

# The Postulates of a Structural Psychology[1]

E. B. Titchener (1898)

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Biology, defined in its widest sense as the science of life and of living things, falls into three parts, or may be approached from any one of three points of view. We may enquire into the structure of an organism, without regard to function, - by analysis determining its component parts, and by synthesis exhibiting the mode of its formation from the parts. Or we may enquire into the function of the various structures which our analysis has revealed, and into the manner of their interrelation as functional organs. Or, again, we may enquire into the changes of form [p. 450] and function that accompany the persistence of the organism in time, the phenomena of growth and of decay. Biology, the science of living things, comprises the three mutually interdependent sciences of morphology, physiology, and ontogeny.

This account is, however, incomplete. The life which forms the subject matter of science is not merely the life of an individual; it is species life, collective life, as well. Corresponding to morphology, we have taxonomy or systematic zoölogy, the science of classification. The whole world of living things is here the organism, and species and sub-species and races are its parts. Corresponding to physiology, we have that department of biology - it has been termed 'œcology' - which deals with questions of geographical distribution, of the function of species in the general economy of nature. Corresponding to ontogeny we have the science of phylogeny (in Cope's sense): the biology of evolution, with its problems of descent and of transmission.

We may accept this scheme as a 'working' classification of the biological sciences. It is indifferent, for my present purpose, whether or not the classification is exhaustive, as it is indifferent whether the reader regards psychology as a subdivision of biology or as a separate province of knowledge. The point which I wish now to make is this: that, employing the same principle of division, we can represent modern psychology as the exact counterpart of modern biology. There are three ways of approaching the one, as there are the three ways of approaching the other; and the subject matter in every case may be individual or general. A little consideration will make this clear.[2]

1. We find a parallel to morphology in a very large portion of 'experimental' psychology. The primary aim of the experimental psychologist has been to analyze the structure of mind; to ravel out the elemental processes from the tangle of consciousness, or (if we may change the

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metaphor) to isolate the constituents in the given conscious formation. His task is a vivisection, but a vivisection which shall yield structural, not functional results. He tries to discover, first of all, what is there and in what quantity, not what it is there for. Indeed, this work [p. 451] of analysis bulks so largely in the literature of experimental psychology that a recent writer has questioned the right of the science to its adjective, declaring that an experiment is something more than a measurement made by the help of delicate instruments.[3] And there can be no doubt that much of the criticism passed upon the new psychology depends on the critic's failure to recognize its morphological character. We are often told that our treatment of feeling and emotion, of reasoning, of the self is inadequate; that the experimental method is valuable for the investigation of sensation and idea, but can carry us no farther. The answer is that the results gained by dissection of the 'higher' processes will always be disappointing to those who have not themselves adopted the dissector's standpoint. Protoplasm consists, we are told, of carbon, oxygen, nitrogen, and hydrogen; but this statement would prove exceedingly disappointing to one who had thought to be informed of the phenomena of contractility and metabolism, respiration and reproduction. Taken in its appropriate context, the jejune-ness of certain chapters in mental anatomy, implying, as it does, the fewness of the mental elements, is a fact of extreme importance.

2. There is, however, a functional psychology, over and above this psychology of structure. We may regard mind, on the one hand, as a complex of processes, shaped and moulded under the conditions of the physical organism. We may regard it, on the other hand, as the collective name for a system of functions of the psychophysical organism. The two points of view are not seldom confused. The phrase 'association of ideas,' e.g., may denote either the structural complex, the associated sensation group, or the functional process of recognition and recall, the associating of formation to formation. In the former sense it is morphological material, in the latter it belongs to what I must name (the phrase will not be misunderstood) a physiological psychology.[4]

[p. 452] Just as experimental psychology is to a large extent concerned with problems of structure, so is 'descriptive' psychology, ancient and modern, chiefly occupied with problems of function. Memory, recognition, imagination, conception, judgment, attention, apperception, volition, and a host of verbal nouns, wider or narrower in denotation, connote, in the discussions of descriptive psychology, functions of the total organism. That their underlying processes are psychical in character is, so to speak, an accident; for all practical purposes they stand upon the same level as digestion and locomotion, secretion and excretion. The organism remembers, wills, judges, recognizes, etc., and is assisted in its life-struggle by remembering and willing. Such functions are, however, rightly included in mental science, inasmuch as they constitute, in sum, the actual, working mind of the individual man. They are not functions of the body, but functions of the organism, and they may - nay, they must - be examined by the methods and under the regulative principles of a mental 'physiology.' The adoption of these methods does not at all prejudice the ultimate and extra-psychological problem of the function of mentality at large in the universe of things. Whether consciousness really has a survival-value, as James supposes, or whether it is a mere epiphenomenon, as Ribot teaches, is here an entirely irrelevant question.

It cannot be said that this functional psychology, despite what we may call its greater obviousness to investigation, has been worked out either with as much patient enthusiasm or with as much scientific accuracy as has the psychology of mind structure. It is true, and it is a truth which the experimentalist [p. 453] should be quick to recognize and emphasize, that there is very much of value in 'descriptive' psychology. But it is also true that the methods of descriptive psychology cannot, in the nature of the case, lead to results of scientific finality. The same criticism holds, as things stand, of individual psychology, which is doing excellent pioneer work in the sphere of function. Experimental psychology has added much to our knowledge, functional as well as structural, of memory, attention, imagination, etc., and will, in the future, absorb and quantify the results of these other, new coördinate branches. Still, I do not think that anyone who has followed the course of the experimental method, in its application to the higher processes and states of mind, can doubt that the main interest throughout has lain in morphological analysis, rather than in ascertainment of function. Nor are the reasons far to seek. We must remember that experimental psychology arose by way of reaction against the

faculty psychology of the last century. This was a metaphysical, not a scientific, psychology. There is, in reality, a great difference between, say, memory regarded as a function of the psychophysical organism, and memory regarded as a faculty of the substantial mind. At the same time, these two memories are nearer together than are the faculty memory and the memories or memory complexes of psychological anatomy. There is, further, the danger that, if function is studied before structure has been fully elucidated, the student may fall into that acceptance of teleological explanation which is fatal to scientific advance: witness, if witness be necessary, the recrudescence of vitalism in physiology.[5] Psychology might thus put herself for the second time, and no less surely though by different means, under the domain of philosophy. In a word, the historical conditions of psychology rendered it inevitable that, when the time came for the transformation from philosophy to science, problems should be formulated, explicitly or implicitly, as static rather than dynamic, structural rather than functional. We may notice also the fact that elementary morphology is intrinsically an easier study than elementary physiology, and that scientific men are so far subject to the law of [p. 454] inertia, whose effects we see in the conservatism of mankind at large, that they prefer the continued application of a fruitful method to the adoption of a new standpoint for the standpoint's sake.

I may, perhaps, digress here for a moment, to raise and attempt to answer two questions which naturally suggest themselves: the questions whether this conservation is wise, and whether it is likely to persist. I believe that both should be answered in the affirmative. As has been indicated above, the morphological study of mind serves, as no other method of study can, to enforce and sustain the thesis that psychology is a science, and not a province of metaphysics; and recent writing shows clearly enough that this truth has need of constant reiteration. Moreover, there is still so much to be done in the field of analysis (not simply analysis of the higher processes, though these will of course benefit in the long run, but also analysis of perception and feeling and idea) that a general swing of the laboratories towards functional work would be most regrettable. It seems probable, if one may presume to read the signs of the times, that experimental psychology has before it a long period of analytical research, whose results, direct and indirect, shall ultimately serve as basis for the psychology of function; unless, indeed, - and this is beyond predicting, - the demands laid upon psychology by the educationalist become so insistent as partially to divert the natural channels of investigation.[6]

The remaining four psychologies may be dismissed with a briefer mention. 3. Ontogenetic psychology, the psychology of individual childhood and adolescence, is now a subject of wide interest, and has a large literature of its own. 4. Taxonomic psychology is not yet, and in all likelihood will not be, for some time to come, anything more than an ingredient in 'descriptive,' and a portion of individual, psychology. It deals with such topics as the classification of emotions, instincts and impulses, temperaments, etc., the hierarchy of psychological 'selves,' the typical mind of social classes (artists, soldiers, literary men), and so forth.

[p. 455] 5. The functional psychology of the collective mind is, as might be expected, in a very rudimentary condition. We can delimit its sphere and indicate its problems; minor contributions to it may be found here and there in the pages of works upon psychology, logic, ethics, æsthetics, sociology, and anthropology; and a few salient points - the question, e.g., of the part played by the æsthetic sentiment in the make-up of a national mind - have been touched upon in essays. But we must have an experimental physiology of the individual mind, before there can be any great progress. 6. Lastly, the labors of the evolutionary school have set phylogenetic psychology upon a fairly secure foundation, and the number of workers is a guarantee of rapid advance in our understanding of mental development.

The object of the present paper is to set forth the state of current opinion upon the question of the structural elements of mind, their number and nature. It may be doubted, at first sight, whether anything like a consensus of opinion can be made out. "Every psychologist of standing," wrote Külpe in 1893, "has his own laws of association." [7] Every psychologist of standing in the year of grace 1898, so the reader may think, has his own favorite 'unique' process. Does not Brentano advocate an ultimate 'judgment,' and James a 'fiat of the will,' and Stout an ultimate 'thought'? Is there not the perennial controversy about the 'third conscious

element,' the process of conation, the 'activity experience'? Are not even the clear waters of the psychology of sensation troubled by the possibility of an 'efferent' conscious process, a sensation of innervation? The questions are importunate, and cannot be lightly brushed aside. We will begin, therefore, by examining a test case: Brentano's irreducible 'judgment.' I select this, because Professor Ebbinghaus, in his recent *Psychology*, seems to put a structural interpretation upon it. He himself classifies the elements of mind (we shall return to this classification later) as sensations, ideas, and feelings; Brentano, he says, ranks alongside of ideas the element of judgment.[8] If this [p. 456] account is correct, we must admit that the morphology of mind is still a battlefield for individual opinions; we shall hardly escape the difficulty by the mere statement that Ebbinghaus is an experimentalist, and Brentano not.

When, however, we turn to Brentano himself, the matter assumes a different complexion. Brentano's principal criterion of psychical, as contradistinguished from physical phenomena, is that of 'intentional inexistence' or 'immanent objectivity,' which we may paraphrase as reference to contents, direction upon something as object.[9] "Every psychical phenomenon contains in it something as object, though not every one in the same way. In ideation something is ideated, in judgment something admitted or rejected, in love and hate something loved and hated, in desire something desired, etc." [10] This is evidently the language of function, not of structure. Indeed, Brentano uses the phrases *psychisches Phänomen* and *Seelenthätigkeit* interchangeably; his 'fundamental' or 'principal classes of psychical phenomena' are the 'mental activities' of ideation (not 'idea!'), judgment and interest (love and hate, the emotive processes). [11] The spirit of his whole psychology is physiological; and when, on occasion, he discusses a point in anatomy, [12] he leaves his reader in no doubt as to the shift of *venue*. Now the mental elements of the experimentalists, the bare sensation and the bare feeling, are abstractions, innocent of any sort of objective reference. [13] We cannot fairly compare Brentano's 'judgment' with them. Nay, more, we cannot fairly say that he would have posited an ultimate judgment process *if* he had adopted the anatomical point of view; since he has not adopted it, the speculation is absurd. The 'psychology from the empirical standpoint' is a systematization of mental 'activities,' *i. e.*, of the mental functions of the human organism.

This wave, then, has not overwhelmed us. Escaping it, we [p. 457] may turn now to the positive side of our enquiry. Our appeal will lie, in the first instance, to the experimentalists; but the omission of references to works on descriptive psychology is largely due to considerations of space, and does not by any means necessarily imply that the authors of these works differ from the writers quoted. Some of the 'unique' processes still left outstanding will be taken up at the end of this discussion.

We set out from a point of universal agreement. Everyone admits that *sensations* are elementary mental processes. There is, it is true, diversity of opinion as to the range of contents that the term shall cover. Wundt identifies the peripherally excited and the centrally excited processes. "For the psychological attributes of a sensation the circumstance [of external or internal initiation] is entirely irrelevant. . . . It is only the central stimulus that always accompanies sensation." Külpe retains the name 'sensation' for both classes, but declares that they "must be treated separately, as they normally present characteristic differences." Ziehen and Ebbinghaus, on the other hand, draw a sharp line of distinction between the 'sensation,' which is externally aroused, and the 'idea' (in Lotze's sense), which is its centrally aroused substitute, and so recognize two elements where Wundt and Külpe see only one. [14] The divergence, however, is not serious. It seems to depend, primarily, upon the admission or exclusion of genetic considerations. If we rule that these are foreign to a strictly morphological examination of mind, the question of one sense element or two becomes a problem set by analysis to analysis, capable of resolution by analytic methods; it is a subject for dispute 'inside the ring,' and is thus upon a quite different level from the question, *e. g.*, of an elementary will process. - We may note, in passing, that the innervation sensation, [p. 458] while it remains as a theoretical possibility, [15] has been generally given up by the experimental school. [16]

Simple *affective* processes, again, are regarded by a large majority as elemental. Both Wundt and Külpe are at some pains to make clear the essential difference between sensation and affection. Lehmann and Ebbinghaus are equally explicit. Ziehen does not give a place to feeling

beside sensation and idea; his chapters are entitled 'The Affective Tone of Sensation' and 'The Affective Tone of Ideas,' and his treatment makes affective tone an attribute, coördinate with the intensity and quality of sensation and the clearness and contents (meaning) of idea. Nevertheless, he speaks in one passage of the cortical substrate of this tone as "an entirely new psychophysiological process." Münsterberg, on the other hand, denies the ultimateness of feeling altogether, and seeks to reduce it to the sensations accompanying movements of flexion and extension, reflexly released.[17] There is, further, an 'inside' controversy as to the number of affective qualities. But analysis will some day settle the question whether there are two of these (Külpe), or two in the sphere of sensation and many more in that of idea (Ziehen), or an inexhaustible variety under the six heads of pleasantness and unpleasantness, tension and relaxation, excitement and tranquilization (Wundt).[18]

It is natural, in view of the intrinsic difficulty of the subject, that the psychology of feeling should be in a less settled state than the psychology of sensation.[19] All the more striking, when [p. 459] we consider the close relation that obtains between 'feeling' and 'will,' is the unanimity with which experimentalists reject the doctrine of a specific will process. "There is no reason," writes Ebbinghaus, "for looking upon acts of will or appetitions as elementary forms of the mental life." And Wundt, Külpe, Ziehen, and Münsterberg are of the same manner of thinking.[20]

No fourth candidate for elemental rank has appeared. No trace has been found, in all the minute analysis of the last twenty years, of a mental krypton or argon. It seems safe, then, to conclude that the ultimate processes are two, and two only, sensations and affections, though we must not forget that the first class, that of sensations, includes the two well-defined sub-species, 'sensation' and 'idea.'

How, now, are these different processes to be distinguished? What is our justification for looking upon them as last things of mind? Disregarding function, and trying to answer the question upon the anatomical plane, we can point at least to three valid criteria. We may refer to experience itself, and note that sensation and affection are irreducible for introspection. The one cannot be derived from, identified with, the other; they 'look' different or 'feel' different, however far analysis be pushed. Or we may have recourse to physiology. Since the structure of mind is conditioned upon the physical organization, we may differentiate sensation and affection by reference to their physical substrates. Or, again, we may seek a descriptive formula, which shall sum up the essential characteristics of the two processes. It is in this sense that Wundt[21] is speaking, when he says that [p. 460] sensation qualities range between maxima of *difference*, and affective qualities between maxima of *opposition* or antithesis. Any one of these statements is adequate to the psychological requirements. The last of them, however, as Wundt's exposition shows, implies that we are already familiar with the *attributes* of which sensation and affection are constituted. We must devote a brief space to their consideration.

Once more, we set out from a point of universal agreement. "There are two indispensable determinants of every psychical element, quality and intensity." But discussion is not slow to begin. For these two attributes or determinants are, evidently, of different kinds. Quality is specific and individual; it is quality that makes the elemental process a blue or a sweet, a pleasant or a c of the third octave. Intensity, on the contrary, is a general attribute, common to all modalities of sensation and qualities of affection. Hence, while some psychologists rank the two determinations together, as coördinate, others set aside quality for itself, and count intensity along with extent and duration as equipollent characteristics, whether of all the mental elements or of certain great groups of qualities. There is also much difference of opinion as to the precise place to be ascribed to the attributes of extent and duration. For Wundt, who holds a genetic theory, psychological space is the resultant of a two-dimensional system of qualitative local signs multiplied into, or fused with, a one-dimensional intensive system of sensations aroused by movement. It is, primarily, tactual or visual. Psychological time, in the same way, is the resultant of qualitatively varied feelings multiplied into, or fused with, the same intensive system of sensations. The affective processes, in abstraction, are timeless; the primary sources of temporal ideas are audition and 'internal touch.' It follows that space and time, extent and duration, can be predicated only of formations, not of elements. Spatial arrangement (Wundt

makes no distinction between 'spatial arrangement' and 'space' as 'absolute contents') cannot "be an original attribute of the elements, analogous to the intensity or quality of sensations;" it "results from the bringing together of these elements." which means the "arising of new [p. 461] psychical conditions;" and the same thing is true of time. Opposed to this genetic theory is the nativistic view, represented for space, e.g., by Stumpf, according to which every sensation has about it something of tridimensionality, a certain bigness or voluminousness, and every elemental process a certain duration.[22]

It is, indeed, hardly possible to keep the psychological problem of space and time clear of epistemology, on the one hand, and of psychogenesis, on the other. It would, perhaps, be unwise to make any attempt to do so, in a work meant to serve the purpose of instruction; for the attempt would involve a total disregard of historical conditions. Nevertheless, there can be little doubt as to the anatomical facts. I am wholly unable to conceive of a sensation or affective process as timeless, as lacking duration; analysis of mind as it is leaves me, always, with a process-lasting-some-time. I am equally unable to conceive of a visual sensation or sensation of pressure as spaceless, punctual; analysis leaves me, always with a process-spread-out. On the other hand, I feel no constraint to regard the spreading-out as tridimensional. Neither does the surface itself necessarily imply the depth perception, nor need the relation of the surface to the ideating subject be present in consciousness. And the other sensations, tones, tastes, etc., as well as the affections seem to be entirely devoid of space attributes. In mental morphology, the perfect element (say, a sensation of color) shows us quality, intensity, duration, and superficial extension.

A similar difficulty confronts us with regard to the attribute of clearness. Variation in degree of clearness of the constituent processes in ideas is the anatomical equivalent of what is functionally termed the 'distribution of attention.' Wundt places degree of clearness on the same level with spatial and temporal [p. 462] arrangement. "As these attributes [clearness and obscurity, distinctness and indistinctness] arise always and only from the interconnection of the various psychical formations, they cannot be considered as determinants of the psychical elements." Yet, on Wundt's own principle of relativity, the same thing would be true of sensation intensity; we cannot say anything of the intensity of a sensation unless a formation - at least two sensations, side by side - be there for 'comparison.' Moreover, we must exclude genetic arguments here as before. If we make analytic introspection the test, we cannot but admit that the ultimate sensation may be conceived of as clear or obscure.[23]

I conclude, then, that the affective element is constituted of quality, intensity, and duration; the sense element (sensation or idea) of quality, intensity, duration, clearness, and (in some cases) extent.[24] Quality is intrinsic and individual; intensity and clearness are 'relative' characteristics; duration and extent are, very probably, extrinsic translations into structure of the lowest terms of a functional series. And the corollary is that the 'elements' of the experimentalists, as they themselves have been the first to urge, are artifacts, abstractions, usefully isolated for scientific ends, but not found in experience save as connected with their like.

It is unnecessary to pursue further our examination of structural psychology. Just as morphology proper, passing beyond the cell, becomes a morphology of organs, so does structural psychology, passing beyond the elementary processes, become an anatomy of functional complexes. The experimental psychologies deal, as do the descriptive works, with the perceptions and emotions and actions handed down in popular and psychological [p. 463] tradition. Külpe, working out a distinction which was quite clearly drawn in the physiological psychology of the younger Mill, has reduced all the 'higher' processes to two structural patterns: mixtures of intensities and qualities (fusions), and connections of spatial and temporal attributes (colligations)[25] This reduction marks a decided step in advance; but its chief value lies in the suggestion of a plan of arrangement for the results gained by analysis of the basal functions. A discussion of these results themselves would far transgress the limits of the present paper.

What remains, now, is to assure ourselves that the various 'unique' processes of current

psychology, not recognized in the preceding analysis, are conceived of in terms of function, and not in terms of structure. There is no room for doubt of this, in the case of Stout's *Analytic Psychology*. The author's use of the phrase 'mental functions,' his constant reference to Brentano, his insistence upon mental 'activity,' are indications enough.[26] In view of the similarity of standpoint, it may be interesting to compare his final classification with that of Brentano. The latter, as we have seen, ranks ideation, judgment, and interest as the fundamental functions of mind. Stout distinguishes two primary attitudes of consciousness: the cognitive and the volitional. Cognition includes thought and sentience as 'fundamentally distinct mental functions,' and thought, again, subdivides into simple apprehension and judgment. Volition, in its turn, includes "two fundamentally distinct modes of reference to an object," feeling and conation. We have, then, five 'fundamental modes of consciousness,' grouped under the two primary conscious attitudes.[27] The difference between Brentano and Stout is at least as apparent as their agreement.

[p. 464] James' 'fiat of the will,' or "express consent to the reality of what is attended to," is also a functional process:

"This consent . . . seems a subjective experience *sui generis*, which we can designate but not define. We stand here exactly where we did in the case of belief. When an idea *stings* us in a certain way, makes as it were a certain electric connection with our self, we believe that it *is* a reality. When it stings us in another way, makes another connection with our self, we say *let it be* a reality. To the words 'is' and 'let it be' correspond peculiar attitudes of consciousness which it is vain to seek to explain." [28]

Lastly, I may refer in this connection to Dr. Irons' contention that emotion is an 'irreducible' process, an "ultimate and primary aspect of mind." [29] Dr. Irons has stated that the method of his enquiry is not genetic; [30] and his definition of emotion as 'feeling attitude' implies that it is not anatomical. [31] But while his words are the words of function ('cognition,' etc.), his criticism is very largely criticism of the morphologists. It would seem that he has not fully recognized the difference between the two standpoints. [32] No one among the experimentalists has hitherto expressed a doubt - I venture to assert that no one ever will - as to the composite nature of the emotive process.

The burden of the argument has been that there is reasonable agreement, within the experimental camp, as to the postulates of a purely structural psychology, whereas there is pretty radical disagreement among the psychologists of function. Let it not be supposed, now, that this latter state of affairs is anything else than a disadvantage for psychology at large; above all, let it not be thought that the experimentalist rejoices at the lack of unanimity among his colleagues. It is a commonplace of the biolog-

[p. 465] ical sciences that structure and function are correlative terms, and that advance in knowledge of the one conditions and is conditioned by advance in the understanding of the other. Only, in psychology, functional analysis - required by the living of our daily life - had been carried out to a degree sufficient for the successful prosecution of anatomical work, before the experimental method appeared. Structural psychology might proceed far on its way, even if the psychology of function had halted at Kant or, for that matter, at Aristotle. I believe that physiological psychology (in the sense of this paper) has a great future; and I subscribe fully to all that has been said of the critical subtlety of Brentano's discussions, of the delicacy of discrimination shown in Stout's recent book, of the genius of James' work. Nevertheless, I believe as firmly that the best hope for psychology lies to day in a continuance of structural analysis, and that the study of function will not yield final fruit until it can be controlled by the genetic and, still more, by the experimental method - in the form both of laboratory experimenting and of interpretation of that natural experiment which meets us in certain pathological cases.

E. B. Titchener.

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## Footnotes

[1] At the Ithaca meeting of the American Psychological Association, December, 1897, Professor Caldwell read a paper (printed in the *Psychological Review* of July, 1898) upon the view of the psychological self sketched in my *Outline of Psychology*. The present article contains a part of my reply to the criticism of Professor Caldwell; a full answer would require a definition of science and a discussion of the relation of science to philosophy. I hope to publish, later on, a second article, dealing with these topics. Since Professor Caldwell is really attacking, not an individual psychologist, but a general psychological position, the discussion of the questions raised by him can take an objective form. A polemic is always more telling if it be directed against an individual, and Professor Caldwell doubtless recognized this fact when he selected my book as whipping-boy. But a rejoinder in kind would, I think, be dreary reading, while the issues involved are serious enough to justify a broader treatment.

As I shall not return to the point, I may note here that a few of Professor Caldwell's objections rest upon technical errors. This is true at least of nos. 1, 8, and 9 of his twelve arguments. Such lapses are hardly to be avoided by any one who travels out of his own special field into that of another discipline; they do not at all impair the value of Professor Caldwell's contentions regarded as a whole.

[2] The comparison has been drawn, in part, by Professor Ebbinghaus. See his *Grundzüge der Psychologie*, I, pp. 161 ff.

[3] G. Wolff, in *Zeits. f. Psych. u. Physiol. d. Sinnesorgane*, XV, p. 1 (August, 1897).

[4] An article by Professor Dewey, entitled "The Reflex Arc Concept in Psychology," *Psychological Review*, July, 1896, seems to contain this idea of a functional psychology: cf. pp. 358, 364 f., 370. The article is especially valuable in that it has direct reference to the experimental work of Angell and Moore (*Psychological Review*, May, 1896). Professor Caldwell, too, insists on the importance of the study of psychological function, but forgets that function presupposes structure (*International Journal of Ethics*, July, 1898, p. 466).

It may be mentioned, further, that a good deal of the introductory writing in works upon modern logic and theory of knowledge - Bosanquet, Bradley, Hobhouse, Wundt - falls within the scope of functional psychology as here defined. Professor Creighton, indeed, suggests that logic may be distinguished from the psychology of thought as physiology, the science of function, from morphology, the science of structure (*An Introductory Logic*, p. 6). I think that, in spite of present overlapping, logic has a field of its own, which is not the field of functional psychology - though the question cannot be gone into in this place.

[5] Cf. Burdon Sanderson, in *Science Progress*, March, 1896.

[6] I have elsewhere given reasons for the opinion that it is functional psychology which may be expected to bring direct assistance to the teacher: e.g., in the *Amer. Jour. of Psych.*, April, 1898, pp. 420 f.

[7] *Outlines of Psychology*, p. 190.

[8] *Grundzüge*, p. 168. It is only fair to say that Professor Ebbinghaus' remarks here are very brief, and that he promises to return to the subject in his second volume.

[9] *Psychologie vom empirischen Standpunkte*, I, pp. 101 ff.; esp. p. 127.

[10] *Ibid.*, p. 115.

[11] *Ibid.*, pp. 44, 50, etc.; pp. 256 ff.

[12] As in Book ii, ch. I, §3.

[13] Reference to contents, meaning, comes with the mental formation. I have attempted to show its relation to structure in my *Primer of Psychology*, pp. 95, 297, etc.

[14] Wundt, *Grundriss d. Psych.*, 2te Aufl., pp. 43, 46 (Eng. trs. of 1st ed., pp. 36, 39); Külpe, *Outlines*, p. 35; Ebbinghaus, *Grundzüge*, I, pp. 167 ff.; Ziehen, *Leitfaden d. phys. Psych.*, 4te Aufl., pp. 17, 19, 128 ff. (Eng. trs., 2d ed., pp. 22, 25, 153 ff.); Münsterberg, *Beitr. z. exp. Psych.*, I, Einleitung, §§ iv, v; *Die Willenshandlung*, ch. ii, and elsewhere. In his recently published book, *The New Psychology*, Dr. Scripture puts aside the question of mental classification altogether (pp. 39, 305), and groups the chief psychological experiments under physical headings. I cannot but regard this as a retrograde step. There is, surely, no reason for giving up, without a struggle, what our predecessors have so hardly won.

[15] See, e. g., A. D. Waller, *The Sense of Effort, an Objective Study*. *Brain*, xiv, p. 179.

[16] Wundt, *Phys. Psych.*, 4te Aufl., I, p. 431; Külpe, *Outlines*, p. 267; Ziehen, *Leitf.*, p. 57 (trs., p. 71); Münsterberg, *Beitr.*, I, pp. 23, 26; *Willenshandlung*, pp. 75 f.; Müller, *Grdl. d. Psych.*, pp. 311 f. (cf. Müller und Schumann, in *Pfl. Arch.*, xlv, pp. 80 f.); Stumpf, *Tonpsych.*, I, pp. 166 f.

[17] Wundt, *Grundriss*, pp. 34, 39 ff. (trs., pp. 29, 33 ff.); Külpe, *Outlines*, pp. 20, 225 ff.; Lehmann, *Hauptgesetze d. menschl. Gefühlslebens*, pp. 12 f., 17, 22; Ebbinghaus, *Grundzüge*, p. 168; Ziehen, *Leitf.*, pp. 35, 127, 143 (trs., pp. 44, 151, 171). Cf. Fechner, *Vorschule d. Aesthetik*, I, pp. 8 ff. Münsterberg, *Beitr.*, I, p. 23; IV, pp. 216 ff. Exner holds a position somewhat similar to that of Münsterberg.

[18] Külpe, *Outlines*, p. 232; Ziehen, *Leitf.*, pp. 127, 149 (trs., pp. 152, 178); Wundt, *Grundriss*, pp. 91 ff. (trs., pp. 77 ff.); *Vorlesungen*, 3te Aufl., p. 239.

[19] It is, I think, a noteworthy phenomenon that the drift of thought in experimental psychology should be towards a structural dualism, and not towards Münsterberg's monism. On the modern revival of dualistic theories at large, see Külpe, *Introduction to Philosophy*, pp. 133 ff., 144, and a paper by G. Heymans, entitled *Zur Parallelismusfrage* (*Zeits. f. Psych.*, XVII, pp. 62 ff.), with the literature there cited.

[20] Ebbinghaus, *Grundzüge*, I, p. 168; Wundt, *Grundriss*, pp. 35, 187, 214 ff. (trs., p. 29, 159, 183 ff.); Külpe, *Outlines*, p. 267; Ziehen, *Leitf.*, pp. 19 f. (trs., p. 26); Münsterberg, *Beitr.*, I, p. 23; *Die Willenshandlung*, ch. II (cf. p. 55). Wundt's remarks are especially worthy of attention, in view of the voluntaristic attitude of the *Logik* and the *Grundriss*. The voluntarism here is, of course, methodological only.

[21] Wundt, *Grundriss*, p. 40 (trs., p. 33); Külpe, *Outlines*, p. 20. Cf. Wundt, p. 42 (p. 35), and *Vorlesungen*, pp. 224, 229 (passages not contained in the Eng. trs.).

[22] Wundt, *Grundriss*, pp. 36, 121 f., 168, 185 (trs., pp. 30, 103, 143, 157). Ebbinghaus, *Grundzüge*, I, p. 169. Henri, *Raumwahrn. d. Tastsinnes*, pp. 1, 159 f. Ziehen speaks of space and time as *Merkmale* of sensations. He gives a local-sign theory of space, but offers no theory of time. *Leitf.*, pp. 35, 62 ff., 99 ff., 109, 252 (trs., pp. 45, 76 ff., 121 ff., 130, 305). Külpe seems to have been led by the results of his structural analysis into a nativistic theory (*Outlines*, pp. 30, 238, 373, etc.), though there is no necessary connection between the two. For Münsterberg's position, see *Beitr.*, II, III. Cf., further, Stumpf, *Raumvorstellung*, p. 301; James, *Principles*, II, p. 135.

[23] Wundt, *Grundriss*, pp. 36, 244 f. (trs., pp. 31, 208 f.). Külpe, *Outlines*, pp. 424 f. Ziehen's view is somewhat different: *Leitf.*, pp. 143 f. (trs., 171 ff.). I have used the phrase 'distribution of attention,' in the text, advisedly, since I have been brought by introspection to put little faith in the graded 'fringes' and tailings-off of obscure and obscurer processes which figure largely in

some psychological systems.

[24] 'Locality,' Stumpf's *Tonfarbe*, Passy's *pouvoir odorant*, Müller's *Eindringlichkeit*, etc., are all attributes which admit of resolution into constituents. Miss Washburn has recently maintained the thesis that *familiarity* is a "peculiar property of centrally excited sensations." I do not think that this view of recognition will find general acceptance. In any event, however, familiarity would be a *fundierte* attribute, predictable not of the sensation but of the sensation complex. See this REVIEW, May, 1897.

[25] *Outlines*, pp. 21, 276 ff. Cf. J. S. Mill, *System of Logic*, Bk. VI, ch. 4, § 3 (People's ed., p. 558).

[26] I take this opportunity, in view of Mr. Stout's criticism of my *Outline of Psychology* (*Mind*, July, 1897), of saying that there is no reason, as the universe is constituted, why he should not accept my analysis of structure, and I his analysis of function. If we disagree, it is not because our points of departure are logically incompatible.

[27] *Analytic Psychology*, I, pp. 50, 113 ff. It is, perhaps, worth while to remind the reader of the ambiguity of the term 'process,' according as it occurs in a morphological or a physiological context. Stout's use of the word is, naturally, very different from that of this article. The word 'function,' too, is not seldom employed by experimental psychologists - I am myself among the guilty - with a meaning different from that which it bears here. *Tantæ molis erit* to found a terminology!

[28] *Principles*, II, pp. 568, 569.

[29] This REVIEW, May, 1897.

[30] This REVIEW, May, 1898; cf. the no. of Nov., 1897.

[31] *Mind*, Jan., 1894.

[32] Although it has been clearly brought out by Professor H. N. Gardiner, in a criticism published in the *Psych. Rev.*, Jan., 1898, p. 100.

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