sively diseased; it weighed eleven ounces. The mitral and aortic valves presented thickening of old date, and there were two rough fibrous patches covered with fine granular fibrine—one on the wall of the left auricle, the other on that of the left ventricle. The meningeal vessels were full of blood, and the brain in general slightly congested. Upon the surface of the pia mater were numerous minute red spots, some consisting obviously of small extravasations, requiring a magnifying glass to display their character. These small spots of hæmorrhage were always disposed upon the course of an artery; and it was made out with regard to many of these, that in the artery, just where the point of blood was outside it, was a minute clot of decolorised fibrine. The minute spots of hæmorrhage were on or in the substance of the pia mater; they had no tangible thickness. A few very minute embolisms were found in the substance of the brain; but the larger arteries were examined in vain for evidence of any larger obstruction. There was no softening. The appearances presented by the brain are shown in a drawing, for which I have to thank my friend Dr. Drewett. I need not describe the other organs in further detail than to say that the lungs were congested, and that well-marked embolic blocks were found in the liver, spleen, and kidneys.

CASE II.—The second case is nearly parallel to the first. The subject of it was a girl named Constance S., aged 18, who came under my care at St. George's Hospital on April 9th, 1879. She had had the usual infantile complaints, but never rheumatic fever, so far as was known; and passed for well until three days before admission. On Sunday, she was noticed as pale. On Monday, she was giddy, drowsy; had severe pain in the frontal region, and vomited whenever food was taken. On Wednesday, she was very feverish, with a temperature, as was reported, of 105°, and on this day was brought to the hospital. She had hitherto been perfectly sensible.

On admission, she lay in a drowsy condition; from which, however, she could be easily roused. The skin was hot (temperature 104.8°), dry, and dusky. There was much intolerance of light; the eyelids were partially closed; the pupils contracted and sensitive. There was external strabismus of the right eye; but no other evidence of paralysis could be detected. There was slight frontal headache, but no twitching or convulsion. The pulse was at the rate of 120; the tongue red in the centre and at the tip; elsewhere coated with white. The urine presented a trace of albumen. There was no diarrhoea; no abdominal fulness or gurgling; no typhoid spots. Although there was nothing to draw attention to the state of the heart but the cerebral symptoms, a loud systolic mitral murmur was detected on examination, together with an excess of impulse and a marked præcordial thrill. The sudden beginning of the febrile symptoms, their rapid advance, the co-existence of the heart-disease, and the close resemblance which this case presented to the one previously recorded, led, as in that case, to the diagnosis of disseminated cerebral embolism, and to the use of alkalies; bicarbonate of potash being ordered in doses at first of eighty grains every three hours, together with carbonate of ammonia.

Next day, she was in much the same condition, except that there were paroxysms of severe pain in the frontal region, and more or less constant aching behind the head. Bronchitic wheezing was heard over both lungs. The temperature was only slightly lower, ranging from 103.2° to 104.6°; sordes collected about the mouth; the tongue became red and dry; and the general aspect of the patient was almost exactly that of typhoid. No *tache cérébrale* could be elicited. The urine was now alkaline. The potash was diminished, and quinine added. Without any further symptoms or abatement of the fever, the drowsiness deepened into insensibility; and in this state she expired on the morning of April 12th, on the seventh day of the disease, the third after admission.

On *post mortem* examination, the heart was found to be the subject of both old and recent disease. The mitral valve was greatly thickened, and its opening narrowed by about one-third. On the auricular surface was a patch of roughness due to granular fibrine; and at this position was attached a long thin semi-gelatinous vegetation, which hung loosely from the valve, and was probably more recent than the granular fibrine at its base, and dated, perhaps, not much before the completion of the act of death. On exposing the membranes of the brain, a number of small hæmorrhages, which varied in size from a pin's head to a sixpence, were found on the pia mater under the arachnoid, mostly over the convexity of the brain. In the centre of these, a small white speck could be seen, which minute examination proved to be a small pale clot within an artery. In connection with several such spots, were small localised effusions of yellow lymph on the pia mater external to the affected vessel. There was no lymph at the base, nor any on the convexity, except in connection with the vessels affected as described. These changes were confined to the surface of the brain; all the internal parts were natural, as far as could be seen. There was no soft-

ening, nor any excess of blood in the ventricles. The lungs were congested. Many small embolic blocks were found in the spleen, with one patch of softening, which apparently had a similar origin. In the liver were several minute white deposits, surrounded by congestion, evidently of the same nature; and several embolic obstructions were found also in the kidneys.

REMARKS.—The two cases were similar in almost every particular. The subjects of both were girls; the leading symptoms in both were high fever and delirium, without any—or with scarcely any—definite paralysis, or the aphasia so common with cerebral embolism. The temperature in one case was always between 102° and 103°; in the other, generally between 103° and 105°. In both, there was much evidence of pulmonary congestion with the progress of the disease, and rapid death by coma. With both, there was a resemblance to meningitis in the headache, the vomiting, and the mental disturbance; while in neither was there the constipation which is general at least with the tubercular form of this inflammation. In both, the resemblance to a specific fever, especially to typhoid, was superficially evident; but the fever was too high, and the cerebral embarrassment too great, for so early a date in the course of that disease. The resemblance to an acute specific fever was indeed striking, and might have been misleading, had the cases been observed hastily, or in disregard of the concomitant circumstances. The pathological condition was, in a word, the distribution through the brain of embolic dust, which was so fine as to traverse without hindrance the larger arteries of the base and substance, to be finally arrested in the minuter channels of the pia mater.

OPTIC NEURITIS IN CHLOROSIS.*

By W. R. GOWERS, M.D., F.R.C.P.

Assistant-Professor of Clinical Medicine in University College; Physician to the National Hospital for the Paralysed and Epileptic.

THE occasional occurrence of optic neuritis in chlorosis—due chiefly, at least, to the state of the blood—is a fact of great interest both to the ophthalmic surgeon and the physician, which has scarcely received due attention.

In my work on *Medical Ophthalmoscopy*, I have recorded one case which is certainly, and another which is probably, of this character. I have now only one fresh case to narrate, but my apology for bringing it forward is, that its history is very significant.

One of the cases which I have already published has had lately a second slight attack, and I will, therefore, briefly narrate it first.

CASE I.—A girl, aged 17, came under treatment in November 1878, with all the well-known symptoms of chlorosis; amenorrhœa, dyspnœa, and extreme pallor. The hæmoglobin was reduced to 30 per cent. of the normal, the blood-corpuscles being 60 per cent. She complained of failure of sight, and near vision was found to be, right $\frac{1}{2}$, left $\frac{1}{4}$. Colour-vision was normal. There was $\frac{1}{2}$ hypermetropia. The ophthalmoscope showed distinct optic neuritis. The discs were red, with edges blurred on all sides to direct examination, to indirect examination on all except the temporal side. There was sufficient swelling to alter the curve and reflection of the veins. The patient was treated with iron, and very slowly improved. As the anemia lessened, the neuritis slowly subsided, and vision improved to $\frac{1}{2}$ each eye (without correction). When she left the hospital, on February 5th, the discs were much clearer. All swelling had disappeared; the edges could be seen in almost the whole circumference, but were scarcely so sharp as normal. She was seen again five months later. She still looked pale, and the hæmoglobin had fallen to 65 per cent., the red corpuscles being 79 per cent. Vision for near objects was now normal (1) each eye. The discs were perfectly clear and sharp; the cup, however, being scarcely so white as is common in a normal state. The catamenia were still absent. They returned in August, and continued regular during the next four months. During this time, the patient was not seen. In the beginning of February of 1880 she applied for advice, having become weaker. She was again extremely pale, and had only 30 per cent. of the normal amount of hæmoglobin, and 46 per cent. of corpuscles. She complained of pain at the back of the eyes, ringing in the ears, shortness of breath, and the usual symptoms of anemia. The optic discs again presented blurred edges, with slight prominence, and the physiological cups were concealed; sight was unaffected. Under the chloroxide of iron, she rapidly improved; in three weeks' time, the left disc had entirely cleared, and the right had almost cleared. A month later, she left the hospital, the hæmoglobin having risen to 80

* Read in the Section of Ophthalmology at the Annual Meeting of the British Medical Association in Cambridge, August, 1880.

per cent., and the red corpuscles to 96 per cent. of the normal. The discs were then natural.

CASE II.—On October 1st, 1879, a younger sister of this patient, aged 16, was brought to me by her mother, who stated that the girl's sight had become bad, just in the same way as did her elder sister's. The girl was well until a year before, when she had gradually become weak and pale. Her breath had become short during the last six months, and for the same time she had complained frequently of frontal headache, and the catamenia had been absent. She presented considerable pallor, and examination of the blood showed that, although the corpuscles were 72 per cent. of the normal, the hæmoglobin was only 38 per cent. Although she complained of her sight being bad, vision was $\frac{1}{2}$ and $\frac{1}{3}$ each eye; there was no defect in the field of vision, and perception of colour, tested with Holmgren's wools, was perfect. The pupils were equal, and acted quickly to light. There was slight hypermetropia in each eye, $\frac{1}{4}$ in the right, $\frac{1}{8}$ in the left. The ophthalmoscope, very much to my surprise, revealed in each eye a well-marked optic neuritis. In each, the edges of the disc were invisible, being concealed behind a swelling about two and a half times the diameter of the disc, and of a prominence which gave a difference, between the top of the swelling and the fundus, of two dioptres. The veins were distended, and curved down the sides of the swelling. The arteries were small. There was a good deal of striated whitish tissue about the surface of the swelling, but there were no conspicuous white spots. At the upper edge of the swelling in the right eye was a striated hæmorrhage. There were no white spots on the fundus. The appearance of the two papillæ, and the degree of swelling, were similar, but on the left there was less striation, and there was no hæmorrhage. The patient's urine was free from albumen and sugar.

The girl was admitted into University College Hospital, placed on the chloride of iron, and kept at rest in bed.

Ten days later (October 10th), her pallor was about the same, but she felt better. There was a striking improvement in the condition of the discs. The swelling in the left, though still marked, had so far subsided, that the position of the edge could be made out by the indirect examination, and the swelling now extended only a little distance beyond the edge. The veins were smaller; the hæmorrhage had disappeared. The subsidence in the right disc was still greater than in the left. The edge could be seen, with the indirect examination, all round, and the physiological cup was reappearing in the middle. In each eye, the edge of the disc was still concealed to the direct examination.

Five days later, on October 15th, there was further subsidence of the swelling, so that in the left eye, the edge of the disc, on the temporal side, could just be seen by the direct method of examination. By the indirect method, the position of the edge could be discerned all round. The central cup was now reappearing in the left eye, as well as in the right. Vision remained normal.

On October 22nd, three weeks after the commencement of treatment, the hæmoglobin had increased to 55 per cent., and the corpuscles to 86 per cent. The edge of the left disc, on indirect examination, was still somewhat blurred, and the surface of the disc reddish; surrounded, beyond the edge, by a pale halo; but the swelling had almost disappeared. To the direct examination, the edge was still indistinct on the nasal side, the appearance being nearly that of the disc of her sister when the drawing was made. The edges of the right disc were fairly sharp, and the physiological cup clear; it might have been passed as within physiological limits. The vessels were normal.

A fortnight later (November 5th), the hæmoglobin had risen to 66 per cent. of the normal, and the corpuscles to 85 per cent. The left disc had become clear, and the central cup was somewhat depressed, although still red.

On December 10th, the hæmoglobin had risen to 80 per cent., and the corpuscles to 96. The patient looked and described herself as being quite well. The right disc was perfectly normal in appearance; the left nearly normal. The edges were still not quite sharp; least so on the nasal side, and still presented a somewhat "filled in" look, the centre being less depressed than that of the right disc. The patient then ceased attendance. I have lately heard that she remains quite well, and is now in a situation as nurse.

On my first examination, the degree of neuritis was so great, and its characters so exactly such as are commonly seen in cases of cerebral tumour, that I could hardly believe that the patient was not suffering from encephalic disease, although she presented no symptoms which were not explicable by the anæmia. I gave to the mother a very guarded prognosis. The progress of the case, however, does not afford the slightest ground for suspicion of intracranial disease, and the subsidence of the neuritis on the administration of iron, a subsidence more rapid than I have almost ever seen, even in cases of syphilitic disease, seems conclusive evidence of its dependence on the anæmia.

I show now the drawings of an intense neuro-retinitis, *i.e.*, papillitis involving the adjacent retina. The figures present its appearance during the active inflammation, and after this had subsided. As the case is published in *Medical Ophthalmoscopy*, I merely mention the chief points, which are of interest in connection with the case last described. The patient was a young woman, with well-marked chlorosis, and the neuro-retinitis developed with extreme rapidity. The degree of intensity shown in the first drawing, a swelling extending as far as the macula lutea, with abundant hæmorrhages and extensive disturbance of the retina, was developed in about ten days, the discs having previously been normal. Iodide of potassium was first given, on the supposition that the patient, a good-looking domestic servant, might possibly be suffering from syphilis, of which, however, there was no history. No improvement occurred, however, until iron was substituted, and then subsidence at once commenced; but, unfortunately, the amount of damage was so great that consecutive atrophy resulted. The stellate group of spots around the macula suggested the possibility of Bright's disease; but of this there was no indication, the urine being repeatedly examined, and this appearance distinctly resulted from the damage to the retinal elements by the inflammation, as it is well-known to do in such cases. The patient was watched for two years after the subsidence of the neuritis, and, except an occasional headache, there was never the slightest symptom to suggest intracranial disease. I have never known neuritis of cerebral origin develop to such a degree with such rapidity; and the rapidity of development, in conjunction with the entire absence of intracranial symptoms, exclude, I think, such a source.

Hesitation may be felt in ascribing to the state of the blood an affection so intense as that shown in the last case. But the difference between it and the second case is scarcely more than between the degree in the second and in the first case described.

In all the patients, there was amenorrhœa. It may be thought that the neuritis was due to the suppressed menstruation; but amenorrhœa is almost invariable in the degree of chlorosis which these patients presented. To suppose that an amenorrhœa of six months' duration, the result of the anæmia, would cause optic neuritis, appears to me unwarranted, when we have in all the cases the present anæmia, a pathological element of known potency, and of continued activity; and which has been proved, in pernicious anæmia, to be capable of causing the effect observed.

It is worthy of note that all the patients presented a slight degree of hypermetropia. I have observed the same coincidence in the neuritis observed in rare cases of functional diseases of the brain. The strain on accommodation in hypermetropia is generally admitted to be capable of causing a transient congestion of the disc, or slight neuritis, quickly subsiding with rest. This my own observation fully confirms. It is, I think, possible that, in these cases of chlorotic neuritis, the hypermetropia may act as the excitant of the change in the papilla, which, owing to the state of the blood, reaches a much more intense degree than it would otherwise attain.

It is needless to point out the practical importance of the recognition of the nature of these cases. In iron, we possess a remedy which is apparently capable of effecting improvement with great rapidity. I fear that, in the last case mentioned, the permanent damage to sight was in part due to the delay in the administration of iron, under the idea that the affection might be syphilitic; and I cannot doubt that, in the second case, sight would have suffered had not iron been promptly given.

One other point in therapeutics: Absolute rest to the eyes is, of course, essential, but absolute rest to the body and mind is of not less importance. The oxygen-carriers of the blood, reduced in number and in power, can scarcely convey enough oxygen to keep up the nutrition of the protoplasm-tissues; and, if any of the oxygen be used up in muscular or other exertion, the protoplasmic tissues suffer, and their degeneration is increased. Hence, I have found confining the patient to bed for a week or ten days of the greatest service at the outset of the treatment of all cases of profound anæmia. The subsidence of such symptoms as headache, vomiting, etc., under its influence, before iron is given, sufficiently attests the value of absolute rest; and its influence must be purely beneficial in the case of such tissue-changes as occur in optic neuritis.

DR. ROBERT ELLIOT has been re-elected to the post of Officer of Health for the city of Carlisle, but his appointment is for one year only. Looking to the terms upon which all the other city officials are appointed, it seems very hard that the medical officer of health should alone be singled out for the annual anxiety and trouble of re-election. Other municipal appointments being permanent ones, held during the good behaviour of the officer, it is not easy to understand why the post of medical officer of health should be made an exception to this rule.