

the coincidences due to that one agency would be as easy to isolate as the coincidence of a dream and a special occurrence is now. There is almost nothing in the records to indicate that the recorders always understood that, for the purpose of the record, the psychological context was as valuable as the isolated occurrence. The physiological context also is not unimportant; but the details of this are practically none. With the experimental cases we get to firmer ground, but the same difficulties have to be faced. It is, however, in this direction that we must look for final confirmation or rejection. I cannot help feeling that the simple and fascinating hypothesis of telepathic agency has led almost all the recorders of phenomena to put less stress on the part possibly due to agencies already known. Mr. Parish's conclusion is that telepathy is—not proven.

In his last chapter—x.—Mr. Parish touches on the familiar difficulties in “explaining” psychical facts by non-psychical facts. As a matter of method, this is outside his problem. He is entitled to assume a psycho-physical organisation, through which certain phenomena emerge. The “blocking” of paths in this mechanism is merely the forming of another mechanism, through which certain similar phenomena emerge. The ultimate question of the relation of neurosis and psychosis does not fall within the scope of a positive research like this. At the same time, one is glad to have indications of the author's final point of view. Everywhere he is careful not to confuse psychological terms or notions with physiological terms or notions, and he never offers a piece of speculative physiology for more than it is. In an appendix he gives analytical tables of the English and Munich Census of Hallucinations. It remains to add that the book is well written and well rendered in English.

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Ueber die Raumwahrnehmungen des Tastsinnes. Ein Beitrag zur experimentellen Psychologie. Von Dr. VICTOR HENRI. Berlin: Verlag von Reuther u. Reichard, 1898. Pp. xii., 228.

WHEN an object impinges on the skin with sufficient force, we have a tactual sensation, characterised by intensity, quality (pressure, pain, heat, cold), duration and spatiality. The present volume is a monograph on the spatial attributes and relations of touch. It embodies a number of original investigations, carried out by Dr. Henri since 1892, and a review of previous work, experimental and theoretical. Pt. i., ‘facts,’ deals with tactual space under the three headings of extension (stimulus limen, difference limen, correctness of ideas of space), localisation (with contact and movement, visual localisation, localisation with description), and physiology and pathology (reflex localisation, transplantation, etc.). Pt. ii., ‘theories,’ has a chapter on the origin and development of the spatial moment in tactual sensations, and

a 'biological and psychological sketch of the spatial perceptions of touch'. A bibliography of 322 titles concludes the book.

The stimulus limen.—Dr. Henri enters upon controversial ground at the outset, in his discussion of the methods of minimal changes and of right and wrong cases. He insists that the procedure without knowledge must in every case be followed, and that the values $\Delta r'$ and $\Delta r''$ must stand, not for judgments of equality, but for judgments "that the difference has ceased to be clear". I believe, on the contrary, that the method of minimal changes implies the procedure with knowledge as certainly as that of right and wrong cases the procedure without knowledge, and that Wundt is right in his choice of liminal values; and I think that Dr. Henri would have reached the same conclusion if he had attempted an analysis of the general factors of expectation and habituation. He makes a very useful suggestion in regard to the variation of the series in minimal changes (p. 10), though he does not mention Miss Washburn's plan of series-arrangement in right and wrong cases. Vierordt's assumption, that the relative delicacy of the 'space sense' at two places on the skin is inversely proportional to the relative distance apart of the compass points, which gives rise at the same two places to an equal number of judgments of 'two,' is shown, by an extension of Müller's argument, to be ungrounded.

The results of liminal determinations are given in great detail. The author argues from them that the influence of practice and fatigue is 'central,' an influence exerted not on the sense impressions themselves but on their apprehension. This is so far in agreement with Dr. Tawney's recent hypothesis of the 'auto-suggestive' character of practice. An interesting section discusses Judd's method of successive æsthesiometric contacts. Judd found, as did Czermak before him, that the second point may be perceived at a different place from the first, while the subject is still unable to pass any judgment of direction. It would be well worth while to make a special investigation of this phenomenon in several sense-departments, having in mind Külpe's hypothesis of the reproduction of the general, and Meyer's criticism of it, as regards tonal discrimination, in the *Zeitschrift* (xvi., p. 359 ff.).

Hardly anything has been done upon the question of the *difference limen*.

Correctness of spatial ideas.—This section contains an investigation of Aristotle's experiment, by the author, which is excellent both in method and execution. Its result is as follows: "If we touch the terminal phalanges of two fingers, first of all in the normal position of the fingers, and then (using the same points on the skin and similar contacts) when the fingers are crossed, the two points of contact appear to occupy very nearly the same relative position in both cases; that which lies on the right in the normal position seems to lie on the right in the crossed position, although the objective contact is here on the left. If the

points of contact are very close together in the normal position, they appear to be very close together in the crossed position, although the objective contacts in the latter case are widely apart." The belief that Miss Washburn's blind subject underestimated the distance between the compass points, as normal subjects do (Wundt, Jastrow), leads Dr. Henri to infer that "the phenomenon has no connexion with visual ideas". The inference is invalid; the author's own results (p. 61) indicate that, in normal cases, there is such a connexion. For the blind, the comparison might be between pressure space (passive) and tactual space (active). As a matter of fact, however, the blind subject in question is not mentioned by Miss Washburn in this regard.¹ The 'puzzle mistake' (perception of two points with a single contact) is due, Dr. Henri says, "to purely physiological causes, though its occurrence is considerably influenced by a procedure with knowledge". Dr. Tawney confirms this statement, though he lays somewhat more emphasis on the subjective factor of autosuggestion. A result which calls for further investigation is this: "If the fingers, in their normal position, are touched by parallel lines, the subject frequently judges that the lines enclose an angle".

The chapter on *localisation* is also largely made up of the author's own investigations. The results are hard to summarise, consisting as they do either of exact introspective analyses or of numerical tables: I can touch upon only a few of them here. A good criticism of Miss Parrish's work is that she made no distinction between the real and the apparent (ideated) place of stimulation. Hence, while her results are perfectly reliable, her theory—overestimation of flexions and underestimation of extensions—stands upon an insecure basis. Dr. Henri devised methods for isolating the two factors, of movement and apparent position. I notice that he omits to take account of the attitude and movements of the head, which I have come to think of some importance. He shows, as against Külpe's local-sign theory, that the movement of localisation alone yields a very inaccurate judgment of position. The criticism, however, is not final; the means of primitive localisation may well fail for us, overgrown as they are by later associations. The experiments on visual localisation lead to the (already familiar) conclusion that "the more 'landmarks' there are in the neighbourhood of the point of stimulation, and the more characteristic the tactual sensation

¹ All that Miss Washburn says is that the blind subject underestimated the breadth of the arm as compared with its length. Her explanation is that "obscure muscular associations influenced the judgments". This fact, of course, has nothing to do with visualisation, as Miss Washburn herself points out.—Dr. Henri makes a similar slip in ascribing to "Steinbuch, Wundt, Bain, Mill, Spencer" the belief that the primitive tactual sensation has the three moments of intensity, quality and *duration*. In general, his abstracts and quotations are exceedingly accurate.

is, the smaller are the errors". It is noteworthy, in view of his absolute rejection of local-sign theories (p. 207 f.), that Dr. Henri speaks throughout this chapter of differences in the 'quality' or 'character' of tactual sensations, as we pass from place to place upon the cutaneous surface—differences which allow of the recognition (*Erkennen*) of the pressure, and which are conditioned by the softness or hardness, thickness or thinness, mobility or immobility of the skin (pp. 106, 122, 126; cf. pp. 210, 213). Further research upon Aristotle's experiment shows that with crossed fingers there is a reversal of localisation; the fingers are confused. Külpe should be credited with the statement that just noticeable duality of impressions is not to be identified with just noticeable cutaneous distance (*Outlines*, p. 338).

We come to the chapter on *physiology and pathology*. Dr. Henri insists (and the point seems not to have been made before, from the psychological side) that, although certain localising movements are spinal reflexes, reflex localisation is approximate only, and by no means accurate. He discusses eccentric projection in the sense of projection to the extreme periphery (cf. the illusions of touch in an amputated extremity), but, curiously, says nothing in the book of eccentric projection in the sense of Lotze's 'sensation of double contact' (e.g., touch at the end of a walking-stick). The subject is treated, though not very satisfactorily, in Dessoir's *Ueber den Hautsinn*, to which Dr. Henri denies the title of 'monograph'. Busch's observations on rhinoplasty (1859) are quoted in full, since, as the author very truly remarks, "they contain facts which are ordinarily overlooked". The general outcome of the chapter is "that the capacity of localisation is in a certain sense independent of the space sense of the skin".

When we pass to the consideration of *theories*, the first question that meets us is: Has the tactual sensation in a primitive consciousness, e.g., in that of the blind new-born child, a moment of spatiality? In other words: Is the spatiality of tactual sensation connate or acquired? The theories are classified by Dr. Henri as follows:

I. Nativistic theories.

- (1) The moment of spatiality is an attribute or partial content of the tactual sensation itself. Hering, Ward, Stumpf, James.
- (2) Spatiality is an immanent attribute of consciousness or mind. Kant, J. Müller, E. H. Weber, Lotze.

II. Genetic theories.

- (1) Tactual spatiality is formed from the primitive moments of intensity and quality, without help from other sense modalities. Herbart, Volkmann, Lipps.
- (2) Spatiality is formed from the primitive moments only by the aid of other modalities. Steinbuch, Wundt, Bain, Spencer, Mill.

(3) Spatiality arises in the course of development, but is in no sense a composition from non-spatial elements. Each of the first four theories is subjected to a detailed criticism. It is, again, impossible to summarise the arguments: I note a few points. Against James' statement that space is an element in all sensations, Dr. Henri urges the non-existence of auditory space-ideas in the adult consciousness. As against Stumpf's doctrine that quality and extension are partial contents, he points to the fact that, while change of extension affects quality, change of quality does not necessarily affect extension. Lotze's theory is in no sense empiristic; the spatiality of sensation is a *Fähigkeit* of mind, not an attribute of the sensation itself. The nativistic theories in general "cannot be shown by observation to be right or wrong. That theory is the best which ascribes the fewest attributes to the primitive consciousness, while not conflicting with the facts." Herbart's theory stands in the closest relation to his now untenable theory of reproduction. Moreover, as Lotze pointed out, tones fulfil all the conditions required by him, and yet are not spatial. Lipps' 'spatial fusion' is in reality a construction from elements that are already spatial. Wundt's theory has two sets of facts against it. The muscular and articular sensations set up, in Aristotle's experiment, by the crossing of the fingers ought, according to it, to fuse, and so bring about a correct localisation: they do not. And the complete loss of movement sensations after hemisection of the cord ought to be accompanied by a diminution of accuracy of localisation: they are not. The last of the genetic theories is merely thrown out as a suggestion.

The second question is: Wherein consists the spatial moment of a tactual sensation for the developed consciousness, and how are the results of tactual investigation to be explained? The first member of it is answered by a five-page summary of pt. i.; the second by a critique of Weber's sensation-circles and Lotze's and Wundt's local signs, and a sketch of a new theory. Weber's hypothesis is contradicted by histology, by the facts of cutaneous perception of linear extension, and by Aristotle's experiment. The local-sign theories are also inadequate to these last two groups of facts. An objective consideration brings us to the following. 'Automatic localisation exists, in young children as in adults. The movement of localisation here is a connate spinal reflex; the resulting sensation of contact depends on the higher centres. The localising finger moves about, until it hits the exact spot to be localised: what prompts it to do so, we do not know. The finger stops when the stimulating and the localising contacts are congruent (*sich decken*). The basis of attentive localisation is this automatic movement, though visual ideas enter as secondary factors. Visual and verbal localisations are alike of associative origin. Passive cognition of spatial characters is conditioned partly by physiological differences, partly by association.'

The strength of the book lies in its wealth of new material, its appreciation of the value of introspection as a check upon figures (pp. 8, 96, 103, 120, etc.) and of the mutual relation of normal and pathological results, and its keenness of criticism. The author is less happy in construction; he seems to dislike theory simply because it is theory (pp. 185, 204). One of the consequences of this attitude is that he fails to give the reader a perspective, to indicate the critical places in the history of haptics; another is a too rigid demarcation of problems, shown, *e.g.*, by the unfortunate severance of haptical from optical theory. But the merits of the work far outmeasure its blemishes. It will add considerably to the reputation, already high, which Dr. Henri enjoys among experimental psychologists.

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Psychologic Foundations of Education. By W. T. HARRIS, LL.D.,
Commissioner of Education, U.S.A New York: D. Appleton
& Co., 1898. Pp. 450. (6s.)

EVERY system must have its *Primum Mobile*; and in his first chapter Dr. Harris postulates the idea of self-activity as fundamental and necessary. "If the reader denies the existence of self-activity, for him psychology does not and cannot exist." He distinguishes between the mental, internal, subjective side of human activity, and that which comes from the environment—he leads us on to see with Hegel that neither excludes the other, but that both are embraced in a more complete whole. He writes: "There is a mental or subjective coefficient as well as an objective one"; "the business of psychology is to find this subjective coefficient wherever it exists"; again, "psychology is so fundamental that it conditions in large measure all the sciences based on the spiritual nature of man—ethics, theology, politics, sociology, æsthetics, and all forms of philosophy". Thus psychology stands in close relation on the one side to science, specially to physiology, on the other to philosophy. We would fain hope that the *Psychologic Foundations* will supersede some books now placed in the hands of those who seek in our Universities a Teacher's Certificate, and which so far as they are assimilated paralyse the energy by denying self-activity, and destroy the validity of ethical teaching by referring all action to universal environment; it is a great matter to have the issues clearly stated and discussed as in the chapters on "The Fallacy that the Strongest Motive Governs the Will" and on "Freedom *versus* Fate".

The book is divided into three parts—the first deals with the "chief themes of educational psychology treated unsystematically," postponing the systematic treatment, until the student has "some familiarity with the simpler aspects of the principle which furnishes the method". Part ii. deals with the subject systematically. Part iii. includes subjects not usually embraced under the