

by the number of intermediate steps which can be perceived to be such between black and a given gray, for instance. This measurement he has not yet carried out for the different spectral colors, but he has determined once more the relative objective intensity of the different parts of the spectrum at the threshold of color-perception both for the dark-adapted and for the light-adapted eye, his results agreeing with those of former observers. He also applied the flicker method to determine the relative luminosity along the spectrum. No great degree of precaution against errors seems to have been taken; "having made several such observations * * * the curve was drawn."

Dr. Breuer made a direct examination of the amount of spectral light of different colors absorbed by the macula, by comparing color-equations at or near the center with those taken in a field at from three to six degrees distant. His results confirm very closely those of Sachs made upon the extracted retina. He reaches the general conclusion that, since the total amount of absorption by the yellow pigment is so very small, individual differences in this amount cannot be of very great consequence. This fact has an important bearing, of course; it follows from it that something more is necessary to the explanation of the difference between the two types of red-green blindness.

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A Note on the Phenomena of Mescal Intoxication. HAVELOCK ELLIS. *Lancet*, June 5, 1897.

Mr Havelock Ellis has re-examined the wonderful vision-producing properties of mescal, which were first brought to notice by Prentiss, Morgan and Weir Mitchell. Mescal buttons are the fruit of *Anhalonium Lewinii*; they are eaten by the Kiowa and other Indians of New Mexico in connection with religious ceremonial. Three of the buttons were taken in three doses at intervals of an hour; an immediate effect was experienced in the relief of a headache, which had been rather serious at the beginning of the experiment, and in a consciousness of unusual energy and intellectual power. After two hours the expected visual phenomena began with a pale violet shadow floating over the pages of an open book. Objects seen peripherally were enlarged and heightened in color, and after-images were marked and persistent. Green shadows next appeared; soon afterwards vague, confused masses of color, of kaleidoscopic character, were seen with closed eyes, which presently became distinct and brilliant, while at the same time the air was filled with perfume. Later, when muscu-

lar incoördination had reached such a stage that writing was difficult, a golden tone lay over the paper, the pencil wrote in bright gold, and the hand seen in indirect vision was red. Dr. Weir Mitchell's visions were apparently much more brilliant than these, but he could see them only with closed eyes, while Mr. Ellis found it perfectly easy to see them with open eyes in a dark room, though they were less brilliant than when the eyes were closed. Insomnia persisted during the greater part of the following night, but it seemed to be less connected with the constantly shifting visions, which were always beautiful and agreeable, than with the vague alarm which was caused by a considerable degree of thoracic oppression and of auditory hyperæsthesia. The skin was hot and dry, and the knee-jerk was much exaggerated. A gas flame seemed to burn with great brilliancy and to send out waves of light which extended and contracted rhythmically in an enormously exaggerated manner. What was chiefly impressive, however, was the shadows, which came in all directions, heightened by flashes of red, green and especially violet. "The violet shadows especially reminded me of Monet's paintings, and as I gazed at them it occurred to me that mescal doubtless reproduces the same conditions of visual hyperæsthesia, or rather exhaustion, which is certainly produced in the artist by prolonged visual attention (although this point has as yet received no attention from psychologists)." These violet shadows may be conditioned by the dilatation of the pupils which always occurs in mescal intoxication, for Dobrowolsky has maintained that the erythropsia which is common after eye operations is due to the dilatation of the pupils produced by the atropine previously administered, "so that the color vision is really of the nature of an after-image due to bright light; Dobrowolsky's explanation seems to fit in accurately with my experiences under mescal." Mr. Ellis seems not to have noticed an important paper on Erythropsia by Dr. Ernst Fuchs in a late number of the *Archiv. für Ophthalmologie* (noticed in an earlier issue of this Journal). In this it is shown, with a great degree of probability, that erythropsia is in reality entoptic rod-pigment vision; after exposure to blinding snow-light, or to the excessive amount of light admitted by a widened pupil, the rod-pigment, which is usually overlooked on account of its constant presence, becomes rapidly reconstructed and hence produces for a few moments its proper color effect. In defects of nutrition it has been often noticed, first by Parinaud, that the rod-pigment is a substance which is among the earliest to suffer; hence, even without the dilatation of the pupil, an erythropsia due to this cause might be readily expected to occur in this case.

The phenomena of mescal intoxication are, according to Mr. Ellis, mainly a saturation of the specific senses, and chiefly an orgy of vision. He is convinced that all the senses are effected; there were vague dermal sensations, and a marked casual stimulation of the skin produced other sensory phenomena a heightening of the visions or an impression of sound—a fact which may throw an interesting light on the synæsthesiæ or ‘secondary sensations.’ The immediate cause of the sensory phenomena seems to have been a great and general disintegration or exhaustion of the sensory apparatus; in a slighter degree the same phenomena, even the color vision, are found in neurasthenia. The drug, it appears, is expected to have a great future as a specific in cases of neurasthenia; the homeopaths will therefore find their account in the fact that it produces, when taken in large doses, the very symptoms which it is most powerful to cure.

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Sight, an Exposition of the Principles of Monocular and Binocular Vision. JOSEPH LE CONTE. 2d edition. New York, Appleton, 1897. Pp. 318. \$1.50.

“In this second edition I have found little to *correct*; the changes are mainly in the form of *additions*.” Of these additions probably the most important is that on astigmatism; the portions of the book on the nature of space perception and of the laws of direction and on color have been amplified.

The conspicuous merits of the first edition are retained—the ingenuity of the illustrations, the clearness of the statements and the fascinating character of the experiments described. One characteristic still remains, namely, a misunderstanding of the psychological principles involved in monocular vision; the view is essentially a physiological one, whereas most of the facts are mental ones.

At the time the first edition was written there was no special science of psychology which was recognized by the other sciences. Introspective psychology was, for various reasons, regarded by the scientists as one stage of senile dementia. Here is an illustrative quotation from Le Conte (p. 69) concerning the theories of erect vision: “First, there have been metaphysical theories characteristic of this class of thinkers. According to these, erect and inverted are purely relative terms. If all things are inverted, then nothing is inverted. There is no up and down to the soul, etc. * * * The first we put aside as being non-scientific.” Of course, this caricature resembles