woman's hallucination, delusion, or wish projection, or else a fiction of other people's belief about her. The reforms of the nineteenth century toward the humane treatment of the insane and the rise of the concept of mental disease (Pinel, 1801) did not

go far toward the subjectivization of psychopathology (61). Braid's theory of hypnosis, as the scientific successor to mesmerism was called, was based on suggestion as a principle, a mentalistic but not a conscious entity (11). Liébeault cured a patient of sciatic pain by hypnosis; is a patient who says he feels pain introspecting? Liébeault was a dualist, for the title of his book asserts that he was studying *l'action de la morale sur le physique*: a treatise on psychosomatic medicine in 1866 (45). Later Charcot worked out the stigmata of hysteria and thus, as he thought, of hypnosis, but most of the stigmata were not described in conscious terms, being phenomena like anesthetics, amnesias, and catatonias (15, III & IX). Kraepelin, Wundt's one-time student, whose classical system of mental diseases reached maturity about 1896, established the basic dichotomy between manic-depressive psychoses and dementia praecox (40). Thus he recognized elation, depression, and hallucinations as symptoms of mental disease, but that is a far cry from saying that his psychiatry was based on some kind of introspection.

Nevertheless this last decade of the nineteenth century was the decade for psychopathology to turn truly psychological. It marked the emergence of Janet first, and then of Freud. Janet's classical study of the symptoms of hysteria appeared in 1892 (33), and Freud's great book on the interpretation of dreams in 1900 (24). Janet's theory of hysteria in terms of dissociation and the retraction of the field of attention was a psychological theory, although not an introspective one. Freud in his association with Breuer discovered the "talking cure" out of which psychoanalysis has emerged (13). The effect of psychoanalysis upon psychiatry

has during the present century been profound. Not only has psychiatry taken over psychoanalytic concepts while rejecting the total system, but the psychiatric interview has been arranged to assay consciousness, as well as to bring to consciousness those forgotten materials whose absence constitutes a symptom of mental disorder. Nowadays the interview and the couch are used as tools for a special kind of introspection, one which inventories consciousness and seeks to bring forgotten memories up to and across the threshold of introspection.

One of the most definite claims for the use of introspection by abnormal psychology was made by Morton Prince, Janet's complement in America, long a student of dissociated and alternating personalities, and later insistent upon the simultaneous functioning of coconscious personalities (62, 63). Prince once suggested that introspections might be obtained simultaneously from two coconscious personalities, even though they had but one set of receptors and effectors between them. You might, he thought, be able to question one personality with written questions shown to the eye and get the protocols spoken by the voice, while the other personality received spoken questions by ear and replied by writing on a pad. This is a difficult form of dissociation and, when it has been tried, the protocols tend to become habituated clichés or nonsense (69); yet Prince's suggestion carries the point that patient's protocols are, after all, a kind of introspection. The operationist can, of course, translate protocols into discriminative response, for any consciousness that yields public data can be described in behavioristic terms; yet that fact does not alter the feeling of reality that

the psychopathologists have about both consciousness, got by introspection, and unconsciousness, observed by more inferential technics.

PSYCHOPHYSICS

It was the prevailing nineteenth-century dualism of mind and body, and thus of spiritualism and materialism, that led Fechner, concerned with combating materialism and in establishing a spiritualistic monism, to invent psychophysics (22). By measuring both the physical stimulus and the psychical sensation and by showing how the magnitude of the latter is dependent upon the magnitude of the former, he believed that he was bringing mind and matter into a single system of relationships. The effect of Fechner's success in devising or standardizing the classical psychophysical methods which are still in use was to support the current psychophysical parallelism—although that is not what Fechner intended. For psychophysics the stimulus was available as an independent variable. The sensations, or the relative magnitudes of two sensations, or the sense-distances between two sensations, were available to introspection and so constituted a dependent variable in the psychophysical experiment. This kind of introspection has remained scientifically useful in experimental psychology for a full century and persists in good status today, although of course operationism has the necessary formulas for transforming it into behavioristic terms.

Before Fechner the experimental attack on sensory problems was apt to be psychophysical. Investigators determined both absolute and differential thresholds. When Bouguer in 1760 measured the differential threshold for brightness, he relied on the

observer's judgment as to when a shadow on a screen becomes only just noticeable (10, pp. 51 f.). Weber's formulation of his psychophysical law in 1834 depended on the same kind of judgment (92, pp. 44–175). Sensory phenomenology was stimulated by the discovery of the law of the spinal nerve roots (1811, 1822) which showed that the sensory nerves present a set of problems of their own. Johannes Müller's doctrine of specific nerve-energies (1826, 1838) was, in a sense, psychophysics, since it distinguished between sensory quality and the property of the stimulus which arouses the quality (56, pp. 44–55; 57, II, p. v). Many of these early instances of psychophysics, especially the quantitative ones, have been discussed by Titchener (78, II, pt. ii, pp. xiii–cxvi). There is no need to labor the point that parallelism was the accepted doctrine of the century and that psychophysics consisted in the observation of correlations, many of them quantitative, between the two correlated terms of mind and body. No one doubted that you can observe mind as sensory experience.

For at least half a century (1860–1910) psychophysics flourished along with classical introspection and came under some of its constraints. It was thought, for instance, that observers need special training in order to give reliable results. Titchener, as we have already seen, warned against the stimulus-error (5; 79, pp. 202 f.), and both Wundt and Titchener believed that control stimuli (*Vexirversuche*) were improper. For instance, in determining the limen of dual impression upon the skin, you vary the separation of the esthesiometer points according to some standard procedure, but you do not throw in single points as controls—not if you

are a classical introspectionist. The control lies in training the observer to avoid the stimulus-error. If he says *two* when he has only one, he is not wrong, for introspection cannot lie—or at least it was thought that good introspection of trained observers cannot lie very much, and in any case to argue that a one-point stimulus cannot give rise to a two-point perception is to prejudge the experiment which seeks to find what it is that you do feel for every value of the stimulus.

The same point about introspection appears in Wundt's method of identical series for the investigation of recognition (66, pp. 24–30). In this method you give the observer a series of stimulus-objects, and later you give him in the test the identical series again, having him state which items he recognizes. You do not introduce new items as controls. He knows the series are the same, but you trust him in his introspection. He will not report recognition for an item unless he experiences recognition, and no one but the observer himself can publish the privacy of his own consciousness. If you place all this responsibility on the observer, no wonder training becomes important.

This kind of incontrovertible psychophysical introspection did not last long in the functional atmosphere of American psychology. Perhaps it has not now been heard of for thirty years.

For the half century after Fechner the psychophysicists always talked about observing and measuring sensation, but actually they were observing, reporting upon, and measuring, not complete sensations, but sensory attributes. From Fechner on, the psychophysical methods were applied to judgments of the quality,

intensity, extensity, or duration of sensory experience, and Külpe, after he broke away from Wundt, suggested that you never actually do observe a whole sensation, but only separately its attributes, out of which you build the sensation up as a scientific construct (42). Later Rahn, a student of Külpe's, reinforced this comment (65), and Titchener ultimately adjusted his views to meet the contention (84).

Külpe in 1893 had argued that the attributes of sensation are (a) inseparable from the sensation (if any attribute becomes zero, the whole sensation ceases to exist) but (b) independently variable with respect to each other (you can change one and keep the other constant) (41, pp. 30–38). Later this view turned out to be wrong, for there are separate attributes, like the pitch and loudness of tones and the hue and brightness of spectral lights, which cannot easily be varied independently by controlling their stimulus. Stevens solved this problem by an appeal to the concept of invariance. You have, he said, an independent attribute if it remains invariant when the dimensions of the stimulus are varied in accordance with some unique determined function (7, 70, 71). This concept results in plotting isesthetic contours on a stimulus diagram, e.g., in plotting isophonic contours for pitch and loudness against stimulus frequency and energy, or isochromatic contours for hue, brightness, and saturation against stimulus wavelength and energy. Sensory equality becomes the crucial datum, but subjective equality is computed from the same basic introspective data that Fechner used—judgments of *greater* and *less* or of some similar complementary categories.

Modern psychophysics is also en-

gaged in the determination of sensory interval scales and ratio scales, and for this purpose observers report on the relation of one sense-distance as greater or less than another (interval scale) or on the ratio of one sensory attribute to another (ratio scale) (75, pp. 23-30). Such introspection is reliable and receives general approval, even in behavioristic America.

There are other less quantitative kinds of psychophysics which still make successful use of reports on sensory experience and which can be properly classified as modern introspection. An excellent example is Crocker's work on the analysis and assessment of flavors by trained panels of judges, persons who are really introspectors especially trained to appreciate and analyze tastes and smells (18). They estimate the degree of the various olfactory and gustatory components in a flavor, check judgments against one another, working as a cooperative team with high motivation and enthusiasm. Such a trained panel may be sent out from the parent laboratory to some industrial plant to savor and calibrate its product, and then may later be brought back to the parent laboratory for checking in introspective reliability and also, when necessary, for analytic recalibration. Crocker's account of how attitudes are fixed and judgments rendered uniform in these panels is reminiscent of the atmosphere of Wundt's laboratory in all respects, except that Crocker's laboratory lacks the authoritarian control of Wundt's.

Another recent example of the modern use of the report of sensory experience is the book on pain by Hardy and his associates (27). This book sets forth the psychophysics of pain, having regard, among other things, to the different qualities of

algesic experience, and to establishing a sensory scale of pain by the subjective equation of algesic sense-distance.

The lesson to be learned from psychophysics is, therefore, that, in respect of the observation of sensory experience, introspection has thrived for a hundred years and is still in style.

ANIMAL CONSCIOUSNESS

In denying rational souls to animals, Descartes had made the problem of animal psychology relatively unimportant, but Darwin, with his evolutionary argument that the forms of both mind and body show continuous development from lower species to man (1872), changed all that (19). You began then to hear from Romanes about mental evolution and the evolution of intelligence (1883). Romanes coined the term *comparative psychology* for the study of the nature of mind in different species (67). By giving the animal mind the benefit of the doubt, he was able to represent animal intelligence as not so far below man's. Lloyd Morgan, writing a comparative psychology, sought to temper Romanes' enthusiasm with the principle of parsimony: do not interpret an action as the outcome of the exercise of a higher psychical faculty, he said, if it can be interpreted as the outcome of one that stands lower in the psychological scale (54). Lloyd Morgan warned against "anthropomorphism" in assessing animal behavior—meaning, of course, anthropopsychism. Loeb, establishing the concept of tropism and the unconscious action of lower animal forms (1890), suggested that consciousness emerges in the course of evolution as it becomes needed for more adaptive action and that the faculty of associative memory constitutes a cri-

terion of it (47). Experiments on animal intelligence began, notably Thorndike's in 1898 (77). In the decade 1900-1910 there was marked activity in experimental comparative psychology, a great deal of it concerned with the measurement of animal intelligence for which the maze was regarded as a very useful instrument.

Although there had already been argument put forward in favor of an objective animal psychology (4), comparative psychology got under way in a period when a psychology with consciousness left out was generally regarded as psychology without its psyche—a branch of physiology perhaps. American functional psychology kept consciousness inside the fold, and the comparative psychologists settled on a formula for the observation of animal consciousness which might well have been called *animal introspection*. Nowhere has this problem been more clearly stated than by Washburn in her handbook of 1908 on the animal mind (88, p. 13). She wrote:

If an animal behaves in a certain manner, what may we conclude the consciousness accompanying its behavior to be like? . . . At the outset of our discussion . . . we are obliged to acknowledge that *all psychic interpretation of animal behavior must be on the analogy of human experience*. We do not know the meaning of such terms as perception, pleasure, fear, anger, visual sensation, etc., except as these processes form a part of the contents of our own minds. Whether we will or no, we must be anthropomorphic in the notions we form of what takes place in the mind of an animal.

There is an implication here that you learn about human consciousness by direct observation of it in introspection, but that animal consciousness is known only indirectly by analogical inference. Not every-

one held to that difference, however. Max Meyer put forward what he called the psychology of "the other one," an argument that your own personal consciousness is not material for science, being particular and not general, and that psychology studies always other organisms—other people, other animals (52). In this sense both the animal's conduct and man's words are introspection if they are taken as meaning something about the subject's consciousness. Even Titchener can be found saying of this argument from analogy: "The animal is thus made, so to say, to observe, to introspect; it attends to certain stimuli, and registers its experience by gesture" (79, pp. 30-36).

It is interesting to see how Watson, before he had thought out behaviorism, accepted the current belief of this first decade of experimental animal psychology that knowledge of animal consciousness is the ultimate goal in comparative psychology. Watson was still at Chicago, the home of systematic functional psychology, which held that consciousness is to be understood psychologically in terms of its use to the organism. He had entitled his monograph of 1907: *Kinaesthetic and Organic Sensations: Their Role in the Reactions of the White Rat to the Maze* (89, pp. 90-97). In this investigation he eliminated vision, hearing, taste, smell, and certain cutaneous factors from the repertoire of the rat who still remembers how to run the maze, and he concluded that "intra-organic sensations—the kinaesthetic sensations coupled with the organic probably, and possibly with the static" are what the rat uses in following the correct path. Watson even discussed the possibility of the rat's use of visual imagery, which "in our own case would play a preponderating role." He suggested that success for

the rat as it runs may reassure it: "If the turn is made at the proper stage (and it has been shown that blind rats deprived of their vibrissae can make these turns without allowing their bodies to touch the edges of the openings at the turns), the animal may be supposed thereby to get a 'reassuring feeling' which is exactly comparable to the experience which we get when we touch a familiar object in the dark."

Later, of course, Watson repudiated this supererogatory concern with consciousness and asked psychologists to get closer to their data of stimuli and responses. That was a move toward positivism, but Watson did not think of that. Indeed, it is possible to regard animal behavior as a kind of language which means something about consciousness, just as it is also possible to strip introspection of its meanings and regard it as mere verbal motion. Certainly, if Max Meyer's "other one" can introspect, the animals can too and did before behaviorism made their consciousnesses unimportant.

VERBAL REPORT

Watson's reaction in 1913, away from the pedantry and unreliability of introspection, as he saw it, toward the more positive psychology of stimulus and response, was an attempt, not so much to create behaviorism as a new psychology with consciousness left out, as it was to reformulate the old psychology in new terms (90). For the imagery of thinking, he suggested that we can substitute incipient subvocal movement. Feeling, he believed, might turn out to be endocrine. Association had already been shown by Pavlov so be a conditioning of reflex responses and not necessarily a connection among ideas. Watson formally ruled introspection out of psy-

chology but he left in the more reliable results of introspection, notably in psychophysics (91). Thus it was necessary for him to leave in introspection as verbal report. Did he thus embrace the bath with the baby? Is introspection anything more than verbal report?

Actually there is a difference. Verbal report viewed simply as behavior is capable of physical specification, in which the writing and speaking of words appear as very different kinds of movements until they have been shown to be equivalent in an experimental situation. On the other hand, verbal report as introspection is not response but observation and description and therefore reference, an indication of objects of observation in the sense of the meanings of the words used.

Another way of expressing this same matter is to write two formulas:

[1] Introspective observation:

$E \rightarrow O = S \rightarrow \text{facts of consciousness}$

[2] Behavioristic observation:

$O = E \rightarrow S \rightarrow \text{facts of psychology}$

The corresponding sentences are: [1] In introspective observation, the experimenter notes the facts of consciousness which the observer, who is the subject, has observed. [2] In behavioristic observation, the observer, who is the experimenter, observes the behavior of the subject in respect of its implications for the facts of psychology. In classical introspection the subject is the observer. He has responsibility for the correctness of his descriptions of conscious data and thus he had at Leipzig, Cornell, and elsewhere to be trained, for introspection is more than having experience. Behaviorism shifts the locus of scientific responsibility from an observing subject to the experimenter who becomes the observer of the subject. In this way it is possible to bring to psychological

observation irresponsible and untrained subjects—animals, children, the feeble-minded, the mentally ill, and also the untrained normal human adult. Thus all the mental tests come into psychology because mostly they involve verbal responses from naive subjects. And the animal experiments come in because ordinarily the discriminative behavior of the animals is a language devised by the experimenter and taught to the animal so that he can tell the experimenter about his abilities and capacities. Are we to say that the animal is not introspecting because he is not communicating to himself what he is communicating to the experimenter? Perhaps. The important thing is to see that Watson, in attacking introspection, was objecting, not to the use of words by the subject, but to trusting the subject to use the words only with those meanings that the experimenter wishes the words to have.

INTROSPECTION AS AN OPERATION

Watson, in substituting verbal report for introspection, was moving in the positivistic direction, but the culmination of this movement came later with the acceptance of operational definitions as providing the most secure specification for psychological concepts. Operationism is perhaps a movement toward greater precision in scientific thinking, but it is not a school. American psychologists first picked up this modern form of the old positivism from the physicist, P. W. Bridgman, who was using the technic to explain relativity theory (14). Then it was found that logical positivism, as the movement came to be called later, was developing at the same time among the logicians in Vienna (23, pp. 1-52). Presently it became clear that the two movements were logically the

same. Stevens undertook to be the expositor to American psychologists (74). Bridgman was content to let operational definition go back ultimately to experience, but for psychologists that regression would not do at all. For them experience was a concept in special need of definition, since the availability of consciousness to scientific observation was the main problem dividing the schools (72, 73). The effect of a great deal of discussion along these lines in the 1930's was a change in the status of consciousness from (a) the reservoir of experience upon which all empirical science draws to (b) a concept based upon observation and specified by the observational operations that make conscious data available to science. That is a large change from the introspection that cannot lie because the having of experience is the knowing that you have it.

Nowadays the word *introspection* has dropped out of use. *Consciousness* or *phenomenal experience* or *sensory datum* or some other equivalent mentalistic term indicates a psychological construct which is got by inference *from* the observations. A comparable concept is the *intervening variable*, and a case could be made for Tolman as a phenomenological operationist, directly observing purpose and kindred entities in his data. Do you truly observe consciousness or an intervening variable? Do you observe any construct, or do you infer it? Do you look at the ammeter and observe the strength of the current or is what you observe merely a pointer on a scale?

Thus the answer to the question "What became of introspection?" seems to be this. Introspection as a special technic has gone. The object of introspection—sometimes called *consciousness*, sometimes something else—is a construct like an ability, or

an intervening variable, or a conditioned response, or any of the other "realities" out of which a general psychology is formed. The modern equivalent of introspection persists in the reports of sensory experience in psychophysics, in the protocols of patients with psychological difficulties, in the phenomenological descriptions of perception and other psychological events as provided notably by Gestalt psychologists, and also in a great deal of social psychology and psychological philosophy where the Cartesian dualism is still found to be convenient.

UNCONSCIOUSNESS

Any study of the history of the availability of consciousness to scientific observation, like the present one, gains significance as we consider also the availability of unconsciousness to science. *A* is specified clearly only with respect to *not-A*. It would not, however, be proper to undertake now the consideration of all the means whereby a knowledge of unconscious psychological events has been brought into science. Nevertheless we may use a paragraph to list the outstanding fields which contributed to what nowadays we call psychology and which got along, nevertheless, without any observation that might be called *introspection*.

The *reflex* was thought almost from its discovery to be unconscious, largely because it could occur without the brain, although Pflüger was of the opinion that its purposiveness implies that it is conscious. Was Lotze, who disagreed with Pflüger, relying on introspection to be sure that reflexes are unconscious? *Instinct* was ordinarily opposed to intelligent action and often supposed to be unconscious. Unconsciousness, however, was not ordinarily involved

in its definition; the criterion for instinct was that it was unlearned and usually involuntary. Loeb's *tropism* was defined with consciousness irrelevant. Herbart's *ideas in a state of tendency* were defined as unconscious, as were Fechner's *negative sensations*. Although the Würzburg school was developing systematic introspection, it seems clear now that its great discovery was the existence and effectiveness of unconscious tendencies—the *determining tendency*, the *Aufgabe*, etc. Freud made the concept of the unconscious familiar to everyone and also started the development of the technics of observation that now replace introspection, but the test of unconsciousness (suppression, repression) remained in part introspection, the fact that ideas that might have been expected to be in mind were conspicuously absent. Thus dynamic psychology carries on with the basic assumption that you cannot trust the subject's personal belief (introspection) for the true assessment of his motives.

In all these cases consciousness is seen to have been important in a negative manner, for its absence is a matter of interest and sometimes even an essential specification—as would, indeed, be expected in a psychology that was originally formed on the dualistic pattern. Indeed it is only in a dualism that *consciousness* has a distinctive meaning.

CONCLUSION

Now let the writer say what he thinks has become of introspection.

There have been in the history of science two important dichotomies that have been made with respect to introspection. (a) The first is animal psychology *vs.* human psychology: human beings are supposed to be able to introspect, and animals are not. (b) The second is the unconscious

mind *vs.* the conscious mind, with introspection the means of observing consciousness. These two dichotomies reduce, however, to one: inference *vs.* direct experience.

Operational logic, in my opinion, now fuses this single dichotomy because it shows that human consciousness is an inferred construct, a concept as inferential as any of the other psychologists' realities (32, p. 184), and that literally immediate observation, the introspection that cannot lie, does not exist. All observation is a process that takes some time and is subject to error in the course of its occurrence.

Introspection's product, consciousness, appears now in the bodies of its progeny: the sensory experience of psychophysics, the phenomenal data of Gestalt psychology, the symbolic processes and intervening variables employed by various behaviorists, the ideas, the manifest wishes, the hallucinations, delusions, and emo-

tions of patients and neurotic subjects, and the many mentalistic concepts which social psychology uses. The newest usage is this latter one, social perception, a term which refers both to the perception of social phenomena, like anger and danger, and the perceptions which are understood by reference to their social determinants; but here the introspection is not different in kind from the phenomenological description that the Gestalt psychologists still use. In general, however, it seems to the writer that there is no longer to be found any sharp dichotomy setting off the introspectable from the unconscious. That once fundamental distinction disappeared with the dissolution of dualism. Consciousness nowadays is simply one of many concepts which psychology employs, usually under some other name, whenever it finds the category useful for the generalization of observations.

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