a type or not is merely a question of words. They are a frequently occurring departure from the normal, with all transitions on the one side to the normal, on the other to the completely red-green blind; so that the boundaries of the group will always be variable. If the anomalous person's defect in red or green goes so far that one of these lacks its specific color impression, one has the case described as extreme anomalous, and characterized by being able to establish an equation between green and yellow or red and yellow, but never both equations at the same time. If the defect goes still further so that in addition to the green (or red) the red (or green) part of the spectrum also loses its specific color, the power to distinguish the colors of the long-waved portion of the spectrum will be completely lost and one has the completely red-green blind.

Malling traces through a series of illustrative cases the stepwise departure from the normal toward the pathologic. One case, a definite anomalous with defect principally in the green, although still retaining specific green perception of inferior quality, is compared with

another case showing a similar defect in the red. In a third case, green perception is extremely reduced and this case approaches the so-called extreme anomalous, in that it can form an equation between a yellow and a green which are not too widely separated from one another in the spectrum (582 and 540). A fourth case lacks specific green and red perception, is a typical red-green blind, and can form an equation between all colors in the long-waved part of the spectrum. This group is of great practical importance in daily life, and the moderate degrees of this color disturbance present material difficulties in the determination of the problem whether they are practically competent as to color or not. For example cases unsuitable for purposes of navigation may succeed in passing the ordinary color tests; while on the other hand the various anomaloscopes, while furnishing information as to even small departures from the normal in green and red perception, do not necessarily indicate the proper boundary line between those who may and those who may not be properly employed in special services.

TOTAL ACHROMATOPSIA.

OTTO WERNICKE, M. D.

BUENOS AIRES.

Abstract translation from the Boletín de la Sociedad de Oftalmología de Buenos Aires, Año IV, p. 159, by M. Uribe-Troncoso, M. D. This reports the cases of two brothers, and gives a general review of the subject.

Altho partial blindness for colors is of common occurrence, total achromatopsia is very rare. The number of cases reported has increased recently since we have learned to suspect the condition by other and more noticeable symptoms than the color tests.

Achromatopes learn to distinguish colors and even to name them by their respective differences in brightness, by the presence or absence of reflexes on

the surface, by the form of the objects and by habit. But for them the world is only an engraving with shades of gray and white. They generally go to the oculist to be relieved of three important symptoms, viz., low visual acuity, photophobia and nystagmus.

Visual acuity generally varies from 1/10 to 1/5; rarely reaches 1/3. Only one case is reported in the literature (Raehlmann) in which acuity of vision

was normal. Low vision is due in some cases to corneal scars, atrophy of the optic nerve, macular choroiditis, albinism, etc., but in the majority of cases there is no organic lesion which may account for it. The amblyopia is almost constant, and not a mere coincidence as has been suggested. This may give some clue for ascertaining the cause of the anomaly.

Photophobia is correlated to this symptom, nystagmus. When the former is severe the latter is very marked and vice-versa. With the photophobia the forehead is wrinkled, eyebrows contracted, palpebral aperture very narrow, and head flexed. Dread of light increases with the intensity of illumination and decreases at night.

Luminous sense is normal in achromatopes. The nystagmus is rarely wanting, but it is not as constant as the amblyopia, and in some cases ceases with advancing age. It generally increases on fixation, and is probably due to another very important symptom, central scotoma.

Roenne was the first to detect central scotoma, which has been found in nearly half of the patients. But it is necessary to have always in mind that its detection is very difficult, and sometimes impossible. Uthoff did not find it in one of his patients at first; but was able a year later to plot it with the ring-shaped fixation test.

According to Grünert, even in cases in which central scotoma could not be detected, an anomaly of the macula, or of the macular fibres, certainly existed. This is the only way to explain how, with very low central vision, the limits of the visual field and peripheral vision in general were normal.

Achromatopes see the color red, and those near it in the spectrum, as a dark spot, and violet and nearby colors brighter than with the normal eye. Red is mistaken for black. Yellow-green is the brightest. The limits of the spectrum are either the same as normal or a shortening of the red end or of both ends may be present. The best method for detecting achromatopsia is Holmgren's test. The Hering disk and the spectroscope are also useful.

Dr. Wernicke's patients were two brothers 18 and 12 years of age, in a family of seven. No history of consanguinity. Daylight was troublesome and provoked continual blinking. If the elder brother maintained the eyes opened in a strong light, after a few moments all appeared white to him. Vision improves at dusk. He is scarcely able to read, and his school work was so difficult that he went to work in a hat store, from which he was discharged because of his inability to distinguish colors.

Pupils react well to light and in accommodation. Fundus normal. Hyperopic astigmatism of half a diopter. Correction did not improve vision, which is only 1/10 for R. E. and 2/10 for L. E. Nystagmus is present and consists of small, very rapid, vertical movements, which do not increase on fixation. Red is mistaken with black; and colors selected according to their brightness.

In the younger brother, the symptoms were alike. Vision: R. E. 1/10?; L. E. 1/10.

Clinical findings in cases of achromatopsia have exerted the greatest influence on the theories of color vision. Both the Young-Helmholtz and Hering theories needed to be modified in order to explain this condition. The first theory was modified by Parinaud and Charpentier, and holds that the function of the cones is restricted to color sensations and that the function of the rods is the perception of light and dark and also black and white.

These two systems do not work simultaneously. When the light is strong, the cones transmit the sensation of all colors to the brain, but when illumination decreases, the cones cease to become stimulated, and then the rods begin to perceive sensations by the destruction of the visual purple. As the regeneration is very slow, peripheral vision is always bad in normal eyes, particularly in low illumination for which the cones are not adapted. Hence the achromatopsia of the normal eye in darkness. Total achromatopsia is due to lack of cones in the macula.

This produces also the central scotoma and accounts for the poor vision of these patients and the nystagmus.

Hering's theory also is capable of explaining achromatopsia, if modified to admit the duplicity of the function

for the rods and cones as suggested by Parinaud and Charpentier. It will explain more easily the case of Raehlmann in which achromatopsia was attended with normal vision and photophobia and nystagmus were absent.

SHORT ABSTRACTS.

Recent papers containing points of the greatest importance capable of presentation in this form are here noticed. For a systematic review of all the current literature in ophthalmology see "Digest of the Literature," a part of which is published each month.

Demaria, E. B.—Hydatid Cyst in Eyeball. (Boletín de la Sociedad de Oftalmología de Buenos Aires, Año IV, p. 41.)

Echinococcus is very common in Argentina, but an intraocular localization of this parasite has never been described. Demaria had been unable to find it in many hundreds of enucleated eyes sectioned at the Ophthalmic Clinic in Buenos Aires. This is the more surprising, because it is very common in all other parts of the body, even in the orbit (20 cases reported in Argentina); and by comparison with the cysticercus, which has so marked a tendency to grow in the eye, that some writers have considered it as its habitual place of living.

In the whole of ophthalmic literature there are only four cases reported as intraocular hydatid cysts; and of these only one is reliable. Yet both tenias, the solium and the echinococcus, live and migrate in the same manner in the body.

Prof. Demaria's patient presented slight pericorneal injection, the iris completely applied to the posterior part of the cornea, the lens cataractous, tension + 2; no light perception. An intraocular tumor with secondary glaucoma was diagnosed, and a trephining operation done, which relieved tension for a few days. But a new attack of pain having set in, the eye was enucleated.

Section of the globe gave exit to a transparent liquid, as clear as "water

from a rock;" and a cyst was discovered filling entirely the vitreous cavity, and adhering to the retina and lens. The cystic membrane was characteristic. No daughter vesicles were present but several proligerous vesicles adherent to the wall and containing scoleces could be observed.

An important characteristic feature was the absence of a pericystic membrane and of leucocytic infiltration; which the author attributes to the lack of inflammation of the tissues. The membrane is only a defensive reaction of nature against the parasite, and it seems that in this case the cyst only acted in a mechanical way during all its growth. This lack of inflammation makes a most important difference from the cysticercus, which always produces a great irritation on the tissues of the eye, intense cyclitis, disorganization and even sympathetic ophthalmitis.

The author reviews afterwards in detail the five cases reported in the literature (Gescheidt, Griffith, Werner, Wood and Scholtz), and only considers reliable that of Werner.

The modern methods of serodiagnosis (Appathie and Lorenz in Argentina, Guedini in Europe), have a great diagnostic value in echinococcus disease. It was positive in Demaria's case and is reliable and constant. Eosinophilia is to be found in about 67 per cent of the patients, and is not pathognomonic.

URIBE-TRONCOSO.