clouded, so that we cannot thoroughly illuminate any portion of the retina with the ophthalmoscope; the whole looks clouded and indistinct. These sudden attacks of haziness may recur several times; and then, when the dimness at length disappears, and we can again examine the fundus with the ophthalmoscope, we but too often find that the retina has become detached.

Pigmentation of the Retina.—As the sclerotico-choroiditis posterior progresses, the retina may become infiltrated with pigment from the choroid, and thus a considerable impairment of vision may result.

Detachment of the Retina.—This is but a too frequent complication; indeed it occurs more often in myopic eyes, particularly those affected with sclerotico-choroiditis posterior, than in any others. The extent and the degree of detachment may vary very considerably. In some cases, it is only very slightly detached from the choroid, and would easily escape the notice of any but a skilled and close observer. In others, it is apparent at a glance, a considerable portion being detached and floating loosely about like a bluish grey cloud.

It chiefly arises in two ways.

1. On account of the retina not following the traction of the choroid and sclerotic (which bulge

posteriorly), a serous, or hæmorrhagic effusion may occur between the retina and choroid, and the former be partially or entirely detached. The detachment generally occurs at the lower portion of the retina, owing to the gravitation of the fluid. It may, however, be at first slightly detached at the upper or any other part; but in the course of a few days or weeks we invariably find that the detachment has extended to the lower portion. Our attention should be particularly directed to this complication, if we find that the upper or lower half of the field of vision has become indistinct, or if the patient complains of a cloud, like the "peak of a cap," hanging before his eyes, and if he sees objects broken or notched.

The effusion may, however, burst through the retina into the vitreous without detaching the former.

2. Heinrich Müller has pointed out* that detachment of the retina may not only occur through the pressure of fluid from behind, but also through traction from before. The latter is thus produced:—when the exudations in the vitreous humour shrivel up and contract, they, being also attached to the retina, draw the latter forward and detach it from the choroid.

* Von Graefe's Archiv. iv, i, 372.

Opacity at the posterior pole of the lens sometimes occurs in the later stages of sclerotico-choroiditis posterior: this opacity, as it is situated generally very close to the "turning-point" of the eye, retains its position in whichever direction the eye is moved. Cataracta accreta and atrophy of the globe may close the scene.

Causes.—The origin of the affection is still a matter of controversy. Without doubt, there generally exists a congenital (and often hereditary) tendency to elongation of the eyeball in the optic axis; and this must necessarily cause a stretching of the choroid in this direction, which is generally soon followed by consecutive atrophy of this membrane. The development of this prolongation of the visual axis is greatly favoured by the strong convergence of the optic axes, and the state of congestion of the eye which is produced during accommodation for near objects, more particularly if these are small and insufficiently illuminated. For during such accommodation, a certain pressure upon the eye always occurs, accompanied by increased intra-ocular pressure; the venous circulation within the eye becomes retarded, and a more or less considerable state of mechanical congestion is produced. Instances of such intra-ocular congestion are furnished by cases of amblyopia due to

opacities of the cornea or lens, in which the myopia is caused by the patients bringing small objects very near to the eye, in order to gain larger retinal images. A similar thing may occur if the patient, whilst using spectacles for reading, gradually approaches the book too near to his eyes. We occasionally find that vitreous opacities, and even detachment of the retina, occur in such cases soon after continued reading or working with spectacles.

This state of congestion and increased pressure of the intra-ocular fluids leads to softening and extension of the tunics of the eyeball. As the eyeball receives no support at the posterior pole from the muscles, the prolongation occurs chiefly at this point, the choroid is stretched and generally undergoes consecutive atrophy.

This secondary atrophy of the choroid, which gives rise to the crescentic white patch at the margin of the optic disc, has been considered by Von Graefe to be most likely due to a chronic inflammatory process of the sclerotic and choroid, and he has, therefore, designated it sclerotico-choroiditis posterior. Others, again, have thought that it depends upon a circumscribed staphylomatous bulging of the sclerotic at this part, and hence they have termed it staphyloma posticum.

But against both these opinions exception might be taken.

We find that this choroidal atrophy often exists without any posterior staphyloma. Indeed Schweigger states that a real staphyloma posticum, *i.e.*, a more or less sharply defined local ectasia of the walls of the eyeball, does not take place in the majority of cases of myopia. The presence of a posterior staphyloma may be diagnosed by means of the ophthalmoscope, particularly with the binocular, for we then see that the white, shining portion of the sclerotic, exposed through the thinning of the choroid, is not of normal curvature, but is peculiarly cupped backwards, giving rise at this point to a slanting position of the optic disc. Schweigger, moreover, thinks that the acuteness of vision is diminished to an unusual degree in cases of myopia in which posterior staphyloma exists beside the optic nerve. This is the more likely to happen, as he has observed that in cases in which the existence of a posterior staphyloma was proved anatomically, the retina in the expanse of the bulging portion was generally found to be more or less changed in structure, and even atrophied and adherent to the remains of the choroid and sclerotic.

In opposition to Von Graefe's view, it has been

urged that all symptoms of irritation and inflammation are frequently completely absent, at least at the commencement of the affection, and that the latter may even attain a considerable degree without their presence. But there is no doubt that such symptoms are almost always developed when the disease becomes considerable, and the myopia is high in degree. In the slightest forms, they may be easily overlooked, but even in moderate degrees of myopia, and in youthful individuals, we not unfrequently observe symptoms of irritation, such as hyperæmia of the optic nerve, retina, and choroid, and it appears probable that a state of irritation, if not of inflammation, exists prior to the atrophy. Donders thinks, "that almost without exception, the predisposition to the development of staphyloma posticum exists at birth; that it is developed with symptoms of irritation, which, in a moderate degree, do not attain any great clinical importance; but that in the higher degrees an inflammatory state almost always occurs, at least at a somewhat more advanced time of life, as a result, and as a co-operative cause of the development of the distension and of the atrophy."

It has also been urged, that either no inflammatory products, or only very few, are to be met with after death.

Von Graefe freely admits that exception may be taken to his opinion, that the disease is due to a chronic inflammation, for he says :—" In opposition to this view it might certainly be objected that in reality inflammatory products are wanting in both tunics (sclerotic and choroid), but the considerable hyperæmia of the choroid itself, the changes in its pigment, the obliteration of the ciliary vessels, and the atrophy in the posterior portion of the tunic, the deranged nutrition of the vitreous humour, the frequent combination with hæmorrhagic processes, and, finally, the beneficial action of antiphlogistics, all these furnish reasons why the affection should not be regarded only as the result of a simple passive distension, but as a chronic state of inflammation."

Jaeger considers that this crescent or posterior staphyloma, as he terms it, is almost always congenital and often hereditary. It may, indeed, exist for many years, or even throughout life, without increasing in size, or without the occurrence of any choroidal changes in its vicinity, its margin remaining distinctly and sharply defined. But we more frequently find, if the eyes are much used and the myopia increases at all considerably in degree, that the edge of the crescent becomes somewhat irregular and broken, and gradually augments in size; this being evidently due to

inflammatory changes in the choroid. Indeed it may well be questioned whether even the congenital crescents may not be of inflammatory origin.

Prognosis.—This should be always very guarded when the disease is at all advanced, when the myopia is progressive, and when the opacities in the vitreous humour are considerable. It becomes still more questionable if the vitreous opacities are diffuse, or large and numerous; if the upper or lower portion of the visual field becomes clouded, which is premonitory or symptomatic of detachment of the retina; and, lastly, if the choroidal changes make their appearance in the region of the yellow spot. They show themselves in the form of small, isolated, whitish spots, around the edges of which there are little accumulations of pigment; these small whitish spots increase in size, coalesce, and then the atrophy of the choroid becomes very apparent. During this process the retina is more or less irritated, and this produces dimness of vision, which however disappears again when the retinal irritation subsides. These atrophic changes in the region of the yellow spot give rise to fixed black spots, which, if considerable, may render working at small objects completely impossible. These changes in the macula lutea

generally commence first in one eye, and may for a time be confined to it, but they almost always extend, sooner or later, also to the other eye. The amblyopia dependent upon general irritation of the retina, which has already been mentioned, is often greatly relieved by careful treatment, and by strictly guarding the eyes against everything that may give rise to, or increase such a state of irritation.

The prognosis to be made in detachment of the retina, must depend upon its situation and extent. If it is far removed from the yellow spot, and only slight in degree, it may remain stationary for a length of time, and vision be but slightly impaired. I can recall to memory one case of extreme myopia in which a slight separation of the retina remained nearly completely stationary during a period of more than three years, the patient being able to read No. 2 of Jaeger. But if the detachment occurs in the region or vicinity of the yellow spot, or if it be very considerable and progressive, we must expect a very rapid deterioration of vision.

Treatment.—Patients suffering from sclerotico-choroiditis posterior should be particularly warned against working for any length of time at near objects, or with their head bent forward, for venous congestion within the eye is thus easily produced.

It is also very injurious to read in a recumbent position. The best posture for reading is, to sit with the head well thrown back, and to have the light falling on the book from behind, so that the page may be well illuminated, but the eye not exposed to the direct glare of the light. In writing, it is advantageous to use a sloping desk, so that the person need not stoop. If such patients are permitted the use of spectacles for reading and writing, we must particularly point out the danger of bringing the object too near when the eye becomes sometimes fatigued, as this will cause a strain of the accommodation. The work or book should then be laid aside until the eyes have been thoroughly rested. In extreme cases, we should strictly forbid all work at near objects, either with or without spectacles.

The irritation of the optic nerve and retina, which gives rise to the appearance of flashes of coloured light, or showers of bright stars, etc., is best relieved by the application of flying blisters to the temples or behind the ear. They may be with advantage repeated at intervals of six or eight days.

The feeling of glare and dazzling, of which many of these patients complain when in a bright sunlight or at the sea-side, may be effectually alle-

viated by cobalt blue spectacles. It was formerly supposed that the red rays of the spectrum were the most annoying and trying to the eye, and consequently green glasses (which exclude the red rays) were much in vogue. Now, however, it is a well known fact that it is not the red but the orange rays which are irritating to the retina ; and as blue excludes the orange rays, this is the proper colour for such spectacles. Another explanation of the benefit of blue glasses in such cases is that the blue colour makes less impression upon the retina, on account of its more eccentric position in the sun spectrum. London smoke-glasses are now much worn and highly recommended in England. They are undoubtedly very serviceable in those cases in which we desire to subdue and diminish, more or less, the whole volume of light and colour, as they produce about the same effect as if we place the patient in a somewhat darkened room. But this is not generally necessary in sclerotico-choroiditis posterior, or even in fact desirable, for we only want to cut off the irritating orange rays, which appear to contribute but very little, if indeed at all, to our power of distinction, for we can read just as far with blue spectacles as with the naked eye, which is by no means the case with smoke-glasses. The tint of the blue spectacles should not be too dark.

In very windy or dusty weather the patient should be directed to wear curved blue eye-protectors. These are bent in such a manner that they fit closely everywhere except at the temporal side, where they permit a sufficient amount of air to enter and to come in contact with the eye, to keep up the absorption of the conjunctival moisture. They are greatly to be preferred to the goggles with wire or silk sides, which keep the eye far too hot and close. These may be indicated if the patient is exposed to the atmosphere very soon after a severe operation, when the eye is still inflamed and very susceptible to cold, but for all other purposes the curved glasses are to be preferred.

If the parenchymatous changes in the choroid are at all considerable, we should always subject the patient to a prolonged course of small doses of bichloride of mercury ($\frac{1}{20}$—$\frac{1}{24}$ of a grain twice or thrice a day). In this, as in all the inflammatory changes in the choroid, its beneficial effects are generally very marked. Iodide of potassium is indicated if there is any syphilitic or scrofulous taint. As the patients frequently suffer from biliary and venous congestions, their general health must be particularly attended to, for we generally find in this disease that the state of the