A critical study of a few of the changes found in the fields of vision, taken whilst the eyes are placed at right angles to their ordinary position / by Chas. A. Oliver.

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BY

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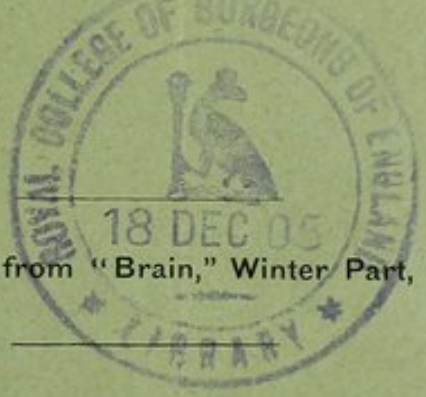

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A CRITICAL STUDY OF A FEW OF THE CHANGES FOUND IN THE FIELDS OF VISION, TAKEN WHILST THE EYES ARE PLACED AT RIGHT ANGLES TO THEIR ORDINARY POSITION.

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THE original suggestion as to this character of work was kindly given to the writer by Dr. S. Weir Mitchell, of this city, in the fall of 1893, during a personal conversation upon various matters pertaining to physiological optics, colour-vision, &c. Dr. Mitchell desired to know why it was that artists could obtain more vivid impressions of the colours of a distant landscape whilst the head was lowered into a horizontal position. After hazarding, as a part explanation of the reason, that a greater blood supply was thus offered to the organ when the head was held in this way, and that there might be some difference in the combined colour values when refracted through another series of meridians of the dioptric apparatus, the writer concluded that a most interesting, and perhaps valuable, series of experiments upon the subject might be established amongst the abundant clinical material at hand, in one or more of his public services, and amongst his more intelligent private patients and his friends.

Limiting the present communication to those cases that gave full acuity of vision, had normal fields of vision, and showed healthy eye-grounds, a great number of observations were made by both the writer and several of his most com-

petent friends and assistants.[1] In every instance, as far as practicable, the two series of experiments were performed under the same conditions. After the fields for white, yellow, blue,[2] red, and green were gotten in the ordinary manner, the patient or subject was placed upon a table or a sofa, so that the temporal or outer side of his eye was situated either superiorly or inferiorly. When in one of these positions, either before the perimeter or the gauged blackboard, and by both natural and artificial light, the same order of field-taking was instituted and consummated in various ways.

With the greatest precaution as to time of day, similar character of illumination for related experiments, and proper rest of the organ, the following observations were rendered sufficiently certain for publication.

(1) Equal areas of the same colour held at equi-distant points around the fixation object, when the fields of vision are taken in their ordinary positions, are more deeply saturated and more intense in vividity when they are situated at the temporal side of the point of fixation;[3] the relative positions of the order of brightness being temporally, inferiorly, nasally, and superiorly.

(2) Unequal areas of the same colour held at equi-distant points around the fixation object show, when the fields are obtained in the ordinary manner, that the smallest colour areas are more distinctly visible and more deeply saturated to the temporal side of the point of fixation; the relative position of the necessary increase in colour area, to give the same vividity as that seen to the temporal side, being inferiorly, nasally, and superiorly.

(3) Equal areas of the same colour, studied during the method of ordinary field taking, are sooner perceived and

[1] The writer here acknowledges his indebtedness for valuable help in this work to Drs. William Zentmayer, William Campbell-Posey, Frederick Krauss, Barton F. Potts, and Frank Savary Pearce.

[2] In many cases yellow and blue were omitted. In a large number of private subjects, however, yellow and blue were tried sufficiently often to admit of their entrance into the series.

[3] In some cases, the best point of excentric colour vision seemed slightly down and out from the point of macular fixation—*i.e.*, just beneath and between the fixation point and the physiological blind spot.

are brighter in tint when they are approached from the temporal periphery to the fixation object, than they are when they are brought in from any other peripheral border of the colour field; the order of greatest distance from the point of fixation in the different parts of the fields before the colours are recognised and properly named as such, being first, to the temporal side; secondly, to the inferior side; thirdly, to the nasal side; and fourthly, to the superior side.[1]

(4) Unequal areas of the same colour approached to the fixation point from the various peripheral borders of the fields of vision taken during the ordinary method of field-taking, show that the smallest colour areas are sooner perceived and become more quickly saturated, when they are brought in from the temporal side; the inferior and nasal sides being the next respectively and the superior side the last.

(5) In every instance where the fields of vision were obtained at right angles to the ordinary position, by placing the temporal field either superiorly or inferiorly, both equal and unequal areas of the same colour approached from the various peripheral borders of the fields of vision to the fixation point, show the same relative order of betterment of comparative sizes, positions, and saturations of tint, in that portion of the field which has been previously the temporal one.[2]

Conclusion.

As a logical deduction from these observations, and as a partial answer, at least, for the reason of the empirical method of dipping the head at right angles to its ordinary position, so frequently made use of by artists in order to

[1] When care was taken to see that equivalent amounts of light were obtained in all meridians, the relative shapes of the fields of vision were not changed whilst the fields were tried at various angles.

[2] In fact, numerous experiments made since, which have no direct bearing upon the exact title of this paper, and which, with other important and interesting observations, will be reserved for a more extended communication, distinctly show that this is true, no matter how the temporal field may be placed.

obtain a better colour effect whilst observing a distant view, it seems most probable that the cause is, that by this plan, as it were, a stronger and a more highly evolutionised series of sensory elements are made to receive natural impressions which, under ordinary circumstances, are received and recorded less vividly by a series of lower grade and less powerful structures.