THE THIRD YEAR AT THE YALE LABORATORY.

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The report is taken up from the point at which it was left in *THE PSYCHOLOGICAL REVIEW*, 1895, II., 379.

The investigation of hallucination and suggestion by C. E. Seashore was continued throughout the third year and was brought to a close in May, 1895. The first section of this investigation concerned the suggestive influence of size on judgments of weight. Two sets of blocks were used. Set A varied in size, but had a uniform weight, while set B varied in weight, but had a uniform size. The problem was to pick out that block of set B which appeared of the same weight as a given block from set A. The difference thus made between the estimated weight of an A block and its true weight, gave the effect of the suggestive influence due to the difference in size. The experiments, carried out with the greatest care, gave a definite suggestive influence for each difference in size. The law governing the results is shown in Fig. 1. The investigation was extended to the various forms under which size shows its influ-

FIG. 1.

ence, *e. g.*, with the blocks indirectly seen, or seen and then hidden, or estimated by muscle-sense, or by touch, etc. The results are shown in figures 2 and 3.

FIG. 2.

FIG. 3.

The next section investigated hallucinations of warmth. It was found that with an appropriate suggestion, a pure hallucination of heat could be regularly produced.

A third section investigated the effect of expectation and suggestion on the least perceptible differences in lights. It was found that the repetition of a number of experiments was sufficient to regularly create a perceptible difference when absolutely no difference existed.

A fourth section showed that expectation was sufficient to create a perceptible continuous change in the intensity of an illuminated disc.

In a fifth section hallucinations of a non-existing object were produced; in a sixth, of a non-existing tone; and, in a seventh, of non-existing sensations of touch, taste, smell and electrical stimulation.

In every case the experiments were quantitative; the scale was more or less an arbitrary one, but always admitted reduction to some standard unit of energy. Thus, on the principle that the intensity of an hallucination is the same as that of a sensation from which it cannot be distinguished, the intensity of the hallucination was measured in terms of the physical stimulus.

It is to be added that all these experiments were made on normal, healthy, unsuspecting individuals.

The second extended investigation was by John M. Moore on the subject of fatigue. In the first place the two eyes were fatigued by being required to estimate depths. The subject looking through a slit at G (fig. 4), had to adjust the bead B

FIG. 4.

midway between the beads A and C, while seeing only one at a time. This middle bead B was placed always beyond the true middle, the error increasing with fatigue.

The experiment was repeated forty times in succession. The average amount by which the successive experiments in-

creased the error of the first one is shown for one observer in Fig. 5.

FIG. 5.

The investigation then proceeded to test one eye instead of two. Similar but less steep curves of fatigue were found. Thereafter the curve of fatigue was determined for steadily

repeated accommodations of the eye with results as shown in Fig. 6. Finally the effect of fatigue on rapidly repeated taps

FIG. 6.

was determined. The general course of fatigue in this case is shown in Fig. 7.

FIG. 7.

These two investigations were presented and accepted for the degree of Ph. D., making four such theses in three years.

Edward M. Weyer succeeded in measuring the reaction time of a dog finding it to be an average of 89σ . A method of measuring the dog's time of thought was devised with great labor; owing, however, to difficulties with the spark records, no definite conclusion was reached on this point.

The activity of the workshop was greater than ever, thirty or forty new instruments having been invented and constructed. Among them are to be found the pendulum chronoscope, the standard drum for very accurate measurements of time, the electric color-wheel with speed indicator, etc.

The results of the completed investigations were published in the *Studies from the Yale Psychological Laboratory*, 1895.

The officers of the laboratory were E. W. Scripture, instructor and director, and J. Allen Gilbert, assistant. Dr. Gilbert left at the end of the year to take the place of assistant professor in the University of Iowa.