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Thinking and the New Psychology: Imageless Thought

Although the birthdate of an experimental psychology can be argued, Wilhelm Wundts assumption of paternity cannot. It was Wundt in 1874 who marked out the "new domain of science" and who made the break with -self-observation by insisting that "all accurate observation implies . . . that the observed object is independent of the observer." The psychical processes had to be properly controlled in order to make objective observation possible. But the transition of psychology to the laboratory also brought with it some Wundt-imposed restrictions on the subject matter of experimental psychology.

In the first place all analytic work in psychology was to be based on the notion that "there is only one kind of causal explanation in psychology ; and that is the derivation of more complex psychical process ones "f. Second, experimental study was possible only when external manipulation of conditions was possible, that is, it was restricted to relations between stimulus and consciousness in the simplest sens . Mental products-including complex thought-"are of too variable a character to be the sub-

* W. Wundt, *Principles ot physiological psychology,* 5th ed., transl. by E. B. Titchener. New York: Macmillan, 1904. Originally published as *Grundzüge der physiologischen Psychologie.* Leipzig: Engelmann, 1874.

t W. Wundt, *Outlines of psychology,* transl. by C. H. Judd. Leipzig. Engelmann, 1897. Originally published as *Grundriss der Psychologie.* Leipzig: Engelmann, 1896.

jects of objective observation . - . [and] gain the necessary degree of constancy only when they become collective." Their study is thus part of social psychology. "[The] experimental method [serves] the analysis'of the simpler psychical processes, and the observation. of general mental products [serves] the investigation of the higher psychical processes and developments."*

The nineteenth century thus passed without any significant experimental work being undertaken on these "higher psychical processes.-

The slack created by Wundts dicta was taken up with a vengeance at the University of Würzburg. Karl Marbe and Oswald Külpe triggered one of the most active periods in the investigation of human thought; the former provided much of the experimental and conceptual impetus, the latter-though credited with the leadership of the Würzburg school-was more concerned with philosophical questions and generally encouraged the,direction of the laboratory investigations.

The first paper to come out of this new school was by Mayer and Orth in - 1901. They, like the other members of the Würzburg group, assumed much of the associationist theory whieh preceded them, but in the course of a study of qualitative aspects of the associational process-initiated by Marbe-they stumbled across an unexpected finding. While examining the thought processes intervening between a stimulus word and the subjects reaction, they found that subjects frequently reported a kind of conscious experience that was neither an image nor an awareness of an act of will or choice. They also noted that sometimes associations were made to the stimulus word without any conscious processes whatsoever, and although this finding might seem to be troublesome for a theory of thinking based on the association of images, this aspect of the problem seemed not to bother them. They were struck, however, by those conscious processes that seemed to be completely imageless. Since their subjects could not describe these processes beyond saying that they had them, Mayer and Orth were in turn helpless to say anything about them. As a solution, they

* W. Wundt, *Outlines ot psychology,* transl. by C. H. Judd. Leipzig: Engelmann, 1897.

coined a phrase, dispositions of consciousness *(Bewusstseinslagen*), took note of the occurrence of these states, called them states of consciousness inaccessible to-further analysis, and let it go at that.*

This seemingly negative finding was an extremely important one. First of all, it was an entering wedge into the closed ranks of association theory. For if thinking consists of associations between images-asserted since Aristotle's time-how can there be thought with no images present? What mediates the obviously meaningful response to the stimulus word? Perhaps even more important, however, was that Mayer and Orth were forced to invent, albeit reluctantly, a new theoretical term. In the face of their subjects being unable to describe what was going on, they were forced to remove themselves from the subjects' theorizing and to invent a term of their own. This is not to say that theoretical terms were alien to psychologists or that they were invented by the Würzburgers. Rather, this was the major step toward letting the subjects' *behavior* dictate the necessity for inventing such a term. just as in other fields of psychology, the theory of thinking was forced to invent theoretical concepts to bridge an introspective void.

4 Alfred Binet, working in France at the same time as the Würzburgers in Germany, came to the same conclusion with regard to imageless thought *(L'éftude expérimentale de 1'intelligence,* Paris, 1903). He stated his position even more strongly, saying that elaborate images such as found in daydreaming were incompatible with the rapid processes of thought. He once illustrated the inadequacy of the image theory by rernarking that with a million dollar thought one only has a nickel's worth of images.

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A. Mayer and J. Orth

Marbe and Orth have previously pointed out that all the usual categorizations of associations suffer to some degree from the error that the bases for these categories have been derived from logical points of view, rather than from the nature of the associations. The reasonable demand to base the categorization of associations on their qualities and not on other considerations suggests a more thorough examination of the qualitative differences among associations.

At the same time it must be made quite clear that many different experiences are subsumed under the concept of association and that facts and categories that are derived from one group of associations cannot be simply transferred to others. Qualitative investigations and new attempts-at the categorization of associations must at first be limited to a certain class of associative processes, and only later can the question be asked whether the same facts can be found within other classes and whether the same categories make sense there.

On the basis of such considerations, Dr. Marbe has set us the task of examining the associations that arise when the subject reacts with a spoken word to a word called out to him, and to attempt to find a useful categorization of these associations.

Such an examination can only be fruitful if we assume that we

A. Mayer ond J. Orth, Zur qualitotiven Untersuchunq der Association. Z. f. Psychoi., 1901, 26,1-13. Transl. by George and Jean M, Mandler.

can become acquainted, as precisely as possible, with those processes which the observer experiences during the experiment.

Since it seemed likely that the qualitative differences among the associations to be examined would be reflected in their association [reaction] times, we incorporated appropriate time measurements into our experiment. In particular, our experiments pursued the following sequence:

After having attracted the observer's attention with a "ready' signal, the experimenter called out the stimulus word and activated a stop watch at the same time. As soon as the subject had begun to pronounce the response word, the watch was stopped. The observer then reported all his conscious processes which had taken place from the moment of the presentation of the stimulus word up to the end of his reaction. These reports were recorded by the experimenter. The association time, obtained from the stop watch, was then also noted in the protocol. [There follows an apology and justification for using a clock with divisions no finer than a fifth of a second.] . . . During the entire experimental period the observer closed his eyes in order to avoid disturbing or influencing the associative process through visual perceptions. [There follows a description of the primarily monosyllabic nouns that were used as stimulus words as well as a description of the number and identity of experimenters and subjects (N = 4).] ...

An examination of the results showed, first, that for a number of associations the stimulus word acted directly to elicit the response, i.e., without any conscious processes mediating the link between stimulus and response word. We shall designate these responses as responses without intervening conscious processes in contrast to those where psychic events are interposed between stimulus and response word.

We next set ourselves the task of determining the relative frequency and duration

of these associations. -[There follows some description of the method of determining mean latency values and of the tables that contain the relative frequency and duration of these two types of associative processes.] ...

The first table seems to show that associations with intervening conscious processes generally appear more frequently than those

without intervening conscious processes [by ratios from 13:1 to 11]. Despite large individual differences, it is quite clear that associations with intervening conscious processes show relatively longer durations than those without intervening conscious processes.... [The same results were obtained in a second series which also showed that], despite obvious individual differences, the associations with intervening conscious processes are more frequent and take place more slowly than those without intervening conscious processes.

The next tables are concerned with a more detailed classification of the associations with intervening conscious processes. Internal psychic events-that is, conscious processes exclusive of perceptions-are divided into images, which may be more or less complex and more or less characterized by feeling tone, and acts of will, which also may be more or less complex and more or less accompanied by feeling tone. For the time being, we do not want to take any position on the question whether acts of will can be derived from images and feelings, much less would we want to answer this question in the negative. Apart from these two classes of conscious processes, we must introduce a third group of conscious events which has not been adequately stressed by contemporary psychology and to the recognition of which we were-in the course of our experiment-forcibly directed. The subjects very frequently reported that they experienced certain conscious processes which they could describe neither as definite images nor as acts of the will. Mayer, serving as a subject, made the observation that following the stimulus word "meter" there occurred a peculiar conscious process, not further definable, which was followed by the spoken word "trochee." In other cases, the subject was able to describe these psychic events more clearly. For example, Orth observed that the stimulus word "mustard" released just such a peculiar conscious process, which he thought might be characterized as "a memory of an idiomatic expression." This was followed by the response "grain." In all such cases, however, the subject was unable to find in his consciousness the slightest trace of the presence of those images which he used in his report of the psychic events. Despite their obviously quite different qualities

we include all of those conscious processes under the name of *"Bewusstseinslagen."* [dispositions of consciousness].* The reports of the observers show that these dispositions were sometimes accompanied by feeling tone, but also sometimes without any feeling tone whatever.

Our data indicated that frequently only one psychic event intervenes between stimulus and response word. For example, one subject reported that the stimulus word "crayon" ["Stift"-which has a variety of different meanings] was followed by a very clear visual image of a friend of that name, whereupon the response "student followed. The protocols also show that two conscious processes may intervene between stimulus and response. For example, for one subject the stimulus word 'lead" evoked a clear visual image of a flat, light gray piece of lead; this was followed by the acoustic-motoric word image "heavy." which on its part produced the response "heavy." Finally, our results showed that even three and

more conscious processes may intervene between stimulus and response word.

[There follow tables showing the relative frequency with which one, two, three, and more intervening conscious events were reported by subjects, as well as the respective reaction times.]

These results show certain differences in the response mode of individual observers in that for three subjects one intervening conscious process was most frequent, while two, three, or more such processes occurred less frequently. For the fourth observer, one psychic event was relatively infrequent while two psychic events most frequently intervened between stimulus and response. Despite all individual differences, the results quite clearly produce the law that the average association time increases with the number of intervening conscious processes.

As our next task, we decided to investigate in greater detail those responses where only one conscious process intervened between stimulus and response.

Our results show that this one psychic event is not infrequently a word image. For example, for one subject, the stimulus word

* Translators' note: Titchener first translated *"Bewusstseinslagen"* as---conscious attitudes." The changed modem usage of the word "attitudes" suggests, among other considerations, the choice of "dispositions.-

. soul" evoked the acoustic-motoric word image " body " which then produced the association "spirit" The one intervening conscious process was also frequently theimage of an object. For example, one subject reported that following the stimulus word "chimney" the visual image of a chimney-sweep was evoked, which was followed by the response "chimney-sweep." Some of our previous examples also show that a general disposition of consciousness may form the only mental process that occurs between stimulus and response words. Finally, the subjects often described this one intervening conscious event as an act of will. One subject reported that the stimulus word " luster " occasioned a search for a connection, where upon the response "sun" was evoked. We then asked ourselves the question: Which was the most frequent intervening event between stimulus and response: a word image, an object image, a disposition of consciousness, or an activation of will? At the same time, we sought to solve the problem whether one or the other type of intervening conscious events slows down or speeds up the response process. Despite intensive investigation of our material, we found very little lawfulness in this direction. What was shown was the already fairly obvious fact that images intervene more frequently than dispositions of consciousness or activations of the will, as well as the rather valuable result that acts of the will slow down the associative sequence.

[There follow two tables that show that for all subjects the mean reaction time for responses with intervening conscious processes involving an activation of will is longer than for those responses where no activation of the will was observed.]

These tables show quite clearly that processes involving the will slow down the associative sequence.

Our material also indicated that the conscious processes intervening between stimulus and response may either be accompanied by feeling tone or not. One subject observed, for example, that for him the stimulus word "forest" evoked

aVisual image of a forest accompanied by positive feeling, which was then followed by the response "green."

[There follow two tables showing the frequency of those associations that are and those that are not accompanied by feeling tone, as well as their average reaction times.]

Despite obvious individual differences, these tables show clearly

that the intervening experiences are in most cases without any feeling tone; beyond that, however, we observed that the average duration of associations with intervening conscious processes accompanied by feeling tone. is considerably longer than the duration of all the others. ,

We now asked ourselves whether the direction of the feelings that accompany the associative processes influence the associative duration.

[There follow two tables that show the frequency of responses with pleasurable mediating links as against those with unpleasurable mediating links, as well as their respective reaction times.]

These tables show clearly that the negative feeling tone of intervening conscious processes decreases the associative speed.

Finally, we found during the perusal of our protocols that conscious processes (including feelings) may be observed not only parallel to the stimulus word but also parallel to the response word. For one subject, the response "worm" that immediately followed the stimulus word "tape" was accompanied by the visual image. of a tapeworm. For another observer, hearing the stimulus word "chorale" evoked a pleasurable feeling, whereupon the response . sing" followed. The small number of cases falling into this category, however, does not permit us to draw any important generally valid conclusions. Therefore, we must leave for later investigations the solution to such questions as whether parallel psychic processes accompany the stimulus or the response word more frequently, whether any one particular group of psychic processes plays this parallel role more frequently than others, and in what direction these parallel events influence the association time. We can only say th at accompanying experiences (including feelings) may occur parallel with either the. stimulus or the response word. Despite the fact that our results do not directly support it, we may assume that even within an associative process various experiences may accompany the stimulus as well as the response word.

In the following we summarize the most important results of our study:

When a subject is given the task of responding to a spoken word with another spoken word, different conscious processes.may oc-

cur. First, the response word may immediately follow the stimulus word; second, one or more conscious processes may intervene between stimulus word and response word.

It then appears that responses without intervening conscious processes take place

more quickly than those with intervening conscious events, and responses with one intervening conscious process take place more quickly than those where several psychic events intervene between stimulus and response word.

Responses with intervening conscious processes occur in general more frequently than those without intervening conscious events.

Whenever activations of the will are found among the intervening conscious processes, the reaction process is slowed down.

The conscious processes following the stimulus words are only in a few cases accompanied by feeling tone. In most cases there is no accompanying feeling tone. The feeling tone of the intervening conscious events slows down the associative process; negative feeling tones delay it more than positive ones. .

If one now were to attempt a categorization of the associations that occur between spoken stimulus and response words, and if such a categorization is to be based on qualitative differences among associations, it would look approximately as follows:

The associations are divided either into:

(a) Those without intervening-, conscious processes, and

(b). Those with intervening conscious processes which may Q further be subdivided according to their number, type and feeling tone, .

or

(a) Those without accompanying conscious processes,

(b) Those where conscious processes accompany the stimulus word,

(c) Those where the response words are accompanied by conscious processes, and,
,

(d) Those where both stimulus and response words are accompanied by other experiences.

Extensive further observations would show that even this second categorization is subject to further subdivision.

[There follows a paragraph thanking Marbe for his valuable advice as well as two subjects for their support of the study.]

It was an uneasy transition in the history of thought. Neither Mayer and Orth, nor Marbe, with whom they were working, were able to do much with this new phenomenon, but Marbe was startled to find a similar problem in his studies of judgment.

Marbe had set himself the task of determining, with the help of the new experimental method of controlled introspection, what conscious processes were involved in the act of judgment. The judgment was considered to he the most basic unit of rational thought; it had been studied intensively by logicians for centuries, and thus it was clear that a great deal was known about it. But exactly what? No distinction had yet been made between the judgment as a human act, and judgment

or proposition as a statement of fact. The intertwining of logic and psychology in the history of thought frequently led to facile interpretations of reasoning and judging, such as we noted earlier in james Mill's treatment of the problem. But Marbe set for himself a genuinely psychological problem when he asked: What goes on in consciousness during the act of making a judgment?

The psychological importance of Marbe's monograph on judgment, published in 1901, lies in the fact that it was the first unified study of complex thought processes. Although it has also been credited with introducing the concept of *Bewusstseinslagen* [dispositions of consciousness], Marbe makes little of his use of that category. Having ventured into the area of judgment, he finds it necessary to justify his method in an introduction and repeats the, by then, traditional complaints against the armchair psychologists. His results he finds astounding; his subjects fail to discover any state of consciousness that is coordinated with the judgmental act. Again and again he stresses this negative finding, for example, 'The present data are quite sufficient to draw the conclusion that no psychological conditions of judgments exist.... Even ... the

observers concerned ... were extremely surprised to note the paucity of experiences that were connected with the judgmental process." *

In the following selection we have translated part of his introduction and his major theoretical conclusion. The latter produces a theory that permits the deduction that judgments could not have any conscious correlates since they are based on knowledge. Like practically all his predecessors, Marbe too had difficulties with the problem of knowledge. To know something implies that we can judge the correctness of a judgment, but the judgment of correctness depends on knowledge which Marbe then relegates to a psychological disposition, a faculty. Knowledge is built into the subject; he either has it or not. As we shall see, the next major attack on knowing was to be undertaken by Ach who introduced the notion of *Bewusstheit,* an awareness of knowledge without palpable content.

* K. Marbe, *Experimentell-psychologische Untersuchungen ùber das Urteil.* Leipzig: Engelmann, 1901, p. 43.

The Psychology of Judgments

Karl Marbe

Current scholarly views about the psychological nature of judgment vary widely. According to Brentano the nature of judgment consists of recognition or denial, while according to the so-called psychology of association the judgment is a special associative process. On the other hand, other scholars assume that judgment

K. Marbe, *Experimenteil-psychologische U*ntersuchungen über dos Urteil. Leipzig: Engelmann, 1901. Pp. 13-14 and 91-92 transl. by George ond Jean M. Mandler.

goes far beyond the simple associative process. For example, according to Wundt it consists of dissecting a complex image into _its parts, a segmentation of a thought into its component elements, whereby the content of the judgment, though in an uncertain form, is given as a whole before it dissolves into its parts. At the same time Wundt assumes that the differentiation that takes place in judging cannot be associatively explained, but rather that it has its basis in the so-called apperception. Sigwart's notion of the psychological process of judgment is just the opposite. According to him, judging consists not of a taking apart but of a coagulation of images. Sigwart teaches that analysis into parts is one of the conditions of judging, but the judgment unifies the partial elements.

This great diversity of scholarly views about the psychological facts of judgments, which could easily be further documented with a mass of other examples, is obviously tied to the method that these scholars use in their research upon the problem in question. The psychology of judgment has not yet gone beyond unmethodical, natural, internal perceptions [introspection] and unsystematic experiments. Those who talk about judgments base their views upon conscious processes taking place within themselves during the act of judging-processes that either have developed haphazardly or have been produced by the observer in some experimental fashion, using experiment in the widest sense of the word. These researchers report nothing about the systematic use of a larger number of internal perceptions. Even the use of additional observers is not common; each scholar restricts himself to internal perceptions which he himself has experienced. Since the psychologist may be subject to serious errors even with relatively easy investigations that he conducts solely on himself, he is even more likely to be subject to such errors when he is dealing with difficult investigations such as those about judgment. One must, therefore, demand that whoever works on judgment should base his views on a larger series of internal perceptions which have been obtained, at least in part, from subjects other than himself.

My goal in the experiments to follow was to fulfill this requirement. At the same time 1 have tried to raise them to the level of experiments in the narrower sense. The internal perceptions

about judgment to be reported on have been, as the reader will note, undertaken under familiar conditions that were artificially varied

Since not all judgments that have been perceived or read are also understood and since Comprehension is not related to psychologically determinable facts derived from the perceived and read judgments, comprehension must be related to other, psychologically indeterminate, presuppositions.

What are these presuppositions; when do we understand perceived or read judgments? If somebody tries to reproduce a tone that he has heard at some previous time, then [another] person. listening to this reproduction, can understand such a judgment only if he knows that it was the intention of the singer to have his tone correspond to some other tone. If somebody is asked: "How much are two and three?' and replies by stretching out the five fingers of his right hand or by saying the word "five," then [another] person who has heard only the replies but not the question cannot understand these judgments. In order to understand them he must know the judging person's intended meaning. Finally, when somebody hears a judgmental proposition in a foreign language he can only understand it when he knows to what objects the words of the sentence are intended to refer. To understand a judgment requires some knowledge; we understand a judgment when we know to what object its meaning corresponds in the intention of the experiencing person....

We can thus easily see that the comprehension of a judgment, dependent as it is upon knowledge, cannot possibly be shown to exist in consciousness. What does it mean to say we know something? What does it mean to say that we know the first ten digits of w, that we know Kant's birthdate, or what he has written? These assertions can only mean that we are able to make correct judgments about the objects concerned. Thus to have reached the conclusion that to understand a judgment means to know what objects are, in the intention of the judge, supposed to coincide with the

judgment, i.e., its meaning, implies simply: to understand a judgment says the same as being able to experience certain other judgments. This ability [to make correct judgments] is going to depend, just as musical ability, on certain psychological dispositions. But this ability will not be noticeable in consciousness, any more than the ability to sing on pitch and so forth, until it is translated into certain actions.

just as we understand judgments only when we know to what object they refer, so can we judge their correctness or falsity only when we know whether or not they in fact correspond to the objects to which they or their meaning make reference. When this correspondence occurs, we judge them as correct, when it is missing, we call them false. Since the ability to evaluate a perceived or read judgment and

the end result of this evaluation both depend upon some knowledge, it is understandable why our experimental investigations of those abilities and end results of the judgments could not yield any positive results. At the same time it cannot be denied that the ability to compare a judgment and its object may at times be related to feelings of unpleasure.

Comprehensible or not, the dispositions, or Bsl's as they were soon called, were here to stay. In fact, an interesting thing soon happened to them. Subjects and experimenters being pretty much interchangeable in the Wfirzburg laboratories, the term Bsl found its way from the theoretical language into the protocol language of the introspecting subject.

The infestation of the language of the subject with the theoretical concepts of the psychologist is beautifully illustrated in the following few examples from the 1906 article by Messer. In these examples, the occurrence of the abbreviation Bsl is directly reproduced from Messer's protocols. It refers to the fact that his subjects, who were also his colleagues working on problems of thinking, actually used the word *"Bewusstseinslagen" [dispositions* of consciousness] in reporting the effects of a particular stimulus.

The general nature of Messer's experiments was typical of the Warzburger school. The subject is given a task *[Aufgabe]* and then a series of stimulus words. The task may be to give the first word the subject can think of, or to give a coordinated concept for the stimulus word, or to make a judgment about a sentence, and so forth. After a description of some of the quantitative (reaction time) results, some of the images evoked by the reactions, and a long section on the psychology of judgment, Messer discusses the *Bewusstseinslagen.* Imbedded in the protocols of that section, we find examples of the following order:

Subject *4: "Bsl,* containing two thoughts. 1. You have to wait, 2. The coordinated object will come to you."-"Bsl, for which I can give the thought: that's easy."-"Bsl: There is a subordinate concept somewhere, but you can't formulate it very easily."

Subject *6: "Bsl:* don't say that."-"Bsl, my father always used to mispronounce that name."-'Bsl: you could say that at any time."

Subject *4. "Bsl:* Can't 1 think of anything? Is that a coordinated whole? Then 1 remembered the word 'anvil.' Then for a time being. an emptiness of consciousness and then a further BSI which went in the direction of the questions: What are you supposed to do now: Are you supposed to test or to search?"

Subject *2: "Bsl:* Let's take the other meaning !"

Subject 3: "Bsl: Why not think about something else !"

Messer bravely attempted to classify or order this endless array of *Bsl* and came to the conclusion that what he was dealing with was not a peculiar type of conscious experience occurring now and again during the thinking process but rather was thought itself. Thus his task of classification became no less than to put order into the entire range of thought.

One of the prominent aspects of his classification is the emphasis on relations. The experiencing of relations had always posed difficulties for classical associationism. How are relations among images perceived? A consistent associationist, such as Ebbinghaus, had to say that in perceiving two tones, for example, we perceive their equality just as directly and in exactly the same way as we perceive the tones and their various qualities themselves. The difficulty of this position had been frequently criticized, perhaps

most succinctly by William james, who, in the Principles of Psychology, pointed out that the perception of A followed by the perception of B is not the same thing as the perception of B following A. With the advent of imageless thought it was at least possible to tackle this problem, although a satisfactory solution was not to be reached until SeIz, and later the Gestalt school, addressed themselves to these questions.

Messer seems to be groping to the conclusion that much of the thinking process goes on below the conscious level, with conscious processes attending it with varying degrees of clarity. Consciousness is beginning to take shape as the visible portion of an iceberg, with much of the work of the thinking process going on below the surface.

The following selection shows Messer trying to bring order into the world of Bsl and his conclusion that the term might as well be abandoned. His footnote on page 151 suggests a solution that Binet had previously advocated and that Biffiler was to adopt in the following year.

August Messer

Experimental-Psychological Investigations on Thinking

DISPOSITIONS OF CONSCIOUSNESS [BEWUSSTSEINSLAGEN]. Our subjects either knew or were actually quite familiar with the concept of "dispositions of consciousness" introduced by Marbe and characterized as "states of consciousness, the contents of which either completely elude a closer characterization or at least make it difficult." Thus we find this term used quite frequently in our subjects' responses.... [From our previous encounter with this concept in our investigation of

comprehension and judgment] we

A. Messer, Experimentell-psychologische Untersuchungen über des Denken. Arch. f. d. ges. Psychol., 1906, 8, 1-224. Pp. 175-188 transl. by George and Jean M. Mandler.

obtain the first group *of dispositions of consciousness:* those Which immediately follow word images and which represent the meaning (the concept or sense) of the word in consciousness. Into this group belong dispositions of comprehension (with its various nuances and graduations), dispositions of various degrees of ambiguity, and of synonymity....

These dispositions of consciousness can be said to represent a middle region between two other relevant groups of states of consciousness.

If we use the degree of unfolding in consciousness as our ordering principle, then the bottom level consists of the usual forms of meaningful speech in which meaning and word are inextricably fused in consciousness. At the upper end, however, we come into the region of cases where consciousness of meaning is represented by objective images of the optical or other sensory type, or by further word images.

Thus, these three forms of consciousness can be brought into a single dimension, though obviously one with continuous transitional states. We can assume the same for the concrete processes which we have, metaphorically, postulated,as the "carriers" of these states of consciousness.

just as these dispositions of meaning can, so to speak, appear as appendices or tails of word images, so can they also appear without words.

We now come to the *second main* group *of dispositions of consciousness.* Here meaning (concepts) are present but the words are missing. One might be looking for the words but even before they are found one knows what is meant-what one wants to say. Here, too, there is no dearth of transitory forms: word fragments may be found or one knows how the missing word sounds.

Both groups of dispositions of consciousness can be extended without any difficulty from the individual word, that is, from the individual word meanings, to propositions and judgmental contents.

These cases where the meaning of a proposition is not immediately present upon reading, but appears lightning-like as a separate experience, belong to the first group. To the second group belong those cases where a judgment or a thought is present which

could only be adequately formulated in a sentence but where still no words can be found in consciousness. We need only suggest that here, too, there are many transitional forms.

[There follows a series of examples and a further subclassification of these two groups, ending up in some thirty-odd different types of dispositions of consciousness.]

The dispositions of consciousness with which we have dealt here may be concrete or more abstract, they may be reproducible in a word or in one or several sentences, and they may be purely intellectual or affective in type. All these manifold types of dispositions are included within the region of experiences which B. Erdmann has described as "unformulateted' (or "intuitive") thinking.

Obviously, in our actual thought processes, it is not possible to differentiate strictly between formulated and unformulated thinking. Not only must we recognize manifold subcategories in both classes, but also continuous intermediary stages and various transitions from one to the other. We can consider as borderline cases on the one side thinking and completely formulated propositions with a clear consciousness of meaning, on the other a lightning-like reflection and recognition which is bare of any trace of a word. The difference between the two is probably greater than that between the slow and correct writing of a child who has just learned to write, and the hasty symbols of a practiced stenographer.

This should not lead us to think of the relationship in the following fashion: that fully formulated thinking in the child is the original type which in the adult is eventually abridged and condensed. Rather, we will have to assume ... a preverbal, hypological thinking in the child which needs verbal shaping in order to gain certainty, in order to become communicable and reliably reproducible.

In order to explain these varied dispositions of consciousness, however, we will have to adopt a hypothesis that the concrete psychic processes which underlie completely formulated thinking occur in shortened forms of great variety, interlaced with one another, using more or less of the available psychophysical energy.

The dispositions of consciousness have thus become somewhat comprehensible in their *intellectual* aspects. In their *affective*

aspects, however, they offer nothing that is either new or particularly obscure. The term *"Bewusstseinslagen"* has done its duty as a temporary collective name, and it seems advisable to replace it with the familiar expression *"Gedanken"* [thoughts].' ...

' It would probably fit language usage best if we were to restrict "thoughts" to those *Bsts* whose content can only be formulated in one or more sentences, while the *Bsl's* concerned with the meaning of single words or phrases should be designated as "concepts."

Messer only mentioned the unconscious aspects of thought *en passant* but Narziss Ach had already treated the problem in 1905, the previous year. Ach worked out both an ambitious experimental program and a comprehensive theory. He proclaimed the heuristic and scientific value of "systematic self-observation," which was his phrase for the experimental technique used in the Würzburg laboratory. His theory, which depends a good deal on unconscious mechanisms of thought, we will deal with in greater detail later on, but for the present we shall concentrate on his development of the concept of the Bsl. For Ach, the *Bsl* was one type of imageless thought, fitting into his larger schema of *Bewusstheit,* or awareness. The *Bewussteinstlagen* described as the imageless knowing that something is the case. Although in themselves they were unanalyzable experiences, they served the purpose of bringing the elementary experience of knowing, or knowing the meaning of something, into consciousness; they are what the familiar "Uh-huh" of daily recognition is about. Around these knowings or

awarenesses, Ach wove a somewhat vague physiological theory to explain when images will arise to consciousness and what degree of intensity they will attain. The general level of this theoretical framework is illustrated in the following selection.

Ach used a wide variety of reaction experiments. The subject might be instructed to flex his right index finger when a white card was presented, or to give a motor response only to a certain class of stimuli, or to name the stimulus (one of several cards of

different colors) when it was presented. In more complex situations the response might be conditional, that is, the motor response was required only when a red card was presented to the left of a white card, or a discrimination was required in which the subject reacted to one color with the right thumb, to another with the left thumb. In addition, there were purely verbal tasks, such as free associations or judgments, or tasks that required the subject to give the name of the river on which a given town was situated. The introspections collected after the completion of the task dealt primarily with the main period, that is, the interval between the perception of the stimulus and the completion of the response.

Awareness

Narziss Ach

Analyses of the contents of consciousness obtained by means of systematic experimental self-observation have shown a variety of experiences in which all of a complex content is simultaneously present in the form of a "knowledge." This knowledge exists in an imageless form, that is, no phenomenological components are demonstrable-neither visual, acoustic, nor kinesthetic sensations, nor their memory images-which would qualitatively define the content of this knowledge. We encountered such experiences in every subject in these experiments. *It is the presence of such imageless knowledge which we designate as awareness.*

N. Ach, Uber die Willenstatigkeit und das Denken. Gottingen: Vandenhoeck and Ruprecht, 1905. This selection translated by D. Rapoport, and reprinted from D. Rapaport, Organization and pathology of thought. New York: Columbia University Press, 1951, pp. 24-38. By permission of the publisher.

The content of such knowledge is given unequivocally and definitively, even though the manner in which it is given is not amenable to analysis. Immediately after the experience of this knowledge, the subject can state what he was aware of concerning it. Such awareness, therefore, is characterized by the knowledge it implies. In our experiments, such experiences were most obvious in the content of expectation at the end of the preparatory period, and in the perseverating contents of consciousness in the period following the experiment. Because we can direct

our attention to this perseverating content as though it were a perceptual content, we can use it to obtain self-observations. In these, the process just experienced is present all at once-in *nuce, as* it were-without details or images. For example, in a none-too-habituated state of expectation, one of the following complex contents is often simultaneously present as awareness: (a) The stimulus with its spatial determination; that is, the subject knows that an unequivocally determined change (the appearance of a white card) will occur at the spot he fixates on. (b) The subject is aware that this must be followed by a known and unequivocally determined change on his part (the reaction-movement). Also, a relationship between these two unequivocally determined changes is given, in the awareness that as soon as the stimulus appears the reaction-movement must follow. (c) The awareness has a temporal component, in the knowledge that the stimulus will appear within a certain known time-span.... Besides these directly given contents of the expectation, and the visual percept (in our case, the screen of the card-changer), the usual phenomena accompanying sensory attention are also present-such as tension-experiences in the upper half of the body and in the optical sense-organ. Occasionally some of these elements of the awareness-complex may appear in the form of images, particularly at the beginning 6f the preparatory period or in the first experiments of a day. In this respect there are great individual differences, which are rooted in individual endowment. Yet in the majority of the experiments the whole expectation-content, excepting the accompanying phenomena, is present only as imageless knowledge, which we call awareness.

Should such experiences occur frequently, the simultaneously given constituents of the awareness-content usually begin to fade:

the intensity of awareness abates. The knowledge-content remains clear and unequivocal, but it is no longer experienced in its original intensity. This process may also be characterized as the decrease of attention-concentration. Besides these changes in the intensity of a total awareness, there are also intensity differences in the awareness of the various simultaneously given part-contents; in other words, attention is directed more to some than to other constituents of the simultaneously experienced complex content. Meanwhile, the entire content is present as awareness. Thus, for instance, in states of expectancy it frequently happens that the awareness of the reaction to be made-described under (b) above -recedes, relative to that of an unequivocally defined changedescribed under (a) above.... With some subjects-for example, Subject L.-this was more the rule than the exception, in the beginning. L. was unable to maintain simultaneously an equally great intensity of the two part-contents.... With much experience, the intensity of awareness-of the whole or part-content may so recede that its presence as awareness is no longer demonstrable. This was the case with Subject j.: when fixating on the screen, besides weak intentional sensations in the reactor organ, there was only a vague awareness that he must react. We designate this recession of the content of awareness as the *automatisation* of the process. In contrast to this, in other instances an increase in the intensity of awareness is demonstrable. Such intensification may occur, for instance, because of repeated internal utterances and continuous concentration of attention. Therefore, we are justified in distinguishing degrees of intensity of awareness in simultaneously given complex contents, as well as in consecutive experiences. . . .

When a content is only an imageless knowledge, immediately preceding or simultaneous with the meaning-awareness, there exists in consciousness a visual, acoustic, or kinesthetic sensation (tension-sensation), or a memory image of the content. These sensations are image-representations in consciousness of the imageless knowledge. They are indicators of the meaning-content. The sensations may, of course, come without such meaning-content, as pure sensory qualities. Thus it happened repeatedly in our experiments that, after the appearance of a

colored card, the sen-

sation "yellow" was present solely in its optical quality. Only afterwards did the knowledge arise, "This is yellow," as an independent thought. it could be said that only this *thought identified* the sensation as the familiar yellow color. Somehow a link to *previous experience* became effective and found expression in this knowledge. This is the process known as *apperception,* which always implies the presence or appearance of the knowledge of a meaning. When a complex content, the part-contents of which show varying degrees of awareness-intensity, is present simultaneously, then that part of the conscious complex which is momentarily in the foreground of awareness may be designated as the apperceived part. It is, as Wundt puts it, in the focus of consciousness. Because of their continuous change of intensity, it is often difficult to judge the degree of awareness of simultaneously given part-contents. As systematic experimental self-observation plainly indicates, attention may be evenly distributed and the simultaneously present part-contents may momentarily show no differences of awareness intensity; therefore, the here-described appearance of the meaning-content must be considered the crucial characteristic of apperception. Herbart gave most careful attention to this phenomenon. These considerations are supported by my previous demonstration that, when a stimulus is apperceived, from the moment of its appearance maximal attention is directed toward a single conscious content (on the basis of a previous *Einstellung).* Thus, the developing stimulus-impression is in the focus of consciousness; yet in this phase we cannot speak of [complete] apperception. Rather, what takes place is the development of the stimulus-apperception; the apprehension of the stimulus-impression in accordance with the preceding *Einstellung* takes time. Thus a content may be in the focus of consciousness, in the center of attention, without having been apperceived.

In analyzing their experience, subjects often find it difficult to describe an imageless awareness-content. Part of the experience is at times indicated phenomenologically: by internal utterances such as "must borne," or "edge, edge," or word fragments like 11 add," "before," "after." Such kinesthetic or acoustic-kinesthetic images may well be the basis for the widespread assumption that our thinking occurs always by means of internal speech or ade-

quate visual, acoustic, and other memory images. It must be pointed out, however, that there are very complex contents of which only part-contents and their mutual relationships are present in consciousness, whereas the contents themselves are not or even cannot be represented by adequate verbal designation or by anything like it. When a phenomenological constituent [of such a complex content] is present, it refers only to a corresponding [partial] meaning-content; for instance, "edge" refers to the expectation of the upper edge of the card. At the same time, other simultaneous expectation-contents do not have such phenomenological representation, and are present within the total tensionstate only as awareness. Furthermore, it happens at times that complex contents, the verbal expression of which would take several sentences, appear momentarily, like a flash of lightning. Therefore, in their brief existence they could not be given in internal speech. Their meaning-content is unequivocal, and their memory clear and definite, though we cannot demonstrate the presence of any sensory qualities. Thus, for instance, in the preparatory period of an experiment with optical reactions of twofold coordination,

Subject C. had a visual memory picture of "Q" and with it a lightning thought that it would be most practical to be prepared only for "0"; beside this, there was the awareness that perhaps there would be only "E." . . . In view of the clear and unequivocal content of such awareness, it seems incorrect to assume that these are "obscure sensations" or memory images, too weak to be demonstrable as single contents, but which when taken together result in a realization of the meaning-content.

Experiences such as the following speak against such an assumption: when an awareness without demonstrable imagery is in the focus of consciousness, together with it a reproduced sensationfor example, a white card-appears as a part-content, with a lesser degree ,of awareness intensity. . . . Often we first observe the presence of an image representation of a meaning-content (for instance, in the form of internal speech, "as fast as possible), and only then the corresponding meaning-content as an awareness without phenomenological representation. There are, however, instances in which awareness is followed by an image. Thus, in an experiment with numbers, after the intention "subsequent,"

the number 9 was presented ... first came the awareness, "I know it," and only then the visual image of zero.

Even though the experience we call awareness was demonstrable in all subjects, there were great individual differences. Many people are given to immediate visual or acoustic-kinesthetic imaging of meaning-contents. The author himself, having neither strong motor nor visual bent, has a definite inclination to think in awarenesses; this circumstance may well have contributed to his interest in the analysis of imageless thinking. One area where imageless conceptual thinking is most obvious is the quick and understanding reading of a text. When, for instance, the written sign of the word "bell" is before me, 1 apperceive the sign and know what it means. The awareness of the meaning is then present in me. According to the *theory of awareness,* it is not necessary that presentations-apperceiving presentation-masses-arise to assimilate the impression, for example, the sound or visual image of a bell. According to this theory, the realization of the meaningcontent occurs in a different fashion. It is well-known that every presentation in consciousness-for example, the stimulus-impression "bell"-puts many associated presentations into readiness. This readiness of presentations-that is, their reproduction tendencies-suffices for a conscious representation of what we call their meaning, without their having to enter consciousness. The reproduction is not yet complete, it has only been initiated by, we might say, a stimulation of reproduction tendencies. This stimulation suffices to create an unequivocal relationship in the direction of the "stimulate " reproduction tendencies. These unequivocal relationships are experienced as knowledge, that is, meaning. . . . One of the reproduction tendencies corresponding to it may then become over-valent; that is to say, one of the associated presentations enters consciousness and appears as the conceptual sign of that knowledge. . . .

According to the laws of association and of reproduction of ideas, the more often the associated ideas have been in consciousness (other factors remaining constant), the stronger the reproduction tendency. If the meaningful word "bell " is given, ideas most frequently associated with this sign will be put into the highest degree of readiness. Thus, the stronger the reproduction-

tendencies, the greater the state of excitation. On the basis of our previous discussion, we are entitled to speak about differences in awareness-intensity within a simultaneously given complex. Nothing seems to be in the way of assuming that the greater the excitation of readied presentations, and the greater the intensity of reproduction-tendencies, the more intensive the awareness. Therefore, we may describe awareness as an increasing function of excitations of reproduction-tendencies. It follows that of all the reproduction-tendencies stimulated by the word "bell." the awareness of those most frequently experienced will be most intensive. In contrast to these, the other readied presentations, being only occasional and incidental, are of a lesser awareness-intensity. The meaning-content of a given word implies a knowledge in which regularly recurring associative connections have far greater awareness-intensity than those occasionally and incidentally formed. The latter will be neglected and not become effective as awarenesses. Here we encounter an experience-determined process of *associative abstraction*, in that only those presentations become consciously effective in a given meaning-content which have recurred regularly as its constituents. This abstraction process, through the continuous assimilation of presentations in their varying connections, occurs entirely automatically.

Since associated presentations which recur regularly represent the constant characteristics of a given concept, associative abstraction determines *the kind of awareness in which a concept is psychologically present in an individual.* This shows that there is no general psychological representation of a concept which is valid for all individuals. Awareness of a concept depends on the association of ideas corresponding to experiences, which again greatly vary with people. Even in the same individual, awareness of a concept does not remain constant. The factors determining the intensity of reproduction-tendencies, that is, of the readiness of a presentation, are also decisive for awareness-intensity. (Such factors are: the frequency of the attention-deployment which brought about the association; the feeling-tone; the time lapse since the association was formed; the generative, effectual, and retroactive inhibitions; the perseverating reproduction-tendencies; the determining tendencies.) For example, if one of these factors reinforces

the excitation of one of the readied presentations, the conceptual awareness changes. The mental constellation is subject to constant change, and so is awareness. Herein lies the developmental potentiality of mental processes. As apperceptive masses are progressively replaced through new associations of ideas, there is a constant change of conceptual awareness; at the same time the excitation of now one, now another, readied presentation is increased by a previous determination. Therefore, even identical stimulations, following each other at brief intervals, may result in differing conceptual awarenesses. The psychological representation of a concept by an awareness is thus not identical with the logical characteristics in its definition.. This incongruity of the logical and the psychological contents of concepts is most obvious in children. On the one hand, they lack the broad experience and varied associative connections necessary for the process of associative abstraction, that is, for the differentiation of the regular from the incidental; on the other hand, their attention often turns to striking but not regular contents of consciousness. Therefore, often the child does not differentiate between essential and unessential characteristics. For him, any incidental accompanying phenomenon may appear the major characteristic of a concept. A child's drawings offer a very instructive opportunity to observe his thinking. They express what he knows about an object rather than what he has perceived of it the drawing is objectified awareness.

These considerations suggest that presentations are abstract, or rather, that all conscious content given as awareness is abstract. The reason is that the incidental associations which are the overtones of every awareness do not attain appreciable

conscious influence as compared with the regular associations.

The discussion of the concept of awareness has bearing on the role of determining tendencies. We have seen that these tendencies determine the course of mental happening so as to accord with the goal-presentation. In the preparatory period of the experiment, when the intention is formed, reproduction-tendencies corresponding to the meaning of the goal-presentation achieve a high degree of excitation, by means of the heightened concentration of attention and the perseverance of the goal-presentation in consciousness. These reproduction-tendencies, accompanied by mean-

ing-awareness, are brought simultaneously into relationship with the referent-presentation, influencing it in accordance with the goal-presentation. Such relationships between goal-presentations and referent-presentations we call intentions. In contrast to the referent-presentation implied in the intention-awareness, the one on which the determination actually takes effect we call "concrete referent-presentation" (for example, when the intention is to calculate, the number 2 that appears as stimulus is the "concrete referent-presentation"). If the intention is accompanied by a good concentration of attention, it also implies a reference to the future in that it is directed toward a concrete referent-presentation to appear subsequently.

The influence of determining tendencies appears in simplest form in the varieties of apperceptive fusion. To this category belong even those forms of apperception in which the meaningcontent may be considered an after-effect of a preceding Einstellung"; for example, the recognition-reaction in which a yellow or red card is apperceived as colored, in accord with the instructions, or the apperception of its color with the awareness of consent or affirmation, "Yes, this is red." These forms of apperception, therefore, may be designated as *determined apperceptions.* Such is the case also when a white or colored card is apperceived as 11 something to react to," since this apperception complies with a preceding determination. There is an apperceptive fusion here between the stimulus-impression and the readied reproductiontendencies, so that comprehension is directly connected with the corresponding meaning....

In contrast to this, in those experiments in which *Einstellung is* poor, the insufficient determination is noticeable already in the apperception. In cases where the preparation has been insufficient, we observe a state of disorientation upon the appearance of the stimulus: the subject does not know what to do.

Besides these described forms, determination may manifest itself in what is known as *specific apperceptive fusion.* Such are particularly frequent and various in reactions without coordination of activity. For example, in the preparatory period Subject B. had a visual image of the plus-sign, representing the intention to " add "; when the stimulus appeared, an apperceptive fusion

took place in that the appearing numbers fell into the prepared scheme. The determined presentation followed associatively from this apperceptive fusion. Subject C. experienced a spatial displacement of the two numbers which corresponded to the intention: in adding they pulled together, in subtracting the smaller figure sidled to the larger....

A middle position between special apperceptive fusion and determined apperceptions is occupied by the cases where the apperception of the concrete referent-presentation (for example, of a number) is followed by an imageless meaning-awareness, and where, after that apperception but before the appearance of the result (that is, the determined presentation), knowledge of what will appear is present.

Another form of apperceptive fusion is apperceptive substitution, in which a preceding *Einstellung* comes to expression. In the simplest cases, a presentation is given as a part-content of the intention of the preparatory period. This is the case, for example, in our rhyming experiments: the letter 'Y' appears [as a part content of the intention] and replaces the initial letter of the concrete referent-presentation (stimulus-syllable). The determined presentation may be considered the product of an apperceptive substitution, effected by the determination. . . .

The list, apperceptive fusion, determined apperception, specific apperceptive fusion, apperceptive substitution, does not exhaust the varieties of the effects of determining tendencies. Some of these are transitions to those forms in which determination finds its most striking expression. In these cases, the determined presentation, the end-product of the determination, appears in consciousness immediately in conjunction with the concrete referentpresentation; and neither the goal-presentation itself, from which the determination arises, nor any part-content of it is demonstrable in consciousness after the appearance of the concrete referentpresentation. The selfsame concrete referent-presentation, once given, may be followed by a variety of determined presentations, selected by the determining tendencies. It is characteristic that even though the appearance of the determined presentation is precipitated by the concrete referent-presentation, its quality depends on the goal-presentation, though the latter is not demonstrable

in consciousness. The qualitative characteristics of the determined presentation are beyond doubt due to unconscious (meaning simply not conscious) effects. Thus we define determining tendencies as *unconsciously acting* Einstellungen *which arise - from the meaning of the goal-presentation and, directed toward the coming referent-presentation, result in the spontaneous appearance of the determined presentation. . .*

In the preceding selection it is clear that Ach is attempting to explain and utilize in his theory what were to. him clear facts derived from his experimental findings: meaning, or recognition, may sometimes he carried by visual images, but at other times it occurs without their presence or before any images have crystalized. Yet his "facts" and those of Marbe and Messer were soon to be bitterly disputed.

Wundt for one was not the man to admit the appearance of an experimental psychology of thinking that he had declared as impossible just ten years previously. And in 1907 Karl Bühler published the *nec plus ultra* of the Würzburger method in a study which did not fail to point out Wundt's previous misgivings.'

Bühler's investigation was much more ambitious than those of his colleagues. His stimulus materials were complex questions requiring extensive thought processes that terminated in "yes" or "no" judgments; the subjects then gave a retrospective account of the processes intervening between stimulus and response. Bühler concluded from these protocols that there were basic unanalyzable units in the thinking process, which should simply be called "thoughts." These units could, however, be classified into types, three of the most important being: first,

consciousness of a rule *[Regelbewusstein],* a knowing that one can solve a

* K. Bühler, *Tatsachen und Probleme zu einer Psychologie der Denkvorgänge. I. Uber Gedanken,* Würzburger Habilitationsschrift, *1907.*

problem and how it is done, without actually having the steps in mind; second, consciousness of knowing the meaning of something, "intending" it *[Intentionenj,* without having the meaningcontent clearly in mind; and third, consciousness of relations *[Beziehungsbewusstsein],* an awareness similar to Ach's conception.

The following passage illustrates Bühler conception of these "thoughts" and also presages the concern with the unit of thought that was to reach full flowering in the next decade.

What really is the consciousness of a rule? It is a thought in which something, that from a logical point of view we call a rule, comes to consciousness. But this does not quite unequivocally determine the concept. I could simply designate a rule just as I designate any other object. But consciousness of rule is not such thinking of a rule, rather it is thinking a rule or thinking according to a rule. The object of the consciousness of a rule is not the rule, but rather the state of affairs, the object, that the rule describes, on which it is used, from which it might possibly be derived. Using a distinction of Husserl's, we might say: Consciousness of a rule is a thought with which we can adequately think certain objects that the logician calls laws. There are at least two ways, . . . and not just one, in which objects can be adequately represented in consciousness, in perception. Perception is image; the other self-sufficient (adequate) object-consciousness is the consciousness of rule.... One thing seems to me to be certain, that consciousness of rule is a very frequent experience in scientific thinking 0

There is a greater emphasis in this analysis of thinking on processes than on contents, and it illustrates the influence of 11 act psychology" on Külpe and thus on others of the Würzburg school. In their eager attempts at classification of imageless contents, some of the Wiirzburgers at times had ignored the obvious active processes occurring in their thinking subjects, and seemed to be harking back to the static classificatory schemes of the early associationists.

* K. Bühler, Tatsachen und Probleme *zu* einer Psychologie der Denkvorgänge. *1. Ü*ber Gedanken. *Arch. f.d. ges. Psychol., 1907, 9, 297-365. Pp. 339-340.* See also Bühler's companion articles: *H.* Uber Gedankenzusammenhänge. *Arch. f.d. ges. Psychol., 1908, 12, 1-23; 111.* Uber Gedankenerinnerungen. *Arch. f.d. ges. Psychol., 1908, 12, 24-92.*

Unfortunately for Bühler, his retrospective technique of introspection, plus some incautious remarks on the necessity of sympathetic interaction between the subject and experimenter, brought swift retribution. That same year Wundt thundered

from on high. He defended his earlier position, criticized the Würzburger methods, questioned their data and rejected their conclusions. After some fifty pages of detailed analysis he concludes:

1. The inquiry experiments are not real experiments, but rather selfobservations with handicaps. Not a single one of the requirements set for psychological experiments is met by them, on the contrary they realize the opposite of each of these requirements.

2. They represent the most inadequate of the older forms of selfobservation; they occupy the attention of the observer with an unexpected, more or less difficult, intellectual problem and demand of him in addition that he observe the behavior of his own consciousness.

3. The method of inquiry must be rejected in both of the forms in which it has been used. As an inquiry prior to the experiment it subjects self-observation to the unfavorable influence of examination pressure; as an inquiry after the experiment it opens wide the door to the interfering influence of suggestion. In both forms the method vitiates self-observation most severely in that the subject who is to observe himself is at the same time subjected to observation by others.

4. The representatives of the method of inquiry ignore the well tried rule that in order to solve complex problems one must first master the simpler ones which the former presuppose. As a result they confuse attention with consciousness and fall victim to a popular error in believing that everything that occurs in consciousness may easily be pursued in self-observation. This last error alone would be sufficient to explain the lack of results obtained by the inquiry experiments.*

Perhaps the success of the Würzburger attack can be measured by the virulence of the reply. In any case, a more dispassionate examination of their results was soon mounted by Edward Bradford Titchener.

In 1909 Titchener gave a series of lectures, printed in book form as *Lectures on the Experimental Psychology of the ThoughtProcesses,* in which he summarizes and analyzes the work of the Würzburg school in detail and includes his own forceful objections to some of their conclusions. Primarily he disputes that there are

* W. Wundt, über Ausfrageexperimente und über die Methoden zur Psychologie des Denkens. *Psychol. Studien, 1907, 3, 301-360. P. 358.*

such things as imageless thoughts. The quarrel is a curious one. It rests on two distinct yet related problems. The first problem is to be found in the nature of introspection itself, and the second in the nature of theories of mind or thinking that would be acceptable to the two schools.

if one carefully observes his own thought processes, does he find imageless thinking or not'.' At first glance, this seems to be a factual question. And yet we have already noticed how the Wilrzburg subjects, as they became practiced in their techniques and familiar with the theoretical notions abroad in their laboratory, gradually began to use the term "imageless thought'' to describe their mental processes, whereas originally the term was invented in order to define an unexpressable experience. The Bsl became more and more common and

eventually came to pepper the protocols. That is not to say that there was no such experience (the term was invented to fill a gap in the common language), but rather to point out the vulnerability of introspection to the theoretical language in vogue. It is quite possible that Marbe and Ach experienced the Bsl and that Titchener did not. Perhaps it should not be said that Titchener did not believe in imageless thought because he could not observe any such process in himself, but rather that he could not observe any such process because he did not believe there was such a thing.

What is probably more important, however, is the disagreement as to the kinds of statements that are to be acceptable, not only in the theoretical language of psychology, but in its protocol language as well.

For Titchener, as for the Würzburgers, the essence of the psychological experiment was controlled introspection. But he carried this principle to its ultimate conclusion and, as frequently happens to principles stretched to the breaking point, it led him into absurdities. If our experimental technique is introspection and if this is all the material we have to work with, then psychology must remain the analysis of the conscious mind. Other, unconscious processes may be taking place within the organism, but strictly speaking they are not psychological; they fall rather within the realm of physiology. What does this imply for the protocol language, the language the subjects use? First of all, Titchener, rather than implicitly suggesting, *directed* his subjects as to the

language they must use. They were explicitly trained to reduce their experience to the most basic terms possible, and these terms were prescribed: sensations and affections. The goal was " to describe the contents of consciousness not as they mean but as they are." Thus meanings, that is, objects, relations, recognitions, and so forth, are not to be admitted to the protocol language (this would he committing the "stimulus error"), but are to be built up by the experimenter-theoretician out of the raw sensations as given to him by the subject. The difficulties inherent in carrying out this edict are enormous. To learn to describe our familiar three-dimensional meaningful world in terms of patches of colors and vague kinesthetic images is not only difficult to the point of impossibility, but it also introduces some degree of distortion of the basic data. The Würzburgers before Titchener and the Gestaltists after him were at great pains to show that such sensations are not the raw data of psychology, but theoretical abstractions of a high order.

Indeed, when the sensationalist position is carried to its extreme, it seems literally impossible to commit the "stimulus error." As Humphrey states in his careful analysis of Titchener's position:

[The] sensationist position endeavours in effect to analyze all experience (save affect) into pure sense datum. But such sense datum can, of itself, give no indication concerning its occasion (stimulus, as Titchener uses the word). To take a single example: Nobody experiencing simply -blue visual image ... vague kinaesthetic image," etc., would be in the position to commit the stimulus-error of maintaining that he thought about a woman coming in secretly. [This refers to a previously given protocol.] How does he know to what these "pure" images refer unless there is something present in consciousness to tell him, and something which is of necessity of a non-sensory nature, since a complete inventory of sensory process has already been made? The *reductio ad absurdum* of the sensationist position is surely given in the following quotation from Titchener: *"I* was not at all astonished to observe that the recognition of a gray might consist of a quiver in the stomach." ,What is there *in this particular "quiver"* to indicate that

it is a recognition "quiver," or even to allow the stimulus error to be made from it? The sensationist hypothesis is in the position of precluding the error with which it taxes its opponent.*

* G. Humphrey, *Thinking.* London: Methuen, 1951, pp. 126-127.

it might be added that the difficulty cannot be removed by allowing meaning to be handled by the psychologist by deducing, it from the protocol, since it is impossible to discover such meaning without the subject lapsing into the stimulus error.

In the following selections Titchener presents his views on imagery and discusses some of the then current notions about thinking.

Edward Bradford Titchener

Imagery and Sensationalism

My visual imagery voluntarily aroused as for Galton's breakfasttable test, is extremely vivid, though it seems bodiless and papery when compared with direct perception. I have never, so far as 1 am aware, experienced a visual hallucination; I have no numberform; I know nothing of coloured hearing. On the other hand, my mind, in its ordinary operations, is a fairly complete picture gallery-not of finished paintings, but of impressionist notes. Whenever 1 read or hear that somebody has done something modestly, or gravely, or proudly, or humbly, or courteously, 1 see a visual hint of the modesty or gravity or pride or humility or courtesy. The stately heroine gives me a flash of a tall figure, the only clear part of which is a hand holding up a steely grey skirt; the humble suitor gives me a flash of a bent figure, the only clear part of which is the bowed back, though at times there are bands held deprecatingly before the absent face. A great many of these sketches are irrelevant and accessory; but they

E. B. Titchener, *Lectures on the experimental psychology of the thought-processes.* New York: Macmillan, 1909. Pp. *13-27, 30-34, 170-183 reprinted by permission.*

often are, and they always may be, the vehicles of a logical meaning. The stately form that steps through the French window to the lawn may be clothed in all the colours of the rainbow; but its stateliness is the hand on the grey skirt. 1 shall not multiply instances. All this description must be either self-evident or as unreal as a fairy-tale.

It leads us, however, to a very important question-the old question of the possibility of abstract or general ideas. You will recall the main heads of the

controversy. Locke had maintained that it is possible to form the general idea, say, of a triangle which is "neither oblique nor rectangle, neither equilateral, equicrural, nor scalenon; but all and none of these at once." Berkeley replied that if any man has the faculty of framing in his mind such an idea of a triangle, as is here described, it is in vain to pretend to dispute him out of it, nor would 1 go about it. . . . For myself, I find indeed I have a faculty of imagining, or representing to myself, the ideas of those particular things 1 have perceived, and of variously compounding and dividing them, . . . [but] 1 cannot by any effort of thought conceive the abstract idea described above.... The idea of man that 1 frame to myself must be either of a white, or a black, or a tawny, a straight, or a crooked, a tall, or a low, or a middle-sized man." The dispute has lasted down to our own day. Hamilton calls the Lockean doctrine a "revolting absurdity." Huxley finds it entirely acceptable. 'An anatomist who occupies himself intently with the examination of several specimens of some new kind of animal, in course of time acquires so vivid a conception of its form and structure, that the idea may take visible shape and become a sort of waking dream. But the figure which thus presents itself is generic, not specific. It is no copy of any one specimen, but, more or less, a mean of the series"-a composite photograph of the whole group.

All through this discussion there runs, unfortunately, the confusion of logic and psychology that is characteristic of the English school. it is no more correct to speak, in psychology, of an abstract idea, or a general idea, than it would be to speak of an abstract sensation or a general sensation. What is abstract and general is not the idea, the process in consciousness, but the logical meaning of which that process is the vehicle. All that we can say of the

idea is that it comprises such and such qualities; shows these and these temporal and spatial characters; has a certain degree of vividness as focal or marginal, clear or obscure; has the vague haziness of distant sounds and faint lights or the clean-cut definiteness of objects to which the sense-organ is accommodated; is arranged on a particular pattern. Locke and Huxley, now, believed that abstract meaning is represented in consciousness by abstract or composite imagery; Berkeley and the other Nominalists believed that imagery is always individual and concrete, and that abstract meaning is accordingly represented by the abstract terim the general name. But here is no alternative for psychology. Imagery might be strictly reproductive in form, and yet-for a certain type of mental constitution-be the psychological equivalent of an abstract meaning; and, again, imagery might be vague and indefinite, and yet be the psychological equivalent of an individual, particular meaning. The issue, in its psychological formulation, is an issue of fact. Is wordless imagery, under any circumstances, the mental representative of meaning? And if it is, do we find a correlation of vague imagery with abstract and of definite imagery with particular meaning?

The first of these questions I have already answered, for my own case, in the affirmative. In large measure I think, that is, 1 mean and I understand, in visual pictures. The second question 1 cannot answer in the affirmative. I doubt whether particularity or abstractness of meaning has anything essentially to do with the degree of definiteness of my images. The mental vision of the incoming tide, which I described at the beginning of this Lecture, is no more definite when it recalls an afternoon's ramble than when it means the progress of science. We must, above all things, distinguish between attentional clearness and intrinsic clearness of definition-sharpness, precision, cognitive clearness. A process may be transversing the very centre of consciousness, and therefore from the point of view

of a psychology of attention may be maximally clear: yet it may be so weak, so brief, so instable, that its whole character is vague and indefinite. In my own experience, attentional clearness seems to be the one thing needful to qualify a process for meaning. Whether the picture as picture is sharply outlined and highly coloured is a matter of indifference.

Come back now to the authorities: to Locke's triangle and Huxley's composite animal. My own picture of the triangle, the image that means triangle to me, is usually a fairly defbite outline of the little triangular figure that stands for the word "triangle" in the geometries. But 1 can quite well get Locke's picture, the triangle that is no triangle and all triangles at one and the same time. It is a flashy thing, come and gone from moment to moment: it hints two or three red angles, with the red lines deepening into black, seen on a dark green ground. It is not there long enough for me to say whether the angles join to form the complete figure, or even whether all three of the necessary angles are given. Nevertheless, it means triangle; it is Locke's general idea of triangle; it is Hamilton's palpable absurdity made real. And the composite animal? Well, the composite animal strikes me as somewhat too even, too nicely balanced. No doubt, the idea in Huxleys mind was of that kind; he, as an anatomist, was interested to mark all the parts and proportions of the creatures before him. But my own ideas of animals are sketchier and more selective: horse is, to me, a double curve and a rampant posture with a touch of mane about it; cow is a longish rectangle with a certain facial expression, a sort of exaggerated pout. Again, however, these things mean horse and cow, are the psychological vehicles of those logical meanings.

And what holds of triangle and horse and cow holds of all the "unpicturable notions of intelligence. No one of them is unpicturable, if you do but have the imaginal mind. "It is impossible," remarks a recent writer, "to ideate a meaning; one can only know it." Impossible? But 1 have been ideating meanings all my life. And not only meanings, but meaning also. Meaning in general is represented in my consciousness by another of these impressionist pictures. I see meaning as the blue-grey tip of a kind of scoop, which has a bit of yellow above it (probably a part of the handle), and which is just digging into a dark mass of what appears to be plastic material. 1 was educated on classical lines; and it is conceivable that this picture is an echo of the oft-repeated admonition to "dig out the meaning" of some passage of Creek or Latin. 1 do not know; but I am sure of the image. And I am sure that others have similar images. 1 put the question not long since to

the members of my graduate seminary, and two of the twelve students present at once gave an affirmative answer. The one reported the mental unrolling of a white scroll: what he actually saw was a whitish lump or mass, flattened and flattening towards the right. The other reported a horizontal line, with two short verticals at a little distance from the two ends. The suggestion in these two cases is plain enough: meaning is something that you End by straightening things out, or it is something that is included or contained in things. There was, however, no such suggestion in the minds of my informants: for them, as for me, the mental representation of meaning is a simple datum, natural and ultimate.

1 have dwelt at some length upon this visualisation of meanings because the point in dispute is of great importance, historically and systematically, and because visual imagery offers, so to say, the most substantial materials for its discussion.

Let me repeat, however, that my mind, the mind which 1 am trying to describe to you, is by no means exclusively, is not even predominantly, of the visual type. 1 have, as I have said, a great deal of auditory imagery; 1 have also a great deal of kinaesthetic imagery. The former needs no further discussion, since it plays no active part in my thinking; but I must speak briefly of kinaesthesis.

As recently as 1904 1 was not sure whether or not 1 possessed free kinaesthetic images. I could not decide whether my kinaesthetic memories were imaginal, or whether they involved an actual reinstatement, in weaker form, of the original sensations. 1 had no criterion by which to distinguish the sensation from the image. However, as so often happens, 1 had hardly recorded my difficulty when the criterion was found: a ground of distinction so simple, that one wonders why there should have been any difficulty at all. It may be roughly phrased in the statement that actual movement always brings into play more muscles than are necessary, while ideal movement is confined to the precise group of muscles concerned. You will notice the difference at onceprovided that you have kinaesthetic images-if you compare an actual nod of the head with the mental nod that signifies assent to an argument, or the actual frown and wrinkling of the forehead with the mental frown that signifies perplexity. The sensed

nod and frown are coarse and rough in outline; the imaged nod and frown are cleanly and delicately traced. 1 do not say, of course, that this is the sole difference between the two modes of experience. On the contrary, now that it has become clear, 1 seem to find that the kinaesthetic image and the kiniesthetic sensation differ in all essential respects precisely as visual image differs from visual sensation. But 1 think it is a dependable difference, and one that offers a good starting point for further analysis.

We shall recur to this kinaesthetic imagery in a later Lecture. All that I have to remark now is that the various visual images, which I have referred to as possible vehicles of logical meaning, oftentimes share their task with kinaesthesis. Not only do 1 see gravity and modesty and pride and courtesy and stateliness, but I feel or act them in the minds muscles. This is, 1 suppose, a simple case of empathy, if we may coin that term as a rendering *of Einfiihlung;* there is nothing curious or idiosyncratic about it; but it is a fact that must be mentioned. And further: just as the visual image may mean of itself, without kinaesthetic accompaniment, so may the kinaesthetic image occur and mean of itself, without assistance from vision. 1 represent the meaning of affirmation, for instance, by the image of a little nick felt at the back of the neck-an experience which, in sensation,, is complicated by pressures and pulls from the scalp and throat. . . .

Sensationalism is succinctly defined, in Baldwin's *Dictionary,* as 1he theory that all knowledge originates in sensations; that all cognitions, even reflective ideas and so-called intuitions, can

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be traced back to elementary sensations.' It is thus, primarily, a theory of the origin of knowledge, not a theory *of* the genesis of thought. "Historically," the *Dictionary* continues, "it is generally combined with Associationalism." Turning to Associationism, in the same work, we find the following definition: "The theory which, starting with certain simple and ultimate constituents of consciousness, makes mental development consist solely or mainly in the combination of these elements according to certain laws of association. According to this theory, rigidly carried out, all genesis of new products is due to the combination of pre-existing

elements." Here is psychological formulation. But it would be a

great mistake, though it is a mistake not seldom made, to confuse the sensationalism of experimental psychology with the doctrine of associationism. Let us see wherein the two kinds of sensationalism differ.

In the first place, the associationists did not distinguish the theory, of knowledge from the theory of thought. "The British thinkers of the past''- I am quoting from a British thinker of the present-" were far from keeping their psychology unadulterated. ... They gave us, in general, psychology and philosophy inextricably intermingled." "Their work often shows a crossing of interests and of points of view. Questions of logic and theory of knowledge \vere mixed up with the more properly psychological inquiry." In fact, the associationists dealt, on principle, with logical meanings; not with sensations, but with sensations-of; not with ideas, but with ideas-of; it is only incidentally that they leave the plane of meaning for the plane *of* existence. The experimentalists, on the other hand, aim to describe the contents of consciousness not as they mean but as they are....

Locke's ideas, then, and James Mill's ideas, were meanings, thought-tokens, bits of knowledge; the sensations and ideas of modern psychology are *Erlebnisse,* data *of* immediate experience. And the change of standpoint brings with it a second principal difference between the older and the newer sensationalism. Meanings are stable, and may be discussed without reference to time; so that a psychology whose elements are meanings is an atomistic psychology; the elements join, like blocks of mosaic, to give static formations, or connect, like the links of a chain, to give discrete series. But experience is continuous and a function of time; so that a Psychology whose elements are sensations, in the modern sense of the term, is a process-psychology, innocent both of mosaic and Of concatenation. This is a point which Wundt, the father of experimental psychology, never tires of emphasizing. In a wellknown passage, in which he is appraising the value of the experimental method for his own psychological development, he says: 1 learned from it that the 'idea' must be regarded as a process, no less variable and transitory than a feeling or a volition; and I saw that, for that reason, the old doctrine of association is no longer tenable." And again, in protesting against the hypostatisa-

tion of ideas, he writes: 'The ideas themselves are not objects, as by confusion with their objects they are supposed to be, but they are occurrences, *Ereignisse,* that grow and decay and during their brief passage are in constant change." . . .

But we must return for a moment to associationism. I said that the psychology of meanings left us with mosaic arrangements or with discrete series. You may reply that this characterisation is unfair. James Mill speaks, for instance, of the coalescence of ideas: "where two or more ideas have been repeated together, and the association has become very strong, they sometimes spring up in such close combination as not to be distinguishable"; the idea of weight-to take a single illustration-involves the ideas of resistance and direction and the "feeling or feelings denominated Will," and resistance and direction are themselves compounded of simpler ideas. And John Mill writes, in the same spirit: "When impressions have been so often experienced in conjunction that each of them calls up readily and instantaneously the ideas of the whole group, those ideas sometimes melt and coalesce into one another, and appear not several ideas, but one, in the

same manner as, when the seven prismatic colours are presented to the eye m rapid succession, the sensation produced is that of white.... These therefore are cases of mental chemistry, in which it is proper to say that the simple ideas generate, rather than that they compose, the complex ones." That is from the *Logic*. There is a similar passage in the *Examination of Sir William Hamilton's Philosophy:* 1f anything similar to this [that is, to colour mixture] obtains in our consciousness generally (and that it obtains in many casesof consciousness there can be no doubt) it will follow that whenever the organic modifications of our nervous fibres succeed one another at an interval shorter than the duration of the sensations or other feelings corresponding to them, those sensations or feelings will, so to speak, overlap one another, and becoming simultaneous instead of successive, will blend into a.state of feeling, probably as unlike the elements out of which it is engendered as the colour of white is unlike the prismatic colours." It seems to me, however, that associationism has here fallen out of the frying-pan into the fire. The principle of association, whieh was to be in the world of mind what the principle of gravitation

is in the world of matter- "Here is a kind of attraction," said Hume, "which in the mental world will be found to have as extraordinary effects as in the natural, and to show itself in as many and as various forms,"-this principle has broken down, and composition has been supplemented by generation, mechanical mixture by chemical combination. 1 see no gain; 1 see rather an equal misunderstanding of chemistry and of psychology. It is, however, a misunderstanding which has been fruitful of bad consequences, and of which we are not yet wholly free. I believe, nevertheless, that experimental psychology has, in the main, transcended the doctrine of mental chemistry. Colour mixture-the illustration chosen by the two Mills and before them by Hartley is, as we all know, not a mixture of visual sensations, but the sensory resultant of the interplay of excitatory processes in the retina. That is a minor matter. But, in general, we have better means than a false chemical analogy for explaining what cannot be explained in terms of a straightforward associationism. We have learned, for instance, to make allowance for complication of conditions; we do not expect, if two sensations are put together, to obtain a simple concurrence of their two qualities; we expect that the synergy of the underlying physiological processes will, in some way, become manifest in consciousness. We may speak of general attributes of sensation, as Ebbinghaus does; or we may speak of *Gestaltqualität,* form of combination, funded character; or we may speak of the organisation of elements in the state of attention. Different systems deal with the facts in different ways, and one Psychologist entertains possibilities that another rejects; but at all events there is no need of a mental chemistry. We have learned, again, that physiological conditions may produce their effect not within but upon consciousness; that nervous sets and tendencies may direct the course of conscious processes without setting up new and special processes of their own. We have learned, also, that such formations as perception and action can be understood only in the light of their history and development; the life of mind is, throughout, subject to a law of growth and decay, of gradual expansion and gradual reduction; what is now, so to say, a mere tag or label upon a dominant formation may, a little while ago, have been itself a focal complex, and the forma-

tion to which it attaches may, a little while hence, sink to the parasitic level. We have all this knowledge, and much more, to supplement what we know of the

mechanics of reproduction, the modem substitute for the laws of association; and there is, surely, good hope that we may work out a psychology of thought without taking any such leap in the dark as John Mill took when he added generation to composition.

1 have mentioned two principal differences between the older and the newer sensationalism. The experimental psychologist deals with existences, and not with meanings; and his elements are processes, whose temporal course is of their very nature, and not substances, solid and resistant to the lapse of time. These differences illustrate, as they follow from, the more fundamental difference of general attitude. Current sensationalism is a result to which we are led by empirical analysis, and its sensations are simple processes abstracted from conscious experience, last terms in the psychological study of mind. The associationism of the English school is a preconceived theory, and its sensations are, accordingly, productive and generative elements, first terms in a logical construction of mind. Associationism, in other words, puts sensations together, as physical atoms or chemical molecules, while modem psychology finds sensations together in the given mental process....

The Psychology of Thought

What shall be adopted ... as the criterion of a mental element? 1 regard as a mental element any process that proves to be irreducible, unanalysable, throughout the whole course of individual experience. Consider, for instance, the processes of sensation and affection. They have certain salient characteristics in common; they suggest the biological analogy of two species of the same genus; I have felt justified in deriving them from a single hypothetical mental ancestor. Nevertheless, I can trace no passage

from the one to the other in the individual mind; they seem to be separate and distinct, so soon as nervous organisation is complete; and they must, therefore, I believe, be regarded by analytical psychology as separate elements. Consider, on the other hand, the attitudes and awarenesses of which we have said so much. If we can trace an attitude back, within the same mind, to an imaginal source; if it thus appears not as original endowment but as residuum, not as primule but as vestige, then I should protest against its ranking as a mental element. Even if there are certain minds in which the derivation is impossible, in which the attitude can neither be identified with sensation and image nor referred with certainty to precedent sensory and imaginal experience, I should still hesitate-so long as there are other minds in which the derivation is possible-to adopt the purely phenomenological standpoint, and to class it outright as elementary; I should prefer to term it a secondary element, or a derived element, and so to distinguish it from the elements proper, as defined a moment ago. Classification is, of course, always a matter of expediency, and 1 have no quarrel with those who difler from me on this particular point. But it seems to me inexpedient to give the rank of element to anything that is not a matter of original and general human endowment.

You see, then, the place that 1 allow to genetic consideration. The misunderstanding to which 1 have referred arises, I imagine, from a confusion of two points of view, which may be distinguished as the analytical and the integrative. The analytical psychologist, even when he is occupied with mind in its development, is always trying to analyse. He may, and he does, protest that it never occurs to him to consider sensation, for instance, the sensation of the adult.

human consciousness, as a genetic unit. Nevertheless, what he finds by his genetic consideration must, of necessity, be sensation over again, in some less differentiated form; his problem is analysis, and his results are conditioned by the problem. The integrative psychologist, eager to preserve that continuity of mind which the analyst purposely destroys, and working from below upwards instead of from above downwards, reaches results that, in strictness, are incomparable with the re-

sults of analysis: as incomparable, let us say as "seasonal dimorphism" and "unstriped muscle." Incomparables, of course, are not incompatibles; but the attempt to compare them, to bring them under a common rubric as facts of psychological observation" or what not, must inevitably lead to misunderstanding.

I have only to add the caution that we must not expect a genetic inquiry to reveal, in every case, a complete series of nicely graded transitional forms. If I may trust some observations of my own, the path that leads, for example, from full imagery to *Bewusstseinslage is* more likely to be broken than continuous consciousness seems to drop, at a single step, from a higher to a lower level; the progress is effected by substitutions and short cuts, rather than by a gradual course of transformation. This, however, is a matter of descriptive detail, and does not affect the principle which is laid down in the maxim.

I assume, thirdly, that consciousness may he guided and controlled by extra-conscious, physiological factors, by cortical sets and dispositions; and I agree with Ach that this extra-conscious determination may lead to novel conscious connections, which would not have been effected by the mere play of reproductive tendencies, though 1 do not agree with Messer that the disposition as such is represented in consciousness by a specific experience. In a paper which is intended to form the basis for a theory of thought, a paper entitled "On the Nature of Certain Brain States connected with the Psychical Processes," von Kries, in 1895, worked out a theory of *cerebrale Einstellung,* cerebral set or adjustment, with the main features of which 1 am in entire accord. He distinguishes two types of adjustment, the connective and the dispositional: the former illustrated, in simple terms, by the reading of a musical score in a particular key, the latter by our understanding of abstract words like "red," "triangle." It is needless to point out that a theory of this sort serves admirably to explain the experimental results of Watt and Ach; indeed, Ach's determining tendencies and subexcited reproductive tendencies are merely specialised types of von Kries' connective and dispositional adjustments. And the idea of determination is now so familiar to us that 1 need not further discuss it here, or devote further time to my third and last regulative maxim. 1 pass on to

the problems themselves; and I take up first of all the problem of meaning.

The Problem of Meaning

Some time ago we met with the objection that it is nonsense to call a psychical fact or occurrence the meaning of another psychical fact or occurrence; two ideas are and must remain two ideas, and cannot be an idea and its meaning. I said, in reply,

that in my belief two ideas do, under certain circumstances, make a meaning. What are the circumstances?

1 hold that, from the psychological or existential point of view, meaning-so far as it finds representation in consciousness at allis always context. An idea means another idea, is psychologically the meaning of that other idea, if it is that idea's context. And I understand by context simply the mental process or complex of mental processes which accrues to the original idea through the situation, in which the organism finds itself-primitively, the natural situation; later, either the natural or the mental. In another connection, 1 have argued that the earliest form of attention is a definitely determined reaction, sensory and motor both, upon some dominant stimulus; and that as mind developed, and image presently supervened upon sensation, this gross total response was differentiated into three typical attitudes, the receptive, the elaborative and the executive, which we may illustrate by sensible discrimination, reflective thought, and voluntary action. Now it seems to me that meaning, context, has extended and developed in the same way. Meaning is, originally, kinaesthesis;

'The term "situation- seems to me to bring out more clearly than any nearer equivalent of *Aufgabe* the part played in determination by the organism itself. Externally regarded, a situation is a collocation of stimuli; but it becomes a situation only if the organism is prepared for selective reaction

upon that collocation. An *Aufgabe*, on the other hand, a task or problem, may be set to any organism, prepared or unprepared. 1 have no wish to press the word: but I here mean by "situation" any form of *Aufgabe* that is normal to the particular organism.

the organism faces the situation by some bodily attitude, and the characteristic sensations which the attitude involves give meaning to the process that stands at the conscious focus, are psychologically the meaning of that process. Afterwards, when differentiation has taken place, context may be mainly a matter of sensations of the special senses, or of images, or of kinaesthetic and other organic sensations, as the situation demands. The particular form that meaning assumes is then a question to be answered by descriptive psychology.

Of all the possible forms, however-and 1 think they are legion two appear to be of especial importance: kinaesthesis and verbal images. We are animals, locomotor organisms; the motor attitude, the executive type of attention, is therefore of constant occurrence in our experience; and, as it is much older than the elaborative, so it is the more ingrained. There would be nothing surprising in the discovery that, for minds of a certain constitution, all non-verbal conscious meaning is carried by kinaesthetic sensation or kinaesthetic image. And words themselves, let us remember, were at first motor attitudes, gestures, kinaesthetic contexts: complicated, of course, by sound, and therefore, fitted to assist the other types of attention, the receptive and the elaborative; but still essentially akin to the gross attitudes of primitive attention. The fact that words are thus originally contextual, and the fact that they nevertheless as sound, and later as sight, possess and acquire a content-character, these facts render language preeminently available for thought; it is at once idea and context of idea, idea and meaning; and as the store of free images increases, and the elaborative attitude grows more and more natural, the context-use of words or word-aspects becomes habitual. The meaning of the printed page may now consist in the auditory-kinaesthetic accompaniment of internal speech; the word is the word's own meaning; or some verbal representation, visual or auditory kinaesthetic or visual-kinaesthetic or what not,

may give meaning to a non-verbal complex of sensations or images. There would, again, be nothing surprising-we should simply be in presence of a limiting case-in the discovery that, for minds of a certain constitution, all conscious meaning is carried either by total kinaesthetic attitude or by words.

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As a matter of fact, meaning is carried by all sorts of sensational and imaginal processes. Mental constitution is widely varied, and the meaning-response of a mind of a certain constitution varies widely under varying circumstances. A descriptive psychology, is primarily concerned with types and uniformities; but if we were to make serious work of a differential psychology of meaning, we should probably find that, in the multitudinous variety of situations and contexts, any mental process may possibly be the meaning of any other.

But I go farther. I doubt if meaning need necessarily be conscious at all-if it may not be "carried" in purely physiological terms. In rapid reading, the skimming of pages in quick succession; in the rendering of a musical composition in a particular key; in shifting from one language to another as you turn to your right or left hand neighbour at a dinner table: in these and similar cases 1 doubt if meaning necessarily has any kind of conscious representation. It very well may; but I doubt if it necessarily does. There must be an *Aufgabe,* truly, but then the *Aufgabe,* as we have seen, need not either come to consciousness. 1 was greatly astonished to observe, some years ago, that the recognition of shades of grey might be effected, so far as my introspection went, in this purely physiological way. I am keenly alive to the importance of organic sensations and, as I shall show in a moment, to that of reduced or schematic kinaesthetic attitudes. 1 was not at all astonished to observe that the recognition of a grey might consist in a quiver of the stomach. But there were instances in which the grey was "recognised" without words; without organic sensations, kinaesthetic or other; without the arousal of a mood; without anything of an appreciably conscious sort. I found not the faintest trace of an image-less apprehension, if that apprehension is supposed to be something conscious over and above the grey itself. 1 cannot further describe the experience: it was simply a "recognition" without consciousness.

Nevertheless, you may say, there must have been something there; you would have had a different experience had the grey not been recognised. So a word that you understand is experienced otherwise than a nonsense word or a word of some unknown foreign language. Certainly! But my contention is that the plus

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of consciousness, in these comparisons, lies on the side of the unrecognised, the unknown, and not on the side of the recognised and known. There was plenty of consciousness, in the experiments to which 1 am referring, when a grey was not recognised: the point is that there was sometimes none at all when there was recognition. But let me repeat that this statement is made tentatively, and subject to correction; I believe it to be true of myself, but it requires confirmation from others.

What, then, of the imageless thoughts, the awarenesses, the *Bewusstseinslagen* of meaning and the rest? 1 have, as you may suppose, been keeping my eyes open for their appearance; and we have several investigations now in progress that aim, more or less directly, at their examination. What I have personally found does not, so far, shake my faith in sensationalism. I have become keenly alive, for instance,

to the variety of organic attitude and its kinaesthetic representation. I am sure that when I sit down to the typewriter to think out a lecture, and again to work off the daily batch of professional correspondence, and again to write an intimate and characteristic letter to a near friend- I am sure that in these three cases I sit down differently. The different *Aufgaben* come to consciousness, in part, as different feels of the whole body; I am somehow a different organism, and a consciously different organism. Description in the rough is not difficult: there are different visceral pressures, different distributions of tonicity in the muscles of back and legs, differences in the sensed play of facial expression, differences in the movements of arms and hands in the intervals between striking the keys, rather obvious differences in respiration, and marked differences of local or general involuntary movement. It is clear that these differences, or many of them, could be recorded by the instruments which we employ for the method of expression, and could thus be made a matter of objective record. But 1 have, at any rate, no doubt of their subjective reality; and I believe that, under experimental conditions, description would he possible in detail. I find, moreover, that these attitudinal feels are touched off in all sorts of ways: by an author's choice and arrangement of words, by the intonation of a speaking voice, by the nature of my physical and social environment at large. They shade off gradually into those em-

pathic experiences which I mentioned in the first Lecture, the experiences in which 1 not only see gravity and modesty and pride and courtesy and stateliness in the minds eye, but also feel or act them in the mind's muscles. And I should add that they may be of all degrees of definiteness, from the relatively coarse and heavy outlines of the typewriting illustration, down to the merest flicker of imagery which lies, I suppose, on the border of an unconscious disposition.

I do not for a moment profess to have made an exhaustive exploration of my own mind, in the search for *Bewusstseinslagen.* But if there were any frequent form of experience, different in kind from the kinaesthetic backgrounds that I have just described, 1 think that 1 am sufficiently versed in introspection, and sufficiently objective in purpose, to have come upon its track. I have turned round, time and time again, upon consciousnesses like doubt, hesitation, belief, assent, trying to remember, having a thing on my tongue's tip, and I have not been able to discover the imageless processes. No doubt, the analysis has been rough and uncontrolled; but it has been attempted at the suggestion of the imageless psychologists, and with the reports of their introspections echoing in my mind. Bühler thought-elements' I frankly disbelieve in. The unanalysable and irreducible *Bewusstseinslagen* of other investigators may, I conceive, prove to be analysable when they are scrutinised directly and under favourable experimental conditions. If they still resist analysis, they may perhaps be considered as consciousnesses of the same general sort as my attitudinal feels, but as consciousnesses that are travelling toward the unconscious by another road. It is conceivable, in other words, that while, in my mind, the attitudes thin out, tail off, lose in bulk, so to say, as they become mechanised, in minds of a different type they retain their original area, their, extension, and simply become uniform and featureless, as a variegated visual surface becomes uniform under adaptation. If that hypothesis is worth consideration, then the first problem for experiment is, as I have earlier suggested, to trace this course of degeneration within the same mind. Whether the featureless fringes or backgrounds shall be classified as a secondary kind of mental element-in any event, as we have seen, a question of expediency-would then depend upon the suc-

cess or failure of the search for intermediaries that should link them to imagery.

What exactly did Titchener and his subjects find when they introspected on the same thought processes which the Würzburgers had investigated? What was the manner of the squabble going back and forth across an ocean, via the psychological journals? Interestingly enough, in spite of the quarrel about the allowable language in the protocol statements and about permissible conclusions to be drawn from these protocols, the actual descriptions elicited by subjects are highly similar and the practical conclusion drawn is almost identical: there is "a paucity of conscious contents in much of our thinking." The *theoretical* conclusion is of course entirely different, but the protocols themselves, drawn from Marbe, Messer, and Ach on the one hand, or from jacobson, Okabe, Clarke, and other students of Titchener on the other, could be interchanged with little noticeable difFerence. To take just one example from Jacobson's study in 1911 in which he visually presented words and sentences to subjects who were instructed to report everything that occurred in consciousness, Jacobson found that at least in some instances subjects reported that the sentences were meaningful to them while the visual and auditory sensations from reading the stimulus were the only conscious contents they had. He adds a footnote about his own experiences in this regard:

The writer finds that he can converse or think in words or in incipient verbal articulations, with the meaning present, while for considerable periods of time he can discern no vestige of sensations or images other than those from the words themselves. There are, in the background, sensations due to bodily position and to general set; but while it is introspectively clear that these play an important part in the whole experience, they do not seem to vary correspondingly with the verbal meanings, as the conversation proceeds or the thought goes on.*

* E. Jacobson, On meaning and understanding. Amer. J. Psychol., 1911, 22,553-577.P.572.

This statement is adduced as evidence for the purely sensory content of consciousness, yet it could equally well be used as a perfect illustration of imageless thought. In either case the paucity of consciousness involved in understanding a sentence is manifest.

Faced with this scarcity, Titchener seems on occasion to drop his context theory of meaning and relegate meaning to the unconscious or the physiological substratum. But once there,, meaning is out of Titchener's experimental psychology and the experimental study of thinking has reached a dead end. Indeed, the backwater in which Titchener soon found himself seems not so much due to a return to atomistic associationist principles per se, as to the restriction of psychological research to the realm of consciousness and the restrictions on the theoretical language.

At this point let us return to Würzburg; and meet the next problem to be faced there, that of *Aufgabe,* or more generally, of motive and purpose, a problem that places us squarely into the realm of the unconscious.