A semi-transparent porcelain plaque was fixed in the side of a box, between which and a light placed on the inside was a plate of ground glass lined with paper and a sheet of cardboard having a horizontal slit for letting the light through. In front on the outside was another light made adjustable for varying the illumination of the visual field. A movable screen held in position by an electro-magnet was used for cutting off the light from within the box when desired. The subject fixated the band of light, and as it disappeared allowed the screen to fall and cut off the stimulus. In this case the after-image appears, but if the fluctuation takes its course until the moment of reappearance before the screen is dropped, no after-image, or only a barely perceptible one, is seen. There thus appears to be considerable fatigue present in the retina at the time of disappearance but practically none at the reappearance. From this it appears that from the point of appearance to that of disappearance there is a phase of increasing fatigue, and from the point of disappearance to that of appearance is one of decreasing fatigue.

In spite of the several studies which have been published upon this subject, the development is slow and much the same ground has continually to be plowed over for a preliminary discussion. A fundamental advantage would be gained by having a basis of distinction between the fluctuations peripherally and those centrally originated. Such a one may be found in the fact that when the peripherally conditioned disappearance has taken place, the mental image may yet be retained. Although the direction of attention may be slightly different when fixed on an external object than when on the remembered image of it, there is yet a sufficient similarity between the two states to prevent there being a fluctuation of the attention properly speaking. What, therefore, has most commonly been called a fluctuation of attention is essentially a fluctuation in the functioning of the sense organ, or possibly in the sensory tract before the ideational centers are reached.

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Zur Theorie des Bewusstseinumfanges und seiner Messung. WILHELM WIRTH. Philos. Studien, XX. (Wundt's Festschrift, II.), pp. 487-669.

Of this contribution one hundred and forty-eight pages are devoted to theoretical discussion, nineteen to the description of new apparatus, and eleven to experimental results. There have been several studies of late either directly or bordering upon the question of the boundaries

of consciousness, and the present discussion aims to clear the ground for more intelligent work.

The starting point is the well-known experiments of Wundt with the tachistoscope, and that in which two consecutive series of metronome strokes are compared to find how long these series can be and yet have their relative lengths rightly judged. The question arises as to why in the former experiment only from four to six objects can be perceived from an instantaneous exposure, while in the latter from sixteen to forty may be correctly compared. A cue is found in Cattell's work, where it was observed that in addition to the four or five simple objects that could be clearly seen, there was an estimation of the whole number, but characterized by a large average error and a tendency to underestimate. The greater distinctness and smaller number of objects as compared with the auditory experiment is the result of greater practice in seeing these particular forms. Also with the series of metronome strokes there is a tendency towards a rhythmical grouping which corresponds to the grouping of letters into words with the visual impressions and which make it possible to see a much larger number of letters. In both experiments no judgment is possible until the sensory impressions are passed, and in both two images are compared; in the one case the two series of strokes, and in the other the memory of the visual impression with the expressed judgment. If an arrangement of the tachistoscopic experiment could be made to conform more closely with the conditions of the auditory experiment, more similar results could be expected.

To this end a new form of tachistoscope was constructed, with which it was possible to present to the subject two groups of simple figures for the purpose of comparison, one quickly following the other. In the main the two groups were alike, but with one or more changes of the figures in the second. It was found that changes could be indicated correctly within a limited region of the point of fixation. When twenty-five figures made up the group, not more than one change in the outer edge would be noted if the attention were not directed there. Whenever there were several changes, only one would be noted, except when they were close together.

The author is well informed and the discussion well arranged. A condensation of the theoretical part would greatly increase its value, although an 'exhaustive' discussion, as with Kant, may derive much of its value by exhausting the reader to the point of consistently avoiding the past of a problem in favor of its future. The apparatus described is ingenious and somewhat elaborate. We trust that a more

extensive contribution to experimental results will come from it in the near future.

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- ✓ *Genetic Psychology for Teachers.* C. H. JUDD. New York, Appletons. 1903. Pp. xii + 329.
- ✓ *A Survey of English Ethics: being the First Chapter of Mr. Lecky's History of European Morals.* Ed. by W. A. HIRST. London and New York, Longmans. 1903. Pp. li + 180.
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- ✓ *History of Philosophy.* W. TURNER. Boston and London, Ginn. 1903. Pp. x + 674.
- ✓ *Contemporary Psychology.* G. VILLA. Trans. by H. MANACORDA. London, Sonnenschein; New York, Macmillans. 1903. Pp. xv + 396. \$2.75.
- ✓ *Gesammelte Abhandlungen zur physiologischen Optik.* A. KÖNIG. Preface by TH. W. ENGELMANN. Leipzig, Barth. 1903. (A collection of thirty-two papers.)