

## CHAPTER IV

### CRITIQUE OF THE WURZBURG WORK

(1) Wundt's polemic. These are bogus experiments. Everything that takes place in a laboratory is not necessarily a scientific experiment. Answer to Wundt: He is really indicting the introspective method, as he himself practised it. The criticism that "suggestion" was probably at work is perhaps justified.

(2) The Würzburg contention of imageless thought was corroborated by many, including Binet ("it should be called the method of Paris"), Wood-worth, Bovet, Selz, Willwoll.

(3) Many experiments have contradicted those of Würzburg, in particular those of Titchener's school at Cornell.

(4) The Cornell hypothesis was that the so-called imageless processes were faint kinaesthetic images. Hence the translation "conscious attitude". Conscious experience was made up of sensory material in the form of sensations (the product of the analysis of perceptions), and images, also of sensory nature, plus *Affekt*. So that the meaning of an image may be another image. In this way, by the road of kinaesthesia, Titchener, the apostle of "introspection", became a minor prophet of reaction psychology.

(5) Since the Würzburgers claimed that some mental content other than that admitted in section (4) (Bsl., *Gedanken*, both imageless) gave the meaning of an image, Titchener was forced to claim that they were not describing "contents of experience" at all, but independent objects, objects of thought, stimuli, i.e. they were committing the "stimulus error" of describing not experience but the stimulus giving rise to experience.

(6) In essence, the imageless-thought contention maintained that just as you perceive the external world directly, without the intervention of any "idea" or "presentation", so you may imagine or *think* the world directly, part of the process often being imagery. I.e. part of this process may involve sense-resembling processes of a particular modality, and this is the cart, not the horse. The primary "work" when one thinks a proposition such as "Russia is East of Britain" is imageless: but there may also be sense-like processes in the form of verbal or other imagery.

IT WAS PERHAPS to be expected that a method so revolutionary as that of the Würzburgers would meet with strong opposition, particularly since the experimental results were radically opposed to prevailing theory. Chief among the critics were Wundt, who since 1875 had held the chair of philosophy at Leipzig; and in the United States Titchener, of Cornell University. The criticisms of these two men will be considered in detail. 106

*Wundt's Criticism of the Würzburg Work*

It was in 1907 that Wundt published his polemic entitled "On the *Ausfrage* Experiments and on the Methods of the Psychology of Thinking". Apart from its importance as a criticism of the Würzburg work, the paper is a significant discussion of the experimental method in its relation to psychology. For that reason it is here considered in some detail. The paper is sixty pages long. It begins by formulating four rules which must be followed by any experimental investigation.

- (1) The observer must, as far as possible, be in the position to determine, of himself, the occurrence of the event to be observed.
- (2) The observer must be in a state of the utmost concentration of attention to observe the phenomena and to follow them in their course.
- (3) In order to safeguard the results, every observation must be capable of being repeated a number of times under similar circumstances.
- (4) The conditions under which the phenomenon occurs must be ascertained by variation of the accompanying circumstances, and, when they are ascertained, they must be regularly changed in the appropriately varied experiments. That is to say, in the different experiments they must be on the one hand completely isolated, on the other graded in their intensity or quality.

These four rules, he says, are ideal only. In practice they can be followed only imperfectly even by the physical sciences.<sup>1</sup> He gives examples of psychological experiments, some of which are complete, others incomplete, according to the criteria which he has laid down.

On the twenty-seventh page of the paper the critique proper begins. The Würzburg experiments, Wundt says, are "experiments without instruments".<sup>2</sup> This does not constitute an argument against them; but it does mean that the work must be judged by the four above-mentioned criteria alone. Taking each of these in turn he finds that they are none of them satisfied by the Würzburg work.

*The observer cannot himself observe the relevant event.* In these experiments the real observer is not the experimenter, but the subject, who has to observe what is happening in his mind. The subject, however, does not know the content of the question about to be put to him; the question is then, for him, an unexpected event, which constituted the most unfavourable condition for scientific observation.

<sup>1</sup> Loc. cit., p. 308.

<sup>2</sup> *Ibid.*, p. 329. His criticisms here, as well as elsewhere, are confined chiefly to Bühler's work, who seemed especially to have roused his anger.

Under such circumstances observation may be possible of simple psychic events, as in the association experiments, but hardly of such complicated ones as those investigated by Bühler. Here the psychic processes involved are so complex that the combined difficulty of solving and at the same time observing is insurmountable. In addition, the factor of surprise itself exercises a severely disturbing influence on the process of thinking. The usual introspective difficulty, namely that the process of observation modifies the event which is being observed, is, in the *Ausfrage* method, intensified at the outset by this element of surprise.

Further, *the observer cannot devote his attention to the events to be observed*. Every psychologist would agree, says Wundt, that we cannot at the same time both engage in an activity which requires our utmost attention, and attend to the mental events which are simultaneously occurring. This would require an impossible cleavage of the personality. To solve a difficult problem, and simultaneously to give an account of our mental processes to an observer with watch in hand, is then a psychological impossibility.

Thirdly, *the criterion of repeatability is not fulfilled*. There is, indeed, repetition in a general way, in that a similar method is used for a number of trials, with the same observer and the same class of questions. But this does not constitute real repetition where the experiment is repeated with similar content in order to rule out irrelevancies. Such repetition is precluded by the nature of the *Ausfrage* experiments. Thus one of the most important features of the experimental method is lost.

Lastly, *the criterion of variability of conditions* is not fulfilled. There is, and can be, no systematic variation of the questions put to the subject; for this would turn the experiments into memory and recognition experiments.<sup>3</sup>

The result is then unequivocal. The *Ausfrage* experiments are not experiments at all in the sense of a scientific methodology, but they are sham experiments, which have the appearance of being systematic only because they take place, as a rule, in a psychological laboratory, and because a *soi-disant* experimenter and subject participate in them. In reality they have no scientific value, because they fall short when judged by all the criteria which distinguish the self-observations of experimental psychology from those of ordinary life. They are even inferior to ordinary self-observation, where the observer at least waits until the favourable moment for the mental

<sup>3</sup> Loc. cit., p. 333-4.

event appears; while in these experiments the subject's attention is under the strain of solving difficult problems. Further, the "division of labour" of which the experimenters speak is no real division of labour. On the contrary, the presence of the observer puts the subject in the position of a student in an examination room. Experience has shown that the presence of another person in the experimental room acts as a strong distracting influence; thus once more the *Ausfrage* experiment is at a disadvantage as compared with the old method of self-observation.

Similar considerations apply to Ach's method, whereby questions are asked after the experiment is finished. "There is no doubt that the quick forgetting of many events that hasten only fleetingly over consciousness . . . reduces all reports upon that which is experienced in consciousness to fragments of reality, which in addition are falsified in many cases by illusions of memory." Thus questioning after the event cannot elicit the truth. The only result can be a suggestive effect on the subject's answers. The suggestion may easily impose the theoretical views of the experimenter upon the subject, so that he thinks he has observed what was never in his consciousness at all. Ach's experiments have, however, at least the merit that they deal with relatively simple mental events, and in addition provide the control of exact time-measurement.

Thus the *Ausfrage* experiments are in no sense correct self-observations, but "self-observations under conditions of difficulty, conditions which favour self-deception rather than self-observation" (p. 343). In addition to these methodological errors, they contain, one and all of them, what may be called a psychological error. They attempt to treat the problem of thinking as an isolated one, without consideration of its relation to the general facts of consciousness, of attention, of the progress of the psychic events in question, and so on. These psychological complications are of the highest importance, but they are entirely neglected. To this point we shall return later.

Apart from the general logical reflections of the subject and the experimenter, which have nothing to do with the psychological problem, the upshot of this mass of work is that "the observers observed nothing at all".<sup>4</sup> "The thought certainly stood as a whole clearly before consciousness. But this thought was bodiless. It lacked the substrate of sensations, feelings, presentations, or any other conceivable content of consciousness. These contents did indeed at

<sup>4</sup> Loc. cit., p. 344.

times swirl through consciousness, but so casually, and in most cases probably so out of relation with the thoughts themselves that they could with perfect right be treated as chance accompaniments. What is then, finally, the thought itself? It is . . . a content of consciousness *sui generis*, different from everything else which we include among experiences of consciousness (*Bewusstseinslebnissen*) and, in particular, different from its sensory component parts".<sup>5</sup> We find ourselves back to the "actus purus", the *pure act* of the scholastics, who came to this result not by means of *Ausfrage* experiments but as a theoretical deduction from the "creative mind"<sup>6</sup> of Aristotle. According to the scholastics this active, contentless spirit could bring about only that which was itself contentless. Thus psychology has reverted to a dualistic spiritualism which has been consistently rejected by experimental psychology. According to the Würzburg doctrine, thought is then definable only in terms of itself. How one thought differs from another, and how this thought, existing like a thing-in-itself, can ever clothe itself in presentations or words—such questions are left unanswered.

One chief reason, Wundt says, for this negative result of these writers has already been mentioned: they confuse consciousness and attention. They have concluded that because they observed no sensory elements in consciousness when they experienced a thought process, therefore thought is essentially non-sensory in character. Such a conclusion rests on the presupposition that everything in consciousness must be immediately given in self-observation. This in its turn presupposes that consciousness and attention are identical. This conclusion has been shown to be false by common observation and psychological experiment alike.<sup>7</sup>

As a matter of fact, he continues, the problem of thinking cannot be treated, in the manner of the *Ausfrage* experiments, as though it were divorced from the rest of psychology. Not only does it require all available psychological information, but also every available psychological method. Of the latter, one of the most important methods is to be found in the psychology of speech. By his own observations Wundt has made it clear that "a thought is not first formed while one speaks the sentence, but that it already stands as a whole in our consciousness before we begin to fit words to it. With this whole there is, nevertheless, present at the focus of consciousness none of the verbal or other representations which form during the

<sup>5</sup> Loc. cit., p. 345.

<sup>7</sup> The point is repeated by Wundt, *ibid.*, p. 352.

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development and the linguistic expression of the thought; but only at the moment when we develop the thoughts are their separate parts successively lifted to clear consciousness".<sup>8</sup> This, Wundt continues, is not the "actus purus" of the *Ausfrage* results; it is parallel to the feeling-effect (*Gefühlswirkung*), which may be observed when a total presentation is in consciousness with certain details missing, and which adequately covers the character of the thought, including the missing details. Such feeling effects may be seen when poetical and ethical thoughts come to our mind.<sup>9</sup> Such a feeling is able to carry a rhythm; we are able to identify a rhythmically repeated series of taps "because this beat-form creates a peculiar rhythmic feeling which is characteristically different from any other beat-form". The logical form of the thought is parallel to this beat-form.

For Wundt thought is, then, a logical total presentation which appears as a totality in consciousness. "As such it is constituted of the same nexus of single presentations as that into which discursive thought articulates it afterwards in successive apperception of the single elements. But it is, with all these parts, dimly apprehended<sup>10</sup>; and only because this is so can it be given at all as a simultaneous whole, which enters the forms of consciousness in discrete presentational elements by means of the total feeling peculiar to it. This also not seldom happens when the process of thought-articulation is inhibited. The real development, or, as we could better call it here, unfolding of the thought, is constituted in the successive grasping of the separate constituent elements of the total presentation standing in the background of consciousness."<sup>11</sup> This far we can go, says Wundt, and no farther.

In summary, Wundt divides his criticism into four headings. (1) The *Ausfrage* experiments are not real experiments, but self-observations with obstructions. They do not satisfy a single one of the criteria of a real experiment. (2) They represent the worst type of the old method of self-observation. "They employ the attention of the observer on an unexpected, more or less difficult, intellectual problem, and in addition require him to observe the behaviour of his own consciousness." (3) The *Ausfrage* method is to be rejected in both its forms. When employed to question the subject before the experiment, it exposes the subject to the unfavourable influence of cross-examination. When employed to question him after the experiment, it opens the door wide to suggestion. In both forms it

<sup>8</sup> The point is repeated by Wundt, *ibid.*, p. 349.    <sup>9</sup> *Loc. cit.*, p. 351.

<sup>10</sup> *dunkel bewusst.*    <sup>11</sup> *Ibid.*, p. 356; cf. Wundt, 1912, p. 248.

influences self-observation to an excessive degree in that it exposes the subject, who should observe himself, to the simultaneous observation of another person. (4) The method violates the rule that when related problems are to be solved, those should first be attacked which are simpler and are presupposed by the others. "As a result, the users of the method confuse attention with consciousness, and fall into the popular error of believing that every event in consciousness can without more ado be followed up in self-observation." This last error is enough to vitiate the whole method.

#### *Examination of Wundt's Criticism*

These criticisms of Wundt will be considered *seriatim*. Begin with the four rules for experiment laid down early in the paper! When Wundt denies that the observer—that is, the subject—is in the position to observe the relevant event, he is of course using an argument which has been directed against the whole introspective method. The problem whether the mind can be set to observe itself without disturbing the data of observation is an old one: it was old in Wundt's day. What Wundt has here said in effect to the Würzburgers is: "The stock objections to the introspective method apply to the kind of experiment you are making, but not to those which I have made." There is, of course, no *a priori* reason why this statement should not be true. But definite reasons must be given. These, of course, Wundt does give. The element of surprise enters into the experiments under consideration. The data are too complicated. It is impossible to take the first of these objections seriously. It is out of the question that a professor of a German university in the early nineteen hundreds, and one of the calibre of Külpe, should have been so surprised when an undergraduate asked him to solve a problem—which, after all, he was expecting—that his mental processes were seriously disturbed. That he should have been reduced to "examination-flurry"<sup>12</sup> is ludicrous. As a serious objection, the element of surprise may be dismissed. Nor need the charge of complexity *per se* be taken any more seriously. There is no *a priori* reason why complexity of data should in itself vitiate introspection. Once the introspective method has been admitted as methodologically sound, then it must be assumed to be applicable to all mental events, unless special reasons are shown to the contrary. That is to say, the important thing to demonstrate is why a particular mental

<sup>12</sup> *Examenspresse*, p. 358 and *passim*.

event is not amenable to the introspective method; such terms as "complexity" and "difficulty" confuse the issue. Wundt reproaches the Wurzburgers with not knowing the psychology of attention. It is perhaps no accident that in 1913, six years later,<sup>13</sup> Watson was to direct an attack on the whole introspective method, using the concept of attention as an example of the untrustworthy nature of introspective evidence in general. In his charge that the Wurzburg data were too complex, Wundt is then really voicing the stock objections to introspective psychology.

Wundt's second rule for scientific experiment requires that the observer shall be able to give his directed attention<sup>14</sup> to the event to be observed. Here again, his criticism, namely that in these experiments full attention is impossible for the problem at hand, cannot be sustained. As Buhler pointed out,<sup>15</sup> the Wurzburgers insisted throughout that their introspections were recollections obtained by examination of the perseverative memory of the event in question. It is true that Wundt replied that such a procedure inevitably gave a distorted picture of the original mental event.<sup>16</sup> But this is a different criticism. Conceivably some such distortion may have taken place, but Wundt presents no evidence that it was serious enough to invalidate the fundamental Wurzburg theses. At no time in their work did the Wurzburgers maintain that they were simultaneously attending to the problem and to the mental process of solving the problem.

Nor is the charge justified that the Wurzburg experiments are essentially unrepeatable. To begin with, as Wundt admits by implication, the term repetition, as applied to an event of nature, is clearly ideal and non-realizable in any concrete case, like the term equality and the term circle. No two concrete objects in nature were ever ideally equal in every respect. No two experiments on any event of nature were ever ideal repetitions, because nature never repeats herself. When, however, he comes to use the third rule in criticism of the Wurzburgers, he insists on the necessity of repetition "with similar observed content".<sup>17</sup> The word *similar* is disingenuous. Wundt realizes, of course, that identity of content cannot be demanded on successive occasions, and that anything short of it implies

<sup>13</sup> Watson, J.B., 1913

<sup>14</sup> *Gespannte Aufmerksamkeit*.

<sup>15</sup> Buhler, K., 1908 (*b*)

<sup>16</sup> Wundt, 1908; Muller (1911, p. 137 ff) criticizes Ach on the ground that the perseverative image is not necessarily reliable

<sup>17</sup> *bei gleichem beobachteten Inhalt*

abstraction of identical features in successive experiments. Every psychological, as well as every physical, experiment demands such abstraction when it is repeated. Now it is true that an experiment on thought cannot be twice used with the same problem on account of what is now known as the practice effect. But it is possible to abstract identical features from experiments on different thought problems, and with reference to these identical features there is repetition of the experiment. To maintain that the mental processes involved in solving different problems have nothing in common would be pure scepticism, and would deny any meaning to the general term thought or thinking. And once more, if there is something common to such different mental processes, then solution of different problems involves repetition with reference to the common factor in question. Actually, it was of course precisely such a factor common, for example, to different reaction experiments that Ach professed to find in his *Bewusstheit*, or awareness. Bühler's "Consciousness of a rule" is similarly an abstraction from the mental processes involved in solving many different problems. If the generalizations of Ach and Bühler are correct, then any reaction experiment which involves the appearance of a *Bewusstheit* is an adequate repetition of the original experiment, no matter what the nature of the reaction situation; and any experiment which involves consciousness of a rule adequately repeats the original problem situation no matter what the specific problem. If the generalizations leading to the concepts of *Bewusstheit* and of consciousness of rule are incorrect, they should be specifically disputed. To question them on the score of the impossibility of repeating the experiments is disingenuous.

The answer to the third criticism carries with it the answer to the fourth, which concerns variation of conditions. It has been shown that, from the methodological point of view, the Würzburg experiments did fulfil the experimental criterion of repetition with variation. All in all, it is therefore not possible to take very seriously Wundt's statement that these are "sham experiments which have the appearance of being systematic only because they take place in a psychological laboratory". In the preceding chapter of this book certain methodological defects in the experiments were, however, indicated. In particular it was pointed out that the conditions of Ach's experiments were not standardized, in that the questions were not published in full and no regular order of questions is hinted at. These defects did, we say, constitute a serious objection to the method, as did the fact mentioned later by Wundt that the use of

questions must have exercised a suggestive effect. We shall, then, ill the main reject Wundt's general criticisms of method, but will consider these two objections as established.

To proceed with the more specific part of Wundt's critique, to reproach the Würzburgers with "observing nothing", and with going back to the "actus purus" of the scholastics is, of course, to say merely, "I do not agree with you". He asks: "How can one such thought differ from another?" The answer is obviously just as one sensation or one feeling differs from another; that is, by the attributes peculiar to its category. The fact that a mental category is *sui generis* does not mean that mental events belonging to that category are indistinguishable; it means only that it rests for science to discover the attributes by which such distinction may be made. It is impossible to believe that Wundt overlooked this elementary fact; once more, one cannot believe he is entirely disingenuous either here, or when, in the same context, he accuses the Würzburgers of Locke's Fallacy of the *tabula rasa*.

It remains to consider the general objection that the Würzburg approach considered the problem of thought as though it were isolated, independent of other psychological problems, and specifically that the factor of attention was neglected. The criticism that conventional distinctions are overlooked has, of course, been brought against many scientific innovations. Actually, a characteristic feature of the Würzburg doctrine, namely the theory of the determining tendency and of the *Aufgabe*, involves the distinction in question. For it is of the essence of these that they represent directive factors which are not ordinarily observed, but which may be observed if attention is specifically directed towards them. These factors form an exact parallel to the tachistoscopic experiments to which Wundt appeals, and which show "how much attention and consciousness differ not merely in the manner of apprehension of what is given . . . , but also in the range of the regions which they control".<sup>18</sup> But apart from the doctrine of the determination of thought, which is apparently overlooked by Wundt, the same answer must be made as before. Wundt's criticism applies to the introspective method in general, not merely to the Würzburg results. It is generally easy to object to an introspective finding on the ground that it would have been different had attention been differently directed. This constitutes a major source of uncertainty in the introspective method; and it was the difficulty involving the psychology of attention, among

<sup>18</sup> Wundt, W., 1907, p. 352.

others, which, as already indicated, caused Watson five years later to reject the whole method as unscientific and unreliable.

Specifically, Wundt's criticism amounts to saying that images were present in experience to the Würzburgers during the so-called image-less processes, but that attention was not directed towards these images; just as the red light of a traffic signal may be present in the experience of a motorist who is "staring straight at it", but the motorist may not be aware of the signal until his attention is drawn to it by the traffic officer. To accuse Külpe, as Wundt actually did, of ignorance of what was at that time a conventional psychological distinction is ridiculous. And actually the reports of hundreds of Würzburg experiments show that Wundt's accusation simply is not true. The subjects were obviously on the alert to observe imagery, and imagery was reported in hundreds of cases. But there were also many cases where, although they were on the watch for imagery, they observed none. To assert that if the attention of these observers had been properly directed they would have observed images in these cases is sheer dogmatism. Wundt's criticism cannot be admitted.<sup>19</sup>

Finally, when he comes to his alternative proposal for a psychology of thinking, Wundt is really restating the Würzburg position in his own words. The pre-linguistic thought-whole, which is in consciousness, and which unfolds itself by means of speech; the feeling-effect which adequately covers the character of the thought, and which is able to carry a complicated rhythm—these are surely none other than Ach's *Bewusstheit*. To use the term "feeling-effect" is surely to play with words and to confuse the issue.

*In summary:* The only one of Wundt's criticisms which is justified, as specially directed against the Würzburgers, is that concerning suggestion. Much of this long polemic is given up to objections which really criticize the introspective technique in general, and which, in fact, have since been used against that technique. Little of it is characterized by that dispassionateness which we feel we have a right to expect from one who held, and whose name still holds, an eminent position in the world of science. This is one of the notable critiques in the history of psychology, both from the effect it had on contemporary prejudice and opinion, and for the indirect influence it has accordingly exerted on the direction of psychological thought up to the present day. Yet to one who rereads it a generation later it seems in many places shallow and pretentious, and to have employed the authority of a great name unworthily.

<sup>19</sup> The special case of kinaesthetic imagery will be considered later.

*Other Experimental Confirmations of the Würzburg Conclusions*

Wundt was an experimentalist. Though it was not supported by actual experiment his criticism of the Würzburg work was based on experimental presuppositions and supported by experimental findings. Nevertheless, Bühler was justified in reproaching Wundt with not having himself performed *Ausfrage* experiments. Other workers did, in fact, employ much the same methods as those of the Würzburgers. In spite of Wundt's diatribe, they actually did arrive at similar conclusions. This corroborative work is additionally impressive, in that it was apparently independently executed. It is fair to say that the discovery of imageless thought was independently reported from laboratories in three countries, from the Würzburgers in Germany, Binet in France, and Woodworth in America.

Binet (1903, 1903a, 1909, 1910), working with his two little girls, aged fourteen and thirteen, found evidence of thought without imagery. He observed cases where image did not correspond to thought, and where only part of thought was covered by the imagery. In aphasics and imbeciles, also, he found thought without verbal imagery, from which again he concluded the presence of imageless thought. Here, as Ogden points out (1911, p. 188), he apparently left out of account the possibility of kinaesthesia. So closely did Binet's result agree, both in method and in general conclusion, with the German work, that he claimed that the method should properly be called not the Würzburg method but the method of Paris. In the same way, Woodworth maintained from experimental evidence that "in many cases the imagery present in consciousness did not exhaust the content of consciousness. Sometimes the subject, though clearly aware of the movement he was about to make, denied that he had any visual, kinaesthetic, verbal or other imagery of it" (1906, p. 702). Woodworth's experiments were carried out upon voluntary movement and upon perceptual material of visual and auditory modality (1907). There are, he claimed, non-sensorial components in sense perception (1907). When I hear a horse galloping past, there is more in my consciousness than the sheer auditory sensations (1915). I can be conscious of the horse with my mind free of sensory material other than the auditory sensations in question. The results of the Würzburg investigators were, in general, confirmed also by Bovet, in Switzerland, in a paper published in 1908.

Later we find Pratt summarizing the experimental work for the five years 1922-6 as follows: ". . . there emerge three rather definite and generally accepted conclusions regarding the nature of thought".

The first of these he labels "*Rejection of Associationism*", the third "*The Steering Principles of Thought*". The second concerns us more directly in this context. It is headed "*Impalpable Character of the Contents of Thought*". Pratt's summary of the experimental evidence on this point is as follows: "Some of the ideas which accompany the act of thinking present sensory aspects. These ideas may or may not be relevant to the purpose of the act. But there are persistent contents of thought which reveal no sensory stuff whatever. A goodly proportion of thought is imageless" (1928 p. 551). Pratt instanced the work of Selz, who, as we shall see later, maintained the existence of "impalpable awarenesses of relations and directions". "T. Weiss," he says, "emphasizes the actualization of the second term in an impalpable knowledge-relation as the most important operation in controlled associations" (Pratt, 1928, p. 552). It will be noted that each of these authors maintains that the general principle of imageless thought-contents is upheld by his own experimental results. Rosgen's observers noted the general presence of impalpable knowledge which functions as an anticipatory framework (Rosgen, 1925). Dunn employed legal cases and geometrical problems, and concluded that the fundamental processes employed in reasoning are free of sensory content (Dunn, 1926). Other observers mentioned by Pratt as reporting imageless contents in thinking are Weinhandl, Simonheit, Willwoll, and Clarke.<sup>20</sup>

Gibson and McGarvey (1937), in their survey ten years later, again noted that nobody then questioned the directive nature of the thinking processes; although, since the time of the Würzburgers, there has been a certain development of opinion as to the nature of this direction. This development will be considered later in the appropriate context. In the matter of imageless thought, two studies only are noted, both confirmatory of the Würzburg conclusions. Bowers (1935) used an ingenious method of determining the role of imagery in thought. He argued that if thought is primarily the manipulation of images, then those problems which are more easily imaged will be more easily solved; and those persons who have the power to form stable, vivid imagery would have an advantage in solving problems. The weight of his experimental evidence was uniformly against the sensory theory.<sup>21</sup> It should be noted that this experiment does not show that imagery has no function in thinking;

<sup>20</sup> See Pratt's bibliography for the references.

<sup>21</sup> He did find that imagery was apparently of use in verbal recall. See note 12, in Chapter 10. See also the chapter on "Generalization".

it shows only that reasoning is not synonymous with the formation of images. In any case, the experiment is not wholly decisive. The advocate of the sensory theory will still maintain that ability in reasoning depends not on ability to form images but on ability to use them; the advocate of the non-sensory theory, that if the ultimate *medium* of reasoning is imagery, then the more exactly the problem concerned can be represented in terms of images, the better the problem must be understood and the better will be the reasoning about it. The other study mentioned by Gibson and McGarvey in their resume, viz. that of Peillaube, was of a more conventional nature, and came by methods similar to those of the Wurzburgers to similar conclusions.

*Experimental Findings Contrary to Wurzburg*

In contrast to this confirmatory work, there were important dissentients. First of all, Titchener adopted a thoroughgoing sensationalistic position. Theoretically, for Titchener conscious mental processes are reducible to either sensations, images, or feelings (affections). "If we can trace an attitude [Bsl.] 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." By this theory, then, the constituent elements of mental life are processes of an ultimately sensory nature and their affections. Consider now the visual image of the printed letters CAT. What is the difference between the mental processes of the Englishman when he forms this visual picture, and those of a Japanese who cannot read English but can presumably form exactly the same visual image? Many answers have been given. Ach's is that the one has a *Bewusstheit*, an awareness of meaning, which the other lacks. This Titchener cannot accept. Clearly he must find another image. "An idea means another idea . . . if it is that idea's context! Meaning is originally kinaesthesia; the organism faces the situation by some bodily attitude, and the characteristic sensations which the attitude involves give meaning to the process." Later in the evolutionary scale, the kinaesthetic sensations are replaced by images. The upshot is that we must expect to find what the Würzburgers and others called imageless thoughts dissolving into imagery, much of the more obscure being of the kinaesthetic and verbal type; for words were at first kinaesthetic contexts. Thus we have an entirely "pure" psychology, one which confines

its description entirely to mental states. When, says Titchener, Bühler's observers describe their *Thoughts of something*, or the *Thought that something is the case*, e.g. "the thought that the end of altruism is not attained" (1907, p. 311); when, presumably, Ach speaks of an awareness as an imageless knowing that something is so; then the observers in question are not describing consciousness but "formulating the reference of consciousness to things", not describing thought but reporting after the event what the thought is about. They are committing the "stimulus error", as when the inexperienced student reports not the mental event but the external event (fact) that is the occasion of the mental event.<sup>22</sup> Psychology must confine itself strictly to facts of consciousness; it must not allow itself to digress into inference concerning the objective occasion of the primary psychological datum.

To test this hypothesis four experimental studies were undertaken in the Cornell laboratory, those of Pyle, on Expectation; of Okabe, on Belief; of Clarke, on "Conscious Attitudes", and of Jacobson on Meaning and Understanding. Pyle confronted his observers with series of stimuli, two or more in each. Thus a coloured disc might follow an auditory stimulus; a visual stimulus might be repeated; and the blow by which a pendulum was released might be followed by the sound of one or more balls falling, and so on. The observers reported on their experiences between the first stimulus and the following stimuli. "The psychophysical organism 'sets' to meet an imminent situation; and on the conscious side, this 'set' is expectation. On the physical side are: bodily attitude, strained muscles, inhibited breathing, fixed sense organs. The image of the coming impression may sometimes be present, but is not an essential factor, not a characteristic element" (Pyle, 1909, p. 569). Here, it will be noted, conscious expectation *is* kinaesthetic sensation. Okabe confronted his observers with sentences expressed visually or orally, or with pairs of such sentences. The observers were requested to note whether the single sentences aroused belief or disbelief, and after this practice to report introspectively upon the belief- and disbelief-consciousness. There were four observers. At the end of the experiment a summary of each observer's reports was read to him, and he was asked whether he concurred. These reports differed, of course,

<sup>22</sup> The same criticism was voiced by von Aster, who claimed that Bühler's observers practised *Kundgabe*, rather than *Beschreibung*, of conscious experiences, *intimation* (that their experiences related to certain objective facts) rather than *description* (of mental events).—Von Aster, 1908; cf. Dürr, 1908.

from observer to observer. The relevant section of the author's final summary is as follows: "The belief-disbelief consciousness may be a straightforward experience, given, e.g., in terms of a general kin-aesthetic attitude or of internal speech and localized kinaesthesia, or of the mutual relations of visual images; or it may be bound up with, incorporated in, a particular consciousness, verbal or visual. In the former case the contents come to the observer as being specifically belief; in the latter case they come to him as the vehicle of belief" (Okabe 1910, p. 594). Three of these four observers were asked after the main series of experiments whether they found any trace of imageless content; none was found. The exception was observer G, whose analysis made the question unnecessary.

Clarke investigated the *Bewusstseinslage* specifically, taking over Titchener's translation, "*Conscious Attitude*". The experiments required the observer to form a tactual perception of letters and words written in the blind point-alphabet. Reaction time of recognition was measured by a Vernier chronoscope. Sample analyses are appended.

*Awfulness*: Once analysed as a strong unpleasantness and frowning, and again as the same with the addition of inhibition of breathing. *Caution*: Verbal idea, be careful.

*Comparison* (Two observers): The two things were side by side, visually.

*I ought to know that*: Organic sensation and disagreeable feeling. *Injustice*:

Gasping for breath. I started back and threw my head back.

*Pride*: Slight tendency to straighten up my neck and smile. Pleasant feeling.

*Surprise*: At not feeling the better. Something moving along inside the body, a dull pressure going upward from the stomach to the back of the mouth.

"There is no doubt that the reports were intended at the time to represent the attitudes themselves, and not merely incidental or concomitant occurrences."<sup>23</sup> The introspections "show that imagery does not need to be specific and elaborate in order to carry thought . . . the mere setting of the mouth, or the right mode of exhalation, serves as well as the complete word". Stages in clearness of visual imagery are noted, and also the fact that the *Aufgabe* is shortened and modified by repetition and tends to disappear. Experiments were also performed on Understanding. Here again it was found that the understanding of words and sentences is mediated by

<sup>23</sup> Clarke, 1911, pp. 218, 219, 220, 221, 225.

images, verbal or object-visual. However, there are noted observations where the imagery is inadequate, contradictory, and even irrelevant. The summary contains the statement that "The cases in which thought-elements or imageless thoughts or attitudes are reported as the "consciousness that", etc., are cases not of psychological description, but the translation into words of the meaning of a conscious state" (*Kundgabe*)<sup>24</sup> "Imageless Thought" really stands at the end of a graded series of decreasingly clear images, and is thus generically sensory, according to Titchener's postulate (see above p. 50, for a similar description by Ach who argues that it thus passes out of the sensory category altogether).

Jacobson's paper (1911) reaches much the same conclusion. Letters, words, and sentences were shown visually to the subjects, who were instructed to give as precise and minute an account as possible of everything that occurred in consciousness. "The meaning of the stimulus words were . . . thus carried by visual, auditory and kinaesthetic processes; or to speak more precisely, the meanings which these processes bore were the meanings of the stimulus words, in so far as the latter were consciously realized."<sup>25</sup> The introspection of one subject will be quoted. In this case: "The visual and auditory images and sensations from reading [were] the sole processes present in consciousness, while yet the sentence had meaning."

*"The affair was bewildering. (One sec.) White and black sensations (from paper and background) in background of consciousness. Simultaneous with the visual clearing of each word, auditory images. The meaning of the sentence was in the auditory images and visual sentences themselves. No other context to carry the meaning that I can find."*<sup>26</sup> Thus the general conclusion of the Cornell experiments is unanimously in favour of Titchener's hypothesis.

#### *Assessment of the Contradictory Experiments*

We are then faced with two flatly contradictory sets of experimental findings. Certain experimenters, headed by the Würzburg group, Binet, and Woodworth, claimed to have found non-sensory components of thinking. Others, chief and representative of whom were the Cornell group, failed to find such components. The latter claimed that on careful experimental examination the so-called imageless experiences were analysable into sensory elements, prominent among which were kinaesthetic sensations; that further a very elementary sensory process could carry very elaborate

24 Loc. cit., p. 248.

25 Ibid., p. 564.

26 Ibid., p. 572.

meaning; and that the error of the opposing group had been in disregarding the lesser degrees of kinaesthesia, and in including in their psychological account the *thing* meant, which is of an essentially non-psychological nature. The question cannot be decided by majority vote, nor by repetition of the experiments, which would do no more than add another vote to one or the other side. The only way of settling the experimental question is to examine the experiments themselves. For this purpose, the two technically best groups will suffice.

Careful examination of the experiments of Wurzburg on the one hand and of Cornell on the other can lead to only one conclusion. The Cornell experiments failed to reach their avowed objective which was to "describe in analytical terms" certain kinds of experience. This failure was masked by an unjustified use of the metaphor "vehicle of meaning". In addition, the attempt to give a sensationalist account of the mental processes under examination forced the workers to the use of descriptive terms which are only explainable on the hypothesis that either the abjured stimulus error has been committed, or alternatively that, as a matter of fact, imageless processes were being described. Finally, it will appear that the stimulus error itself, with which the Würzburgers had been reproached, cannot be committed at all if the sensationalist hypothesis is true. If the Cornell theory is correct, the error with which the Cornell workers tax their opponents is impossible.

For substantiation of the first statement, it is only necessary to glance over any one of the four papers just discussed. Except where ordinary terms are used, it would generally be impossible to recognize from the "description" the kind of experience that is being "described". E.g.: "Visual image of adult and then of child; reference to my own experience. That was a line representing the time from the present to the past; there was nothing more that I can tell. . . . Memory of child was very plain but scattered and disarranged; a visual pattern made up of bits which were very clear, and which I could see very plainly; clear-cut and separate from one another. Memory of adult was like a spider's web, all united. All this fitted in, in some way, with the reference to past experience; . . . the two things fitted together; but I can't say whether at this stage there was any representation of past experience."<sup>27</sup> One thing that is certain about this is that it is not a "description", analytical or otherwise, of *belief*. It is quoted unchanged and in its entirety except that the words

<sup>27</sup> Okabe, 1910, p. 584.

"Belief in both cases" and "I believed" are omitted. And to speak of "visual imagery of adult and then of child" is illegitimate on the sensationalist hypothesis. What was present in consciousness was of course certain experiences, of, let us say, a quasi-visual character; to call these "visual image of an adult" is to describe not the sheer sensory experience but something else in addition. Either the stimulus error is being committed or non-sensory components of consciousness are being described. For since the total sensory material has been reported, the phrase "visual image of an adult" must either refer to the adult in question (stimulus error) or to a non-sensory component in the consciousness of the subject. The same thing is true of the following "description". "Visual representation of the two sentences at opposite ends of a line; this meant: They are contradictory." Once more either the disavowed "stimulus-error" is present, both in the statement concerning the sentences at opposite ends of a line and in the sentence: "this meant, they are contradictory"; or, again, the subject is describing an imageless process. And once more, without being told, it would be impossible to guess that this was a "description, in analytical terms, of the experience of belief . . . There was, of course, a good deal of *Kundgabe* [verbal statement of meaning]<sup>28</sup> in the records at large, and we were content to let it stand as such; only as regards the consciousness of Belief proper were we at pains to translate [it] into *Beschreibung*"<sup>29</sup> (=description of the conscious process). Actually it was necessary to specify that the images were of an adult and a child in order to describe them in recognizable terms. Description was impossible without either *Kundgabe* or description of imageless processes. To say that the image was made up of bits which were very clear is not to describe it. That is to say, again, an analytic description of *Belief* was not given in the terms proposed. The experiment failed to solve the problem set by the worker, and *ipso facto* it failed to fulfil its critical purpose. The same points may be illustrated by Shimberg's later experiments on the Role of Kinaesthesia in Meaning. Shimberg confronted her observers with Esperanto words, together with the request to "understand the meaning it [the word] assumes". One observer was shown the word *Lerteco*; The Response was *Lateral*. Report: "Conscious attitude (Bsl.) 'Think of Something'. Feeling of

<sup>28</sup> Literally *communication*, i.e. of the *nature* of the experience (as opposed to description of it) identified by Titchener with a statement of meaning, or the commission of the "stimulus error".

<sup>29</sup> Loc. cit., p. 567-8.

anxiety. Strain in eyes and throat. Awareness kinaesthetically of position of body. IS (Internal speech) *lateral*, simultaneously muscular relaxation and a feeling of pleasantness".<sup>30</sup> This is given as an analysis of the "conscious attitude". But once again, "Strain in eyes and throat", together with "awareness of the position of the body", is not an adequate description of the mental state, "Think of something". It would be possible to experience these sensations without having the experience corresponding to the words. The imagery is surely the accompaniment of another, unrecorded, mental event. And when "a catch of the breath and a contraction of the stomach . . . symbolized", for another subject, the feeling of assertion, it cannot be said that the feeling of assertion has been described. When further, a third subject reports on "*Boats*", the following, viz: *Boat, boats*,<sup>31</sup> *image of rowboat*,<sup>32</sup> is the subject not either committing the stimulus- or *Kundgabe-error*, or else describing some imageless process? Shimberg's paper was not intended to add material to the discussion on imageless thought. She does, however, imply that complete description of the mental processes was given in terms of the imagery recorded.

In Jacobson's paper there is recognition of the fact that description of imagery has its own difficulties, and the observer was instructed to parenthesize "meanings, objects, stimuli and physiological occurrences".<sup>33</sup> Omitting the parentheses, we have then for the meaning of a sentence the following description: "Then vague visual and kinaesthetic image, . . . i.e. blue visual image . . . and very vague, featureless image, flesh coloured. . . ." <sup>34</sup> These images with others are said to "bear", "carry", or "be the vehicle of" the meaning of the written sentence "She came in secretly". We are then to understand that apart from certain processes corresponding to the colour of the ink and paper and kinaesthetic-auditory images corresponding to the words, the result in consciousness of reading this sentence was the appearance of a vague visual and kinaesthetic image in a certain projection, together with kinaesthetic images relating to the upper right leg and the muscles of the right side, *and nothing more*. How then is the observer in a position to say as he does, "The sentence meant: Miss X came in over there, through the door secretly?" (ibid.). The only datum he has for making this statement is his own

30 1924, p. 176.

31 Visual and verbal imagery.

32 Visual and concrete imagery.

33 Loc. cit., p. 555.

34 Explanatory words between parentheses are omitted; e.g. for the second parenthesis, "upper left part of skirt".

(conscious) experience, which by his own account is limited to the very meagre imagery indicated. It will be remembered that Bühler met exactly this case with his imageless *Wasbestimmtheiten des Meinens*, qualitative determinations of consciousness corresponding to meaning. In order, Bühler would say, that the observer may be able to state the meaning of this written sentence, there must be some specific conscious experience corresponding to the meaning. For, once more, the observer's conscious experience is all he has to go upon.

Returning to the Wurzburg-Cornell controversy, it is now clear that the assertions of page 123 were justified, in that the sensationalistic hypothesis finds itself in the following triple dilemma: either it must commit "the stimulus error", the "error of *Kundgabe*", whereby the "thing meant" is described, a procedure which is illegitimate and outside the province of psychology. In this case, the Cornell group is committing the very fault for which it had called its opponents so elaborately to task. Or secondly, the sensationalist account must, while avoiding description of the thing meant, slip into the description some statement really concerning an imageless modification corresponding to the thing meant (== *Wasbestimmtheit des Meinens*), a procedure which does, indeed, rationalize the whole description, but which is *ex ipsa hypothesis* illegitimate. Or lastly, it must confine itself to a description of image and sensation which does not correspond to, is clearly not a description of, the conscious experiences allegedly being described, and from which meaning cannot be derived.<sup>35</sup>

Actually the rigorous acceptance of the sensationist doctrine would make the commission of the "stimulus error" not merely illegitimate but impossible. For the sensationist position endeavours in effect to analyse 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. 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

<sup>35</sup> If I understand him aright, I mean much the same thing as Dr. Boring, both in his invaluable *History* and in his article *Titchener on Meaning* (1938).

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 of the stomach."<sup>36</sup> 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.

Lastly, as to the metaphor "vehicle of meaning". It does at first seem to make the sensationistic hypothesis more adequate if one says: the meaning is not the images but it is carried, borne by sensations or images. When, however, the metaphor as thus used is examined, it may easily be seen to be invalid. The critical question is: What is the difference between an image that carries and one that does not carry a meaning, or, what is the effect on consciousness of the fact that an image A carries a meaning X? If there is no effect, how then can the observer know the meaning, as he clearly must be able to do under the hypothesis? (Differences in conscious experience are clearly necessary in spite of Titchener's half-hearted defence of unconscious factors; see note 36).<sup>37</sup> If there is an effect, this must, on the sensationistic hypothesis, result in some difference of a sensory nature. That is to say, the image which is a vehicle is a different one from the image which is not a vehicle. But since meaning has now been directly expressed in terms of image, there is now nothing left for the image to carry. The term "vehicle" has lost its significance. If, on the other hand, the term is to be used as it logically must be used with the implication that meaning is something extrinsic to image, then the meaning must be represented either by unconscious mental processes, which really do not help in a psychology dealing with "experience" (see note 36), or by imageless ones. A sensation-alist cannot logically use the metaphor at all. It will be remembered that Ach discusses the imageless awareness of meaning, which is however accompanied by an image. There seems here to be no objection to the use of the term vehicle. In fact, the metaphor "vehicle of thought" or "of meaning" really implies an imageless component of consciousness. Some have even gone so far as to maintain that every image has its imageless component.<sup>38</sup> We find, then, the Würzburg experiments giving an intelligible

<sup>36</sup> 1909, p. 179. See note at the end of the chapter.

<sup>37</sup> The argument applies equally to Titchener's more explicitly developed statement that meaning *is* sensory context. For this statement provides no criteria by which we may tell which images are meaningful and which not. What sort of context is a *meaningful* context?

<sup>38</sup> Ogden, 1913, p. 410; Koffka, 1912, p. 356.

account of certain events, an account which, while it uses descriptive terms inadmissible in the sensationalistic scheme, does at least describe. We find, on the other hand, the sensationalist experiments often completely failing in their descriptive object, because of the inability of the theory on which they were based to distinguish between the psychologically admissible<sup>39</sup> "conscious modification of meaning" and the inadmissible "thing meant". So that their descriptions in an often unsuccessful attempt to avoid the "stimulus error" regularly missed an essential descriptive element.<sup>40</sup> We find the Cornell group consequently forced to employ a metaphor which is only allowable if their opponents' contentions be granted. We find, further, that the fundamental Würzburg thesis was maintained, alike by the majority of the strictly experimental workers, including Binet in France and Woodworth in the United States, and by theorists of the rank of Herbert Spencer, James, Stumpf, Stout, and Calkins,<sup>41</sup> to choose a few names at random. "It thus appears that the introspection of a score of psychologists, of different periods, prepossessions and training, speaks unequivocally in favour of the occurrence of elements neither sensational nor affective."<sup>42</sup> These are psycho-

<sup>39</sup> I.e. admissible, on general grounds, as part of a psychological description in contrast to *Kundgabe*.

<sup>40</sup> If the point is not already overworked, the following descriptions of Miss Clarke's are worth examining:

*Consciousness that the letter was too small:* Muscular strain and organic sensations.  
*The I-consciousness:* Was a kinaesthetic sensation in the back of the mouth. *Conviction that I was right:* Reappearance of the verbal image of the letter to which I should have reacted.

Here it is clear that the descriptions do not describe. Also that what Titchener would call the "stimulus error" is used in the last description. But unless the words "of the letter to which I should have reacted" are inserted after "verbal image", even the image is not described. The only piece of recognizable description comes from the employment of the so-called "stimulus error", or, alternatively, from description of non-sensory processes (Clarke, 1909). Really, the two methods here confront each other. Würzburg description, "the consciousness that", etc. (equals Ach's *Bewusstheit*), really does describe a certain kind of experience. Cornell description (equals muscular strain, etc.) does not describe the experience. There seems to be no doubt at all that the method advocated by the Würzburg group proved itself in practice superior. The Cornell experiments really added evidence on the side of the Würzburgers. They were a concrete demonstration of the fact that certain experiences could not be described in sensory terms; specifically, that when the attempt is made to describe, in such terms, experiences called by the Würzburgers "the consciousness that", the attempt fails. This is, of course, exactly the Würzburg contention.

<sup>41</sup> Spencer, 1855, p. 285; James, 1890, p. 247; Stumpf, 1917, pp. 7ff., 29 ff.; Calkins, 1909.

<sup>42</sup> Calkins, 1909, p. 276.

legists. Of the great names in philosophy, it would be hard to find one, save that of Hume, who states unequivocally that thinking can be described without residue in terms of images. Kant explicitly avows his belief in imageless thought.<sup>43</sup> That the Würzburg description of the class of events termed in these pages "imageless thought-processes" is final, nobody is at present in the position to maintain. That the conscientious, able, and massive experimental attack of the Würzburgers resulted in a real step forwards in psychology is undeniable.

In conclusion, the following statement is tentatively offered. *We perceive objects directly, not through the intermediary of "presentations", "ideas", or "sensations". Similarly, we imagine objects directly, not through the intermediary of images, though images are present as an important part of the whole activity. In each of these two cases, we may assign an important part, though not all, of the activity to one or other of the sensory modalities. We may, however, think a proposition, or (draw) an inference (and an inference is of no use to even the starkest logician unless somebody does draw it!) in such a way that the activity in question falls within none of the sensory modalities; though in general such activity is accompanied by either perception or imagination. This would be a fair conclusion, stated in more modern terms, from the experiments of which those of the Würzburg school are typical.*

Whether of course the "Thought Elements" of Bühler should be considered as experimentally established is doubtful. For a generation, attention has been directed less and less to the general problem of mental elements. For example, R. M. Ogden wrote in the early days of Gestalt psychology: "By a bold declaration that there are no elemental conscious contents gathered together in 'bundles' through the agency of association, the investigation of mind has been turned to concrete common sense experience as the only truly empirical point of departure. . . . We do not find 'sensations', 'images' or 'affections', or even 'imageless thoughts', either singly or in combinations. We do, indeed, find sensory aspects of experience and others which we may call imaginal, affective and cognitive. . . ."<sup>44</sup> Many would not care to subscribe to the Gestalt doctrine in its entirety, but the quotation from Ogden may be taken as typical of the growing belief that the psychological description of the later nineteenth

<sup>43</sup> Aristotle maintains that images are *necessary* for thought, but for him the thinking process is psychologically not the same thing as the images. <sup>44</sup> Ogden, 1923.

century was cast in too rigid a mould. The "thought-element" of Bühler was a product of the pulverizing tendency and technique of the times. That it will survive, as a descriptive concept, at least in the form in which Bühler left it, seems to the writer to be doubtful. On the other hand, it seems probable that the psychology of the future will include among its descriptive concepts something very close to the *Bewusstheit*, the non-sensory "awareness". This much we may take as progressively and experimentally established, or perhaps confirmed, by the experimentalists of Würzburg.

Concerning the Würzburg doctrine of the mechanism of thought, little has been said in this critique. Little opposition was raised to it at the time. The *Aufgabe* and the *Determining Tendencies* have been more or less carelessly absorbed into psychological tradition. But here again it is improbable that the last word has been said. It has been intimated in the last chapter that these two concepts are subject to serious criticism. More will be said on this point later. Here also the Würzburg psychologists must be given their due. Before their time it had long been recognized that thought was controlled; but to them belongs the credit of giving this recognition experimental status. They have given us laboratory demonstration of the fact that thought is directive. The fundamental fact will stand, however much its description may be modified in the future.

Thus ends the discussion of the Würzburgers as such. Under both fundamental headings, that of the material and the mechanism of thought, they effected a significant and indeed a profound contribution and clarification. Their work is truly a milestone in the history of experimental psychology.

#### NOTE ON UNCONSCIOUS RECOGNITION, AND UNCONSCIOUS MEANING

(see note 36 of this Chapter)

There are two points that should be noted. First, Titchener maintains here that after repetition, apparently, recognition may be effected or meaning "carried" in a "purely physiological way"; that is, without consciousness. This seems today a misuse of words, especially for one who professed that psychology is the study of experience, considered as depending on the subject. It would imply, I think, that when I go home tonight and shut the door, I "recognize" the door as well as react to it. The man in the street would say that I don't have to "recognize" the door but simply open it, and he would be right. There is certainly no conscious recognition. Nor when I glance down as I type is there conscious recognition of the keys. To assert that there is *unconscious* recognition, or physiological recognition, seems completely formalistic. Surely there was either

conscious recognition, "unanalysed", or else recognition (together with many other conscious processes) had disappeared through repetition

Secondly, in this as in the further case which Titchener discusses where there is no conscious correlate at all of meaning, not even such a "quiver of the stomach", we should probably say nowadays that Titchener had acquired a discriminated conditioned reflex (He automatically wrote "yes", when confronted with a grey he had seen before ) The fact that a response is included in an experiment on recognition, does not mean that such response necessarily involves recognition When Titchener claims that "a word you understand is experienced otherwise than a nonsense word" because of a *plus* that "lies on the side of the unrecognized, the unknown", he is simply changing the coordinates of the problem, we now have to discuss the psychology of the *unrecognized* (p 179) Titchener himself did, in fact, seem uneasy about all this (p 180) One who has in early days fallen under his spell feels uneasy at thus criticizing him when he cannot reply!