

of objects very readily. He began to notice colors at once, and, except in the case of green, could always recognize a color after having been told its name. With green he had more difficulty, and it may be that he is somewhat *photerythrous*. In artificial light he had as it were to learn the colors over again.

The observations on the patient's first visual perception of form were not searching. 'When asked to distinguish between a ball and a toy brick, he looked at them attentively for a considerable time, his hands meanwhile moving nervously, as if he were trying to translate what he saw by comparing it with an imaginary tactile impression, and then he described both correctly.' But Latta 'found that, before the cube and sphere experiment was made, he had had visual experience of the difference between things straight and curved.' Unlike Cheselden's classic patient, Carruth did not suffer from a visual chaos, and his difficulties were in identifying the new things seen with the old things felt, rather than in building up a consistent visual field *de novo*. Latta seems to ascribe this to the maturity of the patient, his organized 'pre-visual experience.' But this experience was in fact merely pre-operational, for if before the operations Carruth could by means of his eyes 'easily perceive a light and locate it accurately,' it is obvious that the operations did nothing more than to give him much clearer retinal images. His visual space was already well organized. His subsequent experience was merely a process of refining his visual discrimination, and for this reason throws little light on the theories of space-perception. The faculty which Carruth did not have already organized was that for perceiving depth, but the development of this, if it ever did develop, was not investigated.

Carruth soon lost the power to move about confidently in the dark. He could call up visual images somewhat less than a month after the operations, and some six months thereafter his dreams seem to have been mainly visual. Even in his blind state he believes that he never experienced an odor in a dream.

On the whole, this paper is a somewhat desultory clinical report of slight importance in itself, and interesting only when put alongside of the earlier cases of successful operations on the blind.

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Retinal Local Signs. WALTER F. DEARBORN. *Psychological Review*, July-September, 1904, Vol. XI., Nos. 4-5, pp. 297-307.

Dr. Dearborn sets out to cast light experimentally on that one of Lotze's three hypotheses regarding local signs, which says that "the stimulation of each point, through an 'interweaving' of the nerve fibers from the surface of the retina and the ocular motor nerves, causes an eye movement definite enough to bring the fovea immediately to the point of excitation." It would follow from this hypothesis that the local sign of any such excentric point on the retina will be the kinaesthetic feeling of the eye movement (or perchance the feeling of innervation, or possibly both together) through the angle subtended by the arc from this point

to the macula. And if this is true, it must follow that the power of space discrimination of the retina can be neither more nor less accurate than these eye movements (or their corresponding innervations) which are made in order to bring the stimulation of any excentric point on to the fovea. But Dodge and Cline have already called attention to certain errors in the immediate fixation of excentric visual stimuli. The author, therefore, proposes to compare the size of such errors in movement with the spacial discrimination of the same excentric points, that is, their threshold for twoness and their threshold for least perceptible movement.

Dr. Dearborn finds that both these threshold discriminations are always much finer than is the ability to move the eye so as to bring an excentric stimulation on to the fovea. Thus in one subject the error of movement in bringing the stimulation of a certain excentric point on to the fovea was $1^{\circ} 48'$, whereas the threshold for twoness at that same excentric point was between $28'$ and $41'$, and the threshold for perceiving movement was but very little over $5'$. The results are, therefore, adverse to the Lotzean hypothesis.

This is a careful and thoroughly intelligent piece of work. It is to be remarked, however, that we have here the same difficult problem which has come up in the experiments of Müller and Schumann on lifted weights,—that of the relation between the idea (reproduced muscle sensation, feeling of innervation, or whatever it may be) which precedes the movement, and the muscle sensations which later report what the movement has actually been. Also the fact that the threshold for twoness on any excentric region is so different from the threshold of perceived movement on the same region, shows that the situation is otherwise exceedingly complicated. Doubtless, however, Dr. Dearborn is amply justified in concluding that the Lotzean hypothesis in its primitive form does not adequately explain the facts.

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Aristotle's Posterior Analytics. JOHN WATSON. *Philosophical Review*, January and March, 1904, pp. 1-15, 143-158.

In these two articles, Professor Watson has given an abstract of Aristotle's *Posterior Analytics*, a work which, he says, 'has had an influence upon the history of human thought out of all proportion to its length.' In what it aims to do, the abstract is admirably successful, presenting concisely and with perfect clearness what in the original is not open to systematic interpretation except for careful reading. Apart from their excellence as an abstract, the two papers, if we mistake not, would seem to be a kind of sign of the philosophical times in America; for the fact that articles which, instead of being commentary for Aristotelian scholars, pretend to be nothing more than a barest outline of the *Posterior Analytics*, should appear in a leading American philosophical journal, seems to point to a widespread lack of first-hand knowledge of Aristotle's treatise. Professor Watson's articles are timely if this inference is justifiable, and they should be effective in helping to 'revive' the *Analytics* on this side of the water.