only on this last supposition that the rapid increase in such cases as those of Powell and Williams can be accounted for.

One point of some practical importance still remains to be noticed; I mean the necessity, which indeed is generally recognized, of allowing a very copious diet to consumptive patients. The cases of M'Carthy and Richards exemplify this pretty clearly. Phthisicals are with difficulty admitted into many hospitals; but where they are so, it is as foolish as it is unjustifiable to withhold from them as much nourishing food as they can digest.

ART. V.—*Ophthalmoscopic Notes.* By HENRY WILSON, F.R.C.S., &c., Assistant-Surgeon to St. Mark's Ophthalmic Hospital.

RETINITIS PIGMENTOSA.

AMONG the manifold discoveries made in the living eye since the introduction of the ophthalmoscope into practice, that of pigmentation of the retina, made by Von Graefe some years ago, is one of the most interesting. It is, no doubt, true that pigment was found and described in the retina by Von Ammon, Walther, and the now venerable Mackenzie, long before the ophthalmoscope was invented, but only in morbid specimens, in which it appears to have been regarded as a mere accidental peculiarity. Although, however, they were unaware of the true nature of the phenomenon, or of its occurrence as a disease, yet I venture to believe that the earliest recorded instances of retinitis pigmentosa are to be found in the writings of Walther and Mackenzie, the latter of whom relates, as an instance of congenital night-blindness, the case of a deaf and dumb boy, which, from its history, symptoms, and *post mortem* appearance, was, I have no doubt, an example of congenital retinitis pigmentosa.

Pigmental degeneration of the retina, styled by the French, *rétinite tigrée*, originally termed *morbus Arianus*, after a nobleman in whom the disease was remarkably developed, and now universally known as *retinitis pigmentosa*, consists, as its name denotes, in a deposition of pigment in, and degeneration of, the structure of the retina. Strictly speaking, however, the latter name is, I think, not always accurately correct, for it implies and conveys the idea of an isolated, independent, and active disease in the retina, whereas it usually occurs as the result of inflammatory

processes elsewhere, and the retina may be merely passively and secondarily engaged, as I shall mention presently. Independent development of pigment may and does undoubtedly occur in the retina without any other structure being implicated; but this appears to me to be the exception.

Eyes affected with this malady present externally but little peculiarity, except in the very advanced stage of the disease, when the pupil becomes very small, and responds but slightly to the stimulus of light, or in children when nystagmus occurs—an oscillating or to-and-fro movement, common to all congenital or early acquired ocular defects. One of the earliest symptoms generally complained of is night-blindness, at first partial, and in the advanced stage complete. Vision then begins to fail by day, and in such a manner that the field of vision is narrowed. There is, also, loss of the power of fixation; the ability of at once and promptly discerning any given object is diminished, and the patient sees best in strong light. There is no pain, nor is there—externally at least—any trace of inflammatory action. The disease is an exceedingly slow and insidious one, and terminates, as a rule, in blindness. It is essentially progressive, but continues sometimes as long as twenty years before terminating in complete blindness. It occurs congenitally, is hereditary, and is frequently complicated with opacities of the lens and in the vitreous humour. The ophthalmoscopic examination reveals a very marked contrast to the normal state; the fundus of the eye, instead of being of a uniform brilliant or dull red (according to the pigmentation of the choroid) presents patches or spots of a jet black colour, varying in shape and size, scattered irregularly over it. These spots are generally stellate, sometimes small isolated black specks, irregular in outline, having more or less numerous projecting processes, from which appearance they have been likened to bone corpuscles; or they occur as jagged irregularly shaped striæ; or grouped and massed together, forming a black irregular network. The black deposit is nearly always in greatest quantity at the place of division of the retinal vessels. These latter are, as a rule, extensively implicated in the disease, and present here and there streaks of pigment along their course, while at other places they are wholly or partially obliterated, or appear as very fine thin threads, which condition is usually best seen on the optic papilla. The optic nerve is generally somewhat atrophied, and has occasionally some isolated specks of pigment on its intraocular surface. Liebreich has observed a unique case of

pigmentation of the entire papilla, in which the deposit was confined to the optic disc, without any trace of it elsewhere in the fundus; it was, however, impossible to decide whether this pigmentation was a congenital anatomical peculiarity or of a pathological nature. Pigmentation of the retina commences usually at the peripheral and equatorial parts of the retina, and advances slowly, but surely, towards the optic disc.

The black deposit cannot well be confounded with accumulations of pigment which are sometimes seen in the choroid; that it is situated in the retina is ophthalmoscopically recognizable, from the circumstance of its being either in the same plane as the retinal vessels, or even anterior to these, so that they are concealed by it, as well as from the fact of the choroid being generally distinctly visible behind it. In the large majority of cases the choroid itself is extensively diseased, and its pigment epithelium so highly atrophied that the large choroidal vessels are clearly visible. In these cases the black specks, and masses of pigment in the retina, form a very marked contrast to the bright yellowish or red colour of the underlying choroidal vessels, and the dark red of the choroidal intervascular spaces. This condition can be very inadequately represented in anything but a coloured plate. I have, however, attempted to delineate it in the accompanying wood-cut, admirably executed by Mr. Hanlon, from a drawing I made of the fundus of the eye of a man aged 55, who stated that he enjoyed excellent vision up to the year 1862, when he noticed that he could not see as clearly as usual in the twilight. His vision has gradually decreased since then, both quantitatively and qualitatively, so that when he came under my care in Spring he could only read, and with very great difficulty, "canon" type (No. 18, Jæger). His field of vision was small, and it took him a considerable time to make out the exact outline of an object. He saw best in a bright light; the head was held erect, and the eyes appeared as if seeking the light—just the reverse of the condition seen in persons affected with uncomplicated cataract. About the time he noticed his vision becoming impaired he had suffered great domestic affliction and much anxiety. At this time, too, he had a feeling of great heat, and tightness in the head, and would sometimes stagger in the streets like a drunken person—symptoms probably referable to intracranial disturbance. The pupils were normally dilated, but sluggish; the lenses slightly muddy, the left having a few striæ at its circumference; the vitreous was clear and free from muscæ.

The ophthalmoscopic examination revealed the condition I have endeavoured to illustrate by the subjoined wood-cut, which represents the enlarged reversed image of the left eye.

The background of the image is formed by an unequally coloured structure, composed of bright yellow and red tortuosities, which vary in size, and possess well-defined outlines, with dark coloured island-like interspaces indicated in the cut by the white lines and shaded interspaces, which give but a faint idea of the beautiful yellow plexuses formed by the choroidal vessels, which have become visible in consequence of complete and extensive atrophy of the layer of choroidal epithelium. The colour is much lighter at the position of the yellow spot—to the left of the central disc in the cut—where the atrophy has not only destroyed the pigment epithelial layer, but has engaged the stroma of the choroid. In front of this background, that is nearer to the observer, a quantity of jet black patches and specks are scattered irregularly over the fundus; these are aggregated here and there into net-like masses, especially on the outer or temporal side; one large triangular-shaped mass is seen encroaching on the upper border of the optic papilla, and three smaller ones are seen on its surface, towards the temporal side. The retina appears very slightly hazy on the inner side, and around the papilla; the papilla itself is somewhat atrophied, of a greyish white colour; its outline is slightly indistinct and irregular, indented here and there. The condition of the retinal vessels is very peculiar; above and below a large dark-coloured gorged vessel arrives from the periphery at the optic disc, after entering which it is seen to become much smaller, to assume, apparently, a different direction from that which it previously possessed, and to taper gradually to a point—an appearance somewhat similar to the

condition known as excavation of the optic nerve. Besides these there are several small arteries, some of which are so minute and attenuated that they can only be seen by using a high magnifying power; some are altogether obliterated or disappear in the network of pigment. Pigment is seen along the coats of some of the vessels. The pigment is in the same plane or in front of the retinal vessels, and the denuded large choroidal vessels are distinctly visible behind it.

Opinions are still divided as to the origin of this very peculiar disease. Donders, who was the first to institute a careful microscopical examination of the structures engaged in it, considers it to be a special and independent affection, combined with, or due to, a chronic inflammatory process in the retina; his view as to the idiopathic development of pigment in the retina has been confirmed by a case in which Schweigger, of Berlin, found on dissection the choroid perfectly healthy and normal in its entire extent, while the pigment occupied a zone of the retina lying between the equator and the ora serrata, and was confined to the vessels. Other investigators have arrived at the conclusion that the pigment is derived from extra retinal sources; thus Schweigger, who has devoted considerable attention to the pathology of ophthalmic diseases, and who has published the best and most practical work on the use of the ophthalmoscope, maintains that in the majority of cases pigmentation of the retina is attributable to choroiditis, with effusion and secondary infiltration of the retina. A very strong argument in favour of this view is afforded by the observations made independently by Schweigger and H. Müller, that at these places where the retina was unaffected and perfectly healthy, the subjacent choroid was likewise perfectly normal and unaltered, while at these spots where the retina was implicated in the disease, the choroid was correspondingly altered, and was devoid of its pigment cells. Some ophthalmologists still regard pigmentation of the retina as a mere accidental circumstance, which may ensue on any form of retinitis. In the case I have cited it would seem from the condition of the vessels that there had been an independent and idiopathic development of pigment in the retina, while the present condition of the choroid points unmistakably to the existence of choroiditis, so that the pigmentary deposit may be attributed to both causes—intra and extra retinal.

Our knowledge of the causes and mode of origin of pigment as a pathological product is, I think, still a limited one. Melanotic

formations occur in various tissues and secretions, as in pleural adhesions and in sputa; the small cerebral arteries are also occasionally found to have undergone pigmental degeneration. Paget states, with reference to this subject, that the general tendency of inflammatory products is to imitate the properties of the natural products of the part inflamed; and so far as disease of the lungs, choroid, and iris are concerned, this explanation is verified; but whether it will be found satisfactory in all cases of pigmental degeneration is doubtful.

The pigment is found, on microscopical examination, to be principally in the layer of grey nervous matter, and on the vessels. It occurs, however, in the various layers of the retina. It is found as pigment granules, or as pigmented cells, which cells are flattened, polygonal, discoid, or elongated, the larger polygonal ones having a bright nucleus. One or more of the retinal laminae is, as a rule, atrophied. From its proximity to the choroid, the bacillary (Jacob's) layer is the most frequent to suffer, and is generally highly atrophic. The walls of the vessels are found to have undergone a hyaline thickening whereby the tube is narrowed or even obliterated.

A remarkable feature in this disease is its hereditary nature, and its occurrence in the children of consanguineous parents. In thirty-five cases, which Liebreich noted more particularly, he was able to prove descent from blood relations in nearly half. Thus, another example has been added to the list of ocular and other defects dependent on consanguinity, to which Sir William Wilde has drawn attention in his writings, more especially in his essays on Deaf Dumbness and on Congenital Malformations of the Eye, published many years ago in this Journal.

I know of no special or general plan of treatment which will affect this disease permanently; attention to and improvement of the general health, and alteratives will, at first, usually produce a marked change for the better; but this beneficial result is merely temporary and fleeting, and after some time vision will return to its former condition, and the disease will advance steadily, until eventually the patient is hopelessly blind. Opacities of the lens and in the vitreous humour frequently supervene.

Illustrations of this affection are given in Plate 6 of Liebreich's magnificent *Atlas der Ophthalmoscopie*, in Plates 6 and 8 of Jæger's *Beiträge zur Pathologie des Auges*, in Plate 79 of Sichel's *Iconographie Ophthalmologique*, in Plate 19, Figs. 9 and 10 of Ammon's

Klinische Darstellungen der Krankheiten des Menschlichen Auges, in Wedl's Atlas der Pathologischen Histologie des Auges, &c.

DISLOCATION OF THE LENS.

Luxations of the transparent or opaque lens, some varieties of which I described in the *Ophthalmic Hospital Reports*, are not of uncommon occurrence, and have probably been seen by the majority of practitioners. I will, therefore, now merely mention a peculiar phenomenon which is sometimes noticed during the ophthalmoscopic examination of such cases, and which may not be generally known. In certain abnormal positions of the transparent lens the observer is startled by seeing *two* optic nerve entrances instead of one. Some time ago a patient came under my care with hypermetropia of the right eye, and dislocation of the left lens. This person had received an injury of the left eye four months previously, and I found the lens dislocated inwards, in the vitreous chamber, with its equator nearly in the centre of the pupillary space, and still sufficiently transparent to allow of a good view of the fundus of the eye. The internal structures were considerably altered, the retina was hazy, and its vessels indistinct; the optic papilla was ill defined in every respect, but still visible. In the reversed image two optic discs were visible, one to the temporal side and the other to the nasal side of the fundus. These could be made to coalesce almost entirely, immediately behind the equator, by lateral movements of the convex object lens. The cause of this phenomenon was that one image was projected by the lens and refracting media, the other, on the contrary, by the refracting media alone, without the assistance of the lens; and the dislocated lens caused the image projected by itself to occupy a different position from the one in the production of which it had no participation.

ART. VI—*Case of Fracture of the Spine, in which the Operation of Trephining was Performed, with Observations.* By ROBERT M'DONNELL, M.D., F.R.S.; Fellow of the Royal College of Surgeons; Surgeon to Jervis-street Hospital; Lecturer on Surgery in the Carmichael School of Medicine; Examiner in Surgery in the Queen's University.

UNSUCCESSFUL cases are often more instructive to the practical surgeon than those which terminate favourably; with reference to the subject which I propose to discuss in the following pages this is