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# Loss of Sight from Loss of Blood.

BY

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## LOSS OF SIGHT FROM LOSS OF BLOOD.

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THAT loss of blood may be followed by disturbance of vision varying in degree from slight transient amblyopia to absolute and permanent blindness has been known for many years.

Attention was first drawn to this subject by Fontanus 270 years ago, who recorded a case in which a man was bled from the medium cephalic vein to the extent of 6 ounces; he lost the sight of the right eye completely during the venesection, but ultimately recovered it. Since then many cases have been recorded. Some time ago an energetic ophthalmic surgeon collected all the cases recorded during the last 275 years, a total of 106. An examination of their histories showed that partial or complete blindness may follow a sudden loss of blood from almost any cause. Among the cases 36 per cent. occurred in hæmorrhage from the intestinal tract, 25 per cent. from uterine hæmorrhage. Artificial bleeding: phlebotomy accounted for 25 per cent., epistaxis 7 per cent., wounds 5 per cent., and hæmoptysis and urethral hæmorrhage each 1 per cent.

In recurring hæmorrhages results vary. A primary loss may have no deleterious effect on vision, while later though smaller hæmorrhages may lead to complete loss of vision in both eyes. Further, the visual acuity may get less and less with each renewal of the hæmorrhage, with intermitting slight improvements as in a case recorded by Hutchinson in the Ophthalmic Hospital reports; or each attack may be followed by blindness from which the patient recovers, or a later hæmorrhage may have no effect at all on vision. It is well to add that most persons whose vision is affected by loss of blood are in bad health. Perfectly healthy people who suffer a sudden loss, such as soldiers in battle, experience no disturbance of vision, at least so far as I can gather no such case is recorded.

Most of the patients are over 40: the youngest was two, the oldest 77. In hæmatemesis twice as many men are affected as women; the amaurosis is bilateral, as a rule, and of equal intensity in both eyes. In 10 per cent. to 15 per cent. one eye alone is affected. In about two-thirds of all diseases there is bilateral amaurosis



(blindness), and in one-fourth bilateral amblyopia. Rarely one eye is blind, while the other is more or less amblyopic—both eyes may become blind one after the other. The disturbance of vision occurs in 25 per cent. of the cases, either during or immediately after the hæmorrhage, in 20 per cent. of cases within the first twelve hours, and later than this in more than half the cases, most frequently between the third and sixth days, and may be delayed even until the eighteenth to the twenty-first day. Pergens, who examined the reports of 64 cases where visual disturbance followed on hæmatemesis, gives the following figures:—In 21 per cent. it occurred immediately, in 9 per cent. with twenty-four hours, before the end of the first week in 51 per cent., in the second week 11 per cent., and in 3 per cent. in the third week. It is remarkable that visual disturbance occurs much earlier after the event in artificial extraction of blood than in spontaneous hæmorrhage. Of course, other symptoms of severe loss of blood are present, viz., fainting, headache, pain at the back of the head and neck, exhaustion, and palpitation. It not infrequently happens that the patient has entirely overcome the general symptoms caused by the anæmia, and feels quite all right when the loss of vision takes place. As far as is ascertainable there is no constant relation between the amount of blood lost and the severity of the eye affection. The duration of the blindness is a varying one, in milder cases from a quarter of an hour to a few hours or a day. In the majority of cases where any improvement does take place, it is only after days, weeks, or months. In practically one-half of all cases there is no improvement, in one-third there is some improvement, and in about one-fifth only is there complete recovery of central vision, and in these with permanent defects in the visual field, *i.e.*, positive, negative, or relative scotomata. Of the cases examined by Pergens, as far as the literature was available, and this applies solely to gastric hæmorrhage followed by disturbance of vision, 36 per cent. became blind in both eyes, 18 per cent. in one eye, 8 per cent. recovered, and the remainder had varying degrees of permanent amblyopia. Cases are recorded where recovery has taken place after several days of complete blindness.

Examination of the patient shows slight external changes, and these are referred to the pupillary reactions. In complete blindness the pupils are dilated and reaction to light is abolished. Where one eye is blind this pupil and that of the seeing eye react synchronously. Ophthalmoscopic examination has seldom been made within a short time of the occurrence of the blindness, for very obvious reasons.

Where this has been done the edges of the disc were blurred with very little swelling, and a haziness of the surrounding retina gradually



disappearing towards the periphery. Small hæmorrhage and white spots have also been seen. Leber has described cases in which there were no changes at all at the fundus. The final condition in unfavourable cases is atrophy of the optic nerve—a white disc with narrow vessels—the usual condition in those patients who come under observation for the first time, after a long interval has passed since the appearance of the eye symptoms. The atrophy may be complete or partial, and the latter may be compatible with quite good vision. The ophthalmic appearances do not always indicate the degree of the amblyopia, and the vision field may be very little or extremely contracted, and a central scotoma may be present either absolute or relative. From what has been said it appears that the prognosis is bad. Treatment appears to be of little use. Strychnine per os, or subcutaneously, and iron, cod liver oil, and quinine, as well as galvanism, have been recommended, and are said to have had a favourable effect in some cases. The pathologico-anatomical process underlying the occurrence of sudden, complete, or partial blindness may be either central or peripheral, *i.e.*, may be in the brain, optic nerve or retina. V. Græfe, who examined two cases, found hæmorrhage into the sheath of the optic nerve, and this is given in many text books as a common cause.

From examinations made microscopically it is found that the locus of the disease at any rate in many cases is the optic nerve and retina. Several hypotheses have been put forward as explanatory of this peculiar sequel to loss of blood: (1) extravasation of blood into the optic nerve sheath as just mentioned; (2) optic neuritis with consequent atrophy; (3) anæmia of the brain causing œdema of the sheath of the optic nerve.

A direct affection of the visual centre must exist where the pupillary reactions are retained as is said to have been the case in two or three instances. More recently, in view of the paucity of material, experiments have been made on animals in order, if possible, to elucidate this obscure problem. Killed at intervals varying from two days to three weeks after large loss of blood, it was shown in these animals that œdema and degeneration in the nerve fibre and ganglion cell layers of the retina was present, and later degeneration in the medullary sheath of the optic nerve fibres as far as the optic tract.

Relatively few eyes in which this condition obtained have been submitted to pathological examination, and until more extended observations have been made the exact cause of the loss of vision will remain in comparative obscurity. It may lay in some altered condition of the blood brought about by the loss, and acting on delicate structures such as the peripheral terminals of the organ of vision, the



physiological integrity of which is maintained only by a supply of quite normal blood, changes are produced resulting in either suspension or complete annihilation of their function, and the delicacy of function may the more readily be realised when it is comprehended, if indeed it can be, that in the ordinary changes which take place in the retina connected with colour perception, only a small fraction of a second of time is consumed in the bio-chemical changes in the visual purple necessary to the perception of the impulse. Professor Burch gives this interval as 1-700th of a second.

It was the occurrence of a case which came to my out-patients that stimulated me to look more especially into this question, and to find, if I could, why it is that loss of sight should follow loss of blood. As you have heard, after a very patient search I find very little light has been thrown on the real relation between the two.

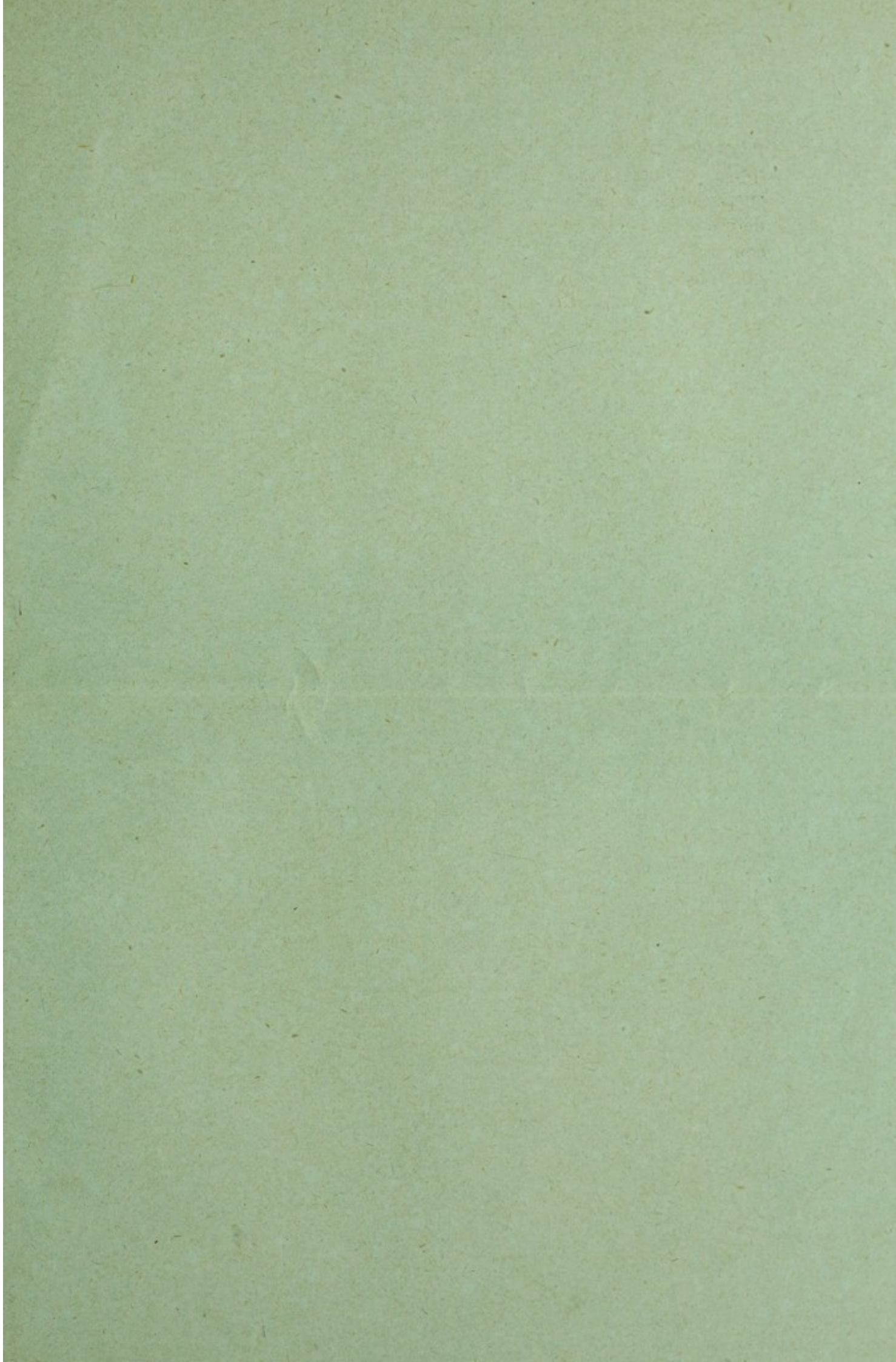
A.B., a married woman of 32, complains of bad vision, right eye = 6-12 with a contracted field, rough test, left eye no p.l. Patient was pregnant three months when she had a large hæmorrhage; loss of blood continued irregularly during the ensuing three months; it then ceased. The pregnancy terminated two months before term, accompanied by much loss of blood. At Christmas the right eye was quite blind, the left eye went a few weeks after, and she was quite blind for five weeks. The right eye has improved up to  $\frac{6}{12}$   $\bar{c}$  a contracted field. The left pupil is dilated and does not react to light, but acts synchronously  $\bar{c}$  the right pupil, the reactions of which are normal.

Ophthalmoscopy: the right disc is pale in the outer quadrant with some slight reduction in size of the vessels. The left disc is quite pearly white, more resembling the disc of primary optic atrophy of tabes, a disease of which she has no other symptom.

More than this, there is little to say. The retinitis of pregnancy is quite out of the question, as shown by the ophthalmoscope, and she certainly never had any other symptom of kidney trouble during the pregnancy; albuminuria was not present at any time.

I assume, and I think quite justifiably, that the condition of the eyes and the bad vision are entirely dependent on the losses of blood she sustained during and at the termination of the pregnancy.







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