Fundus vessels seen with the red-free light are black on a light background due to the absence of the diffuse red of the choroid. Of particular interest are some of the findings in the macular region. Here very minute vessels may be followed over the edge of the macula into its depression until they are lost in the foveal reflex. A well-defined, small granulation of the macular surface is seen. Small macular hemorrhages are easily discernible and larger hemorrhagic and exudative zones in choroiditis quite easily located even through a diffusely clouded vitreous.

The foveal reflex ordinarily found only in youthful individuals can often be observed with the red-free light in old age.

The macular zone is of a radiant yellow color and its diameter about one-third that of the disc. It is therefore easily visible and can be located in pathologic fundi in cases where this would be impossible with ordinary light.

It has been conceded and especially emphasized by Haab that the darker red of the macula is due to increased pigmentation. With the red-free light all pigment appears black. There is, however, no black mottling in the macular zone, consequently no pigment. As the macula is now definitely

known and seen to be yellow, its darker red contrast found with ordinary illumination can only be ascribed to an intensification by the yellow coloration. This can be easily shown by placing a yellow lens over part of a red zone the color of the fundus. The red under the yellow lens will be of a more intense red.

We have therefore with the red-free light the first absolute demonstration of the yellow coloring at the macula in the living eye. A new explanation of why this zone is more intensely red with ordinary illumination. The ability to measure this zone more accurately, comparing it with the usually larger size of yellow discoloration found after death.

We can note new details of the macula as respects its size, reflexes and surface, absence of pigmentation (except secondary to disease), vascularization and the direction of vessels. We can also with it measure and by comparison in various eyes study the yellow discoloration of the lens in age.

Most important is the ability to follow minutely the direction of the nerve bundle and fibre layers in the retina—a matter of great importance; as I will endeavor to show in the near future by presenting some new and intensely interesting findings by Vogt in pathologic fundi as shown with the red-free light.

CORRECTION OF CROSS-EYE DEFORMITY.

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NEW YORK.

This is a review of the author's practice and teaching in the New York Polyclinic Medical School and Hospital, based upon 175 consecutive operative cases.

The chief concern of cross-eyed patients is the correction of the deformity. Cross-eye (Strabismus Squint) cases as a rule are seen in consultation by the eye surgeon at certain ages and under certain conditions and it is always interesting to note the compelling cause of the first visit.

The child in arms is seen by us when a worried mother notices the infant's eyes are crossed, next period when as a sensitive youth he suffers deeply the gibes of his school companions, somewhat later on when he is chagrined to find that because of this deformity he is unable to secure a position for which

he has trained and is perfectly capable of filling, still later on in life when he discovers that the operation for the correction of squint is not a serious one and that it is possible to obtain a good result at any time from nine years of age onward. Certain other compelling conditions are familiar, the young girl who is not invited to parties given by her friends on account of her appearance, the young person during courtship for obvious reasons, and the cross-eyed who are avoided by superstitious people. No other case is more gratifying than when a client applies for the correction of a squint deformity referred by a patient upon whom you have operated.

Strabismus is paralytic (partial, complete), or concomitant (monocular, alternate). In complete paralytic squint the eye is in malposition and can not be voluntarily moved in the direction of the paralyzed muscle; in partial paralytic squint the eye in faulty position can voluntarily be rotated in the direction of the paralyzed muscle, but not to the normal extent.

In concomitant squint the eyes rotate equally, the affected one maintaining the same angle of deviation in all positions. Each eye fixes alternately in alternate concomitant strabismus; and in monocular concomitant strabismus one eye fixes and the other constantly deviates. Vertical concomitant strabismus is uncommon and we have to do chiefly with lateral deviations, convergent and divergent concomitant strabismus.

An infant with a noticeable squint requires a careful direct method ophthalmoscopic examination of the fundus of each eye. They are neurologic cases when we discover as we frequently do edematous changes in the fundi, that indicate an increase in the intracranial pressure. Measurement of the degree of intracranial pressure should be made and recorded at once, by a spinal mercurial manometer at lumbar puncture to verify the fundus findings; and if it records a decided increase above the normal, the excess of pressure is usually due to an intracranial hemorrhage at birth. There

is generally a history given of difficult or instrumental delivery of the child and subsequent occasional convulsions. Spasticity and other neurologic disorders are the usual sequelae of birth hemorrhages, unless the clot is removed and intracranial pressure relieved by a decompression operation. If this procedure is deemed necessary the earlier it is done the better. Often we find in the fundi of cross-eyed infants optic discs that are decidedly pale thruout (atrophic), as the result of faulty development in embryo and sometimes associated with stigmata (high palatal arches, cleft palates etc.) elsewhere from the same cause. These are neurologic cases also.

Mentally normal children with strabismus, in which no changes are noted in the eye grounds, with or without errors of refraction existing, or in which recent exudative changes are observed become the subsequent charge of the ophthalmologist.

Since no one cause has been ascribed for strabismus, the usual attending abnormal factors may be looked for and corrected if possible, the earlier the better. Errors of refraction, amblyopia and faulty fusion are the usual concomitants.

If an error of refraction is present suitable lenses worn constantly give the best results in correcting a squint deformity at a period when a child's eyes are observed to be crossed at times and straight at others, no matter what angle of deviation obtains; or when the angle remains constant and is less than 15 degrees. Glasses may be worn by children as young as one and one-half years of age, and it is never too early to prescribe a correction for an existing error of refraction in a developing strabismus. Correcting lenses, however, seldom have any effect upon a squint deformity of 15 degrees and over, if the eye that turns remains in malposition for three months or longer.

The correction of faulty fusion is rarely successful because of the immaturity of the patient at the time the treatment would avail; and even under the best conditions excessive dili-

gence is required to get a small percentage of good results. An occasional good result is obtained in amblyopics when the affected eye is compelled to fix by placing a correcting lens before it, and shutting off fixation of the good eye by a shade, or atropinizing it.

Conservative methods have been tried out usually, on all strabismic patients who are particular about their looks, before the operative age (9 years) is reached; and when an eye surgeon is consulted a review is made of the history and treatments that had been given, and if stated nonoperative methods have failed to correct the deformity then surgical measures are advised.

Operations upon the external ocular muscles for the correction of squint are advisable when the patient is 9 years of age and over, and all necessary nonoperative measures have been tried and have failed to correct the deformity. The choice of procedure depends upon the character and angle of strabismus that exists, and the nature, and extent of lateral rotations. Under usual conditions the deformity in all concomitant strabismic eyes may be corrected to parallelism by definite surgical procedures.

If the external lateral rotation of the squinting eye is found to be normal, in monocular concomitant convergent strabismus that measures 15 degrees of deviation, a complete tenotomy of the internal rectus of the affected eye usually corrects. If the deviation measures 30 degrees a complete tenotomy of the internus followed by an advancement of the externus of the squinting eye usually corrects. If the deviation measures 45 degrees complete tenotomies of the interni of both eyes usually correct.

However, if it is determined that the external lateral rotation of the squinting eye is not sufficient, but the amount of deficiency is made up by excess of internal rotation, or in other words the lateral excursions are equal, but the plane of rotation is advanced to the nasal side, then an advancement of the external rectus is done first and usually corrects a deviation of 15 de-

grees when it exists. If the deviation measures 30 degrees an advancement of the externus is done first and when the reaction subsides the internus of the same eye is completely tenotomized and usually corrects. If the deviation is 45 degrees an advancement of the externus of the squinting eye is done first followed by a complete tenotomy of the internus of the same eye when the reaction of the advancement operation subsides, and later on an advancement of the externus of the good eye usually corrects.

When tenotomies are indicated in concomitant convergent strabismus a complete tenotomy of the internus corrects 15 degrees and if less than 15 degrees are to be corrected, partial tenotomies are done. When advancements are indicated in concomitant convergent strabismus 15 degrees are corrected by the usual placement of stitches in the externus, but a little more or less can be accomplished by entering the stitches on either side of the usual position.

In alternate convergent concomitant strabismus advancements of the external recti of both eyes are done and the amount to be corrected is divided between both eyes. If the advancements do not correct the entire amount of squint, for the deviation remaining, partial tenotomies of the interni of both eyes are done and should be equally divided between them.

In the divergent type of concomitant strabismus, tenotomies of the external recti have very little effect upon the cosmetic result but the advancement of the internus may be regulated to correct up to 45 degrees of deviation. This is a most satisfactory procedure on account of the good size of the internus muscle, and experience guides one in the placement of stitches to correct various amounts of deviation.

Operations for the correction of paralytic squints are unsatisfactory as a rule, but it is possible at times to pull and fix an eye in straight position.

The usual complete tenotomy in which the aponeuroses of the muscle as well as the tendon are severed, and the advancement operation, a modifi-

cation of Landolt's, give the best results in the writer's hands. In the last 175 consecutive operations for the correction of squint deformity, parallelism has been obtained in all of them.

There were 155 monocular convergent concomitant, 16 divergent concomitant, 3 alternate convergent concomitant and one convergent paralytic (complete).

HYPERPLASTIC EXUDATIVE RETINITIS (NONHEMORRHAGIC).

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The report of four cases and statement of reasons for grouping them as illustrating this form of retinitis. A thesis submitted, and accepted, as a candidate for membership in the American Ophthalmological Society, 1918.

True hyperplastic, exudative, non-hemorrhagic phenomena in and apparently adjacent to the retina are rare. The appearances which they present to ophthalmoscopic examination are frequently similar to, and perhaps often indistinguishable from, the lesions resulting from previous hemorrhagic extravasations. In fact, the ultimate result, subjectively and objectively, of organized hemorrhagic and nonhemorrhagic exudates might conceivably be pathologically identical, as in the lesions of retinitis proliferans, which may have their origin in either form of exudation.

This latter form of retinitis is of course described in all modern text books, but the rarity of its occurrence may be realized by the statement of Weeks that he had seen but two cases in twenty-four thousand private patients, and of Schöbl, quoted by Weeks, who observed five cases out of 179,057 patients. The common acceptance of its etiology is hemorrhagic extravasation from the retina into the vitreous. It has been pointed out, however, that it may occur consequently upon the ejection of a fibrinous exudate or coagulum, with or without the presence of blood corpuscles (Weeks).

Leaving out of consideration, for the present, cases of retinitis circinata, which will be referred to later, the writer has observed at least four cases showing lesions in six eyes, of what ap-

peared to be true organized retinal exudates, nonhemorrhagic, three of them being confined within, or adjacent to the retinal layers, and one combining this type with the currently described type of retinitis proliferans extending into the vitreous body. In none of these cases was there any evidence of previous or present hemorrhage at the site of the lesions, and in all except one the development of the processes was watched from week to week and month to month under ophthalmoscopic observation.

In view of these observations, which are detailed below, the writer suggests that proliferating or granulating or chronic inflammatory (neoplastic) tissue may occur within as well as without (with an origin within) the retinal layers; that it may occur without preceding hemorrhagic phenomena; and that whether within or without the retinal layers these lesions may properly be classified as hyperplastic exudative (nonhemorrhagic) retinitis.

From all that is known of retinitis circinata, it would seem justifiable to include this type in the above classification, the difference in the ophthalmoscopic picture being due merely to the different arrangement of the lesions.

The identification of hyperplastic exudative retinitis with the conditions described by Coats in 1909 as a "disease of the retina, hitherto insufficiently differentiated, which is charac-