do with coal getting. He says "There is plenty of light from big paraffin lamps." I need not further detail his case.

Now in these two cases the "light" question does not come in. There are many occupations above ground pursued in no better or even in worse light. I think the explanation of the causation of nystagmus given is correct. Viewing the five exceptional cases together, it is clear that there are instances of men working underground who suffer from nystagmus, and though not working at coal getting, are pursuing their avocations in a manner that is not irreconcilable with the views I have set forth as to the prime cause at work in occasioning the disorder.

I must pass by many interesting points connected with treatment, and allude only to some of the results, which lend valuable aid in support of the contention as to the part played by the miner's manner of work in causing his malady.

Formerly it was my practice, after a period of rest in severe cases, or more quickly in slighter ones, to advise the patient to seek some work outside of the pit, on the bank, or to obtain some other employment. Increased experience has taught me that leaving the pit, except temporarily, is unnecessary. I lay particular stress upon this.

Included among the 120 cases with which I have dealt in this article—or really 106, because 14 were not actual patients, but were included in a special inquiry as to naked lights—will be found several instances which will bear out the statement that a change of work has been followed by improvement, and they have been enabled to continue working underground. All that has been necessary is that any occupation causing such a constrained position as holing should be discontinued; safety lamps have been used as before.

The following is a particularly interesting case. W. B., aged 29, came to me at the Infirmary on November 11th, 1890. He has worked in the pit for twenty years, and has used safety lamps for fourteen years. He has been suffering from symptoms for about the last two or three months. Quite recently he became worse, and was compelled to leave his work, and, thereupon came to me. He was similarly afflicted five years ago, and was under my care then, and recovered. On my advice he obtained work outside the pit. He continued at this for twelve months, then he went into the pit, looking after the roads and ponies. Then for six months he did getting coal down after it had been holed by others, and removing the "spraggs" or wood supports. He did all this work with safety lamps, be it remembered, without finding it, as he says, trying to his eyes. He thought he might return to his old occupation of holing. He did so, and at the end of four months he was compelled to leave his work and again seek my aid, and this notwithstanding a respite of getting on for five years since he had done holing before. His was a bad specimen of nystagmus. By treatment, at first at my hands and then at the medical side of the Infirmary under my friend, Dr. Cocking (for he had also cardiac disease) he has again made a most satisfactory recovery. He will soon be fit, if he wishes it, to obtain employment underground again, but he will not do holing. When the man first came to me five years ago he was a "lamp man." Is it to be wondered at that he is now convinced that to the constrained position necessitated in holing is to be attributed his disorder?

It is unnecessary to give details of other cases. One of the most recent is a man I saw at Christmas last, of whom my friend Dr. Scott writes: "S. has changed his work to 'datalogging'; he lays rails down for trams, and although he is working in quite as bad a light—ordinary lamps (safety)—still his eyes are not so bad."

In conclusion, let me say that it has been impossible in the space at my command to have either dealt fully with the points mentioned, or indeed to bring out all the evidence and facts, which in the course of a long investigation have accumulated in my hands. Many important facts have been omitted; so much, indeed, is this the case, that it is my purpose shortly to publish in book form my observations in a complete manner, and to illustrate by engravings and photographs the various kinds of work pursued in the pit. For the present, I think I have brought forward sufficient evidence to show that not only is nystagmus met with in the workers with naked lights, and that by no means infrequently, but, further than this, instances have been given of its occurrence in men, not practical miners, pursuing their

work in a good light; that it is impossible to regard, therefore, the use of safety lamps as a sole, or even essential, element in causation, and that even imperfect illumination may be absent. On the other hand, the evidence given as to the men seen at work in the pit, the analysis and consideration of the cases, supported as it is by the views of Dransart, Neiden, and Zieminski, point to the position assumed at work as the prime element in causation. It has been further shown how such a theory is consistent with the symptoms present, and that the results of treatment so based are eminently satisfactory.

TUBERCULOSIS OF THE CHOROID: A FURTHER CONTRIBUTION.

By GEORGE CARPENTER, M.D. LOND., M.R.C.P.,

Physician to Out-patients at the Evelina Hospital for Sick Children, Southwark.

SINCE December, 1889, when I published an article on the above subject in the *Illustrated Medical News*, four additional cases have come under my observation, and two of these are of interest in so far as they illustrate the fact that tubercles in the choroid are to be found in cases other than those of general tuberculosis, both these cases occurring in patients who gave evidence of a localised tuberculous complaint. An account of the case suffering from general tuberculosis, of which the drawing of the fundus now appears for the first time, is to be found in the *Illustrated Medical News*. It is the case of E. S., of which a full history will be found there; and I content myself with detailing the fundal appearances, of which the drawing gives a very good idea.

E. S. Right eye. June 17th, 1889.

Right Eye.—No neuritis, but vessels inclined to be "corkscrew." Between the descending veins is a patch irregularly oval, and a trifle smaller than the optic disc, which is a light fawn colour. It has a reddish-black irregular margin, the redness due to the red reflex showing through the retinal pigment, which is here a shade or two darker. At one spot the retinal pigment is, as it were, shaved off obliquely, and has the appearance of gradually thinning off towards its edge. In the centre is a minute narrow black ring of retinal pigment, and this ring is filled in with the same fawn colour which is seen in the body of the tumour. This body is crossed in the centre by an artery, which runs due south; the

artery is in perfect definition. The vein passing S.E. crosses its margin, partly on the face of the patch, partly on the pigmentary edge; it is well defined. At some little distance from this, and crossed by the vein running S.E. is a fawn-coloured patch, circular in outline, but with an ill-defined margin; it gives one the idea of the retinal pigment having been stroked off with a camel's hair brush. The vein passing across this body is well defined. Several other bodies are to be seen in different part of the fundus; they are either reniform or bluntly triangular, very small, many times smaller than the optic disc, and of a fawn colour. They are quite defined from the retinal pigment, which next them is a trifle darker than elsewhere. When in the proximity of a vessel this crosses them with perfect definition. Two bodies similar to these were found in the fundus of the left eye.

CASE I.—G. G., aged 2 years 5 months, was brought to the Evelina Hospital, on January 23rd, 1890, for a cough and wasting. On examination he was found to be rachitic; the physical signs were those of bronchitis, and he whooped. The liver and spleen were both enlarged. The abdominal walls were tense, prominent, and rounded. The child was emaciated. On February 3rd he was stated not to

G. G., aged 2 years 5 months. Left eye.

keep his food or medicine down, and he passed a "lot of blood" from the bowels on one occasion. He did not improve by February 10th, but was rather worse. An ophthalmoscopic examination revealed the following: At the left yellow spot there was a raised quadrangular mass, with very ill-defined margin, in size about eight times that of the optic disc, and in colour of a dirty grey. The retinal pigment crossed it, and covered it irregularly, being intensified in one spot, in another thinned out, and every here and there a zigzag rift was noticeable in the darker portions. The retinal vessels crossed it; there were very many of them, and they were only fairly distinct, being blurred a little. A light streak on them could not be detected, and the retina was evidently oedematous. In both eyes there was slight optic neuritis. The patient died on March 7th of general tuberculosis. Grey tubercles were found in the lungs, liver, spleen, kidneys, and peritoneum. Along the small and large intestine multiple small punched-out ulcers were found, with enlargement and caseation of the mesenteric glands. Tubercles were discovered likewise in the meninges. A large grey tubercle was found at the yellow spot region of the left eye.

CASE II.—R. P., aged 13 months, was brought to the out-patients' on March 17th, 1890, for whooping cough. On examination the lower lobe of the right lung in front, and in the axillary region was found to be consolidated, and there was deficient resonance over both bases behind. Elsewhere rhonchi and non-consonating *râles* were detected. The liver and spleen were enlarged. Temperature 101° F. The right optic disc was hyperæmic, and the margin was blurred at the upper and nasal side. The left optic disc was blurred at the upper and inner side, and on the inner side of the disc, at some little distance from it, in the fork of a vessel, there was a white oval patch, the margin of which gradually faded into the red reflex with its overlying retinal pigment. The retinal vessels in its neighbourhood were ill-defined, and presented a muddy appearance (retinal oedema). The child subsequently died, and at the necropsy grey miliary tubercles were found thickly scattered throughout the lungs, liver, spleen, kidneys, and brain. In the eye a grey tubercle was found, as had been demonstrated *ante mortem*.

CASE III.—H. B., aged 3 years, a case under the care of Mr. Targett, who had had the left hip excised for tuberculous disease, and was suffering from an abscess of the right hip, was examined ophthalmoscopically on April 10th, 1890. In the left eye I found the following: Situate at some little distance from the optic disc, which presented no signs of neuritis, was an oval body of paper-white colour, with its long

H. B., aged 3 years. Left eye (indirect).

axis lying at an acute angle with the horizontal meridian of the disc. This body was six or seven times smaller than the optic disc, and presented in its centre seven isolated black pigment grains. The edge was fairly defined from the retinal pigment, giving much the appearance as if the immediate neighbouring retinal pigment had been thinned off with a camel's hair brush. A main branch of the vein and artery, passing S.W., crossed its surface undisturbed. The child died on April 11th, 1890. There was old tuberculous mischief at the right apex of the lung, and the bronchial glands were enlarged.

CASE IV.—J. W., aged 3 years, was under the care of Mr. Makins for cervical caries. I examined the eyes on April 24th, 1890, and found the following: In the right fundus, situate to the S.W. of the yellow spot, was a tubercle somewhat smaller than the optic disc. It was of fawn colour, and its margin was fairly defined from the surrounding retinal pigment. Midway between the centre and the circumference of this body was an irregular narrow ring of pigment granules. Two small vessels crossed the face of the tumour quite undisturbed. The edge of the optic disc was a trifle hazy, but there was no bending of the vessels. In the left eye the north of the optic disc was a trifle hazy, but the rest of the margin was quite well defined. The patient went to a convalescent home on August 20th, 1890, provided with a special support. The eyes were examined a few days before his discharge, when the optic discs and the tubercle remained *in statu quo*. This patient subsequently developed whooping cough, and died of acute tuberculosis at the end of April, 1891.

In the article previously mentioned I said, "Tubercles of the choroid are excessively protean in their characteristics, and one must be prepared to find them under several guises. From choroidal atrophy, their proximity to the optic disc, and the fact that they are slightly raised, taken together with their often isolated character, ought to be sufficient distinctions. To distinguish between choroidal and retinal pigmentary disturbance confined to the deeper layer is, of course, quite impossible; where they assume the appearance of localised patches of choroiditis, the absence of inflammatory symptoms in the eye, and their often close proximity to the optic disc, will serve to distinguish them; and the same may, perhaps, be said where the overlying retina is oedematous, and it is impossible to detect the underlying choroidal

J. W., aged 3 years. Right eye (indirect).

mischievous. At any rate, these appearances met with in a case of possible acute tuberculosis should be sufficiently diagnostic of the tuberculous condition. When the body appears like a grey tubercle, and more especially if this is noticed to be raised by a parallax or otherwise, it should not be possible to mistake the appearance for anything else. Though these bodies more often than not have a well-defined margin, yet, as has been seen, this is not always the case, and an indistinct and irregular margin should not be taken to contraindicate tubercle."

The views, then, that I expressed with regard to the ophthalmoscopic appearances of tubercles in the choroid, and their diagnostic distinctions from other fundal diseases presenting somewhat similar characteristics, are in no way prejudiced by this fresh narration of cases.

I should have, perhaps, added that a peripheral situation in the fundus, although of less frequent occurrence, does not contraindicate the diagnosis of tubercle.

THE ADMINISTRATION OF ETHER IN OPERATIONS REQUIRING THE LATERAL OR THE PRONE POSITION.

By C. E. SHEPPARD, M.D., B.S. (LOND.), F.R.C.S.,
Second Chloroformist to the Middlesex Hospital; Anaesthetist to Guy's Hospital (Dental School) and the National Orthopaedic Hospital.

On three occasions recently I was called upon to administer an anaesthetic in cases where, from the nature of the proposed operation, a completely prone position was requisite. The patients were healthy middle-aged subjects, and nothing presented itself either in their general condition or in the nature of the operation to contra-indicate the use of ether. This anaesthetic was accordingly administered, Clover's portable inhaler being used, and the patient lying at first in the usual supine position. As soon, however, as the prone position had been assumed, it was found that the further use of the ether inhaler was rendered well-nigh impossible by inaccessi-

bility of the face, and chloroform was substituted for the remainder of the administration. Now, although the behaviour of these patients under chloroform was in every way satisfactory, I am well aware that a certain amount of risk was incurred, and my object on the present occasion is to urge the preference to be given to ether under similar circumstances (that is, in cases where a completely or partially prone position is requisite, and where the general condition presents no contra-indication to its use), and to bring under notice a simple contrivance whereby the inconveniences thus attendant on its administration may be overcome.

That mechanical interference with thoracic expansion is in itself able to bring about a fatal asphyxia is sufficiently demonstrated by the numerous records of cases where suffocation is to be attributed to this cause alone. An essential difference must, however, be noted between the operation of such interference in the ordinary state of consciousness and in the passive condition of artificial anaesthesia respectively. In the former case the sensation of impending suffocation is recognised by the subject and increased muscular effort is put forth, sufficient or not, as the case may be, to counteract the effect of the opposing force; in the latter case there is no longer consciousness of the need for increased respiratory effort and, furthermore, the action of the anaesthetic in causing the progressive relaxation of most of the muscles therein concerned will ultimately render such increase of muscular exertion physiologically impossible. Dastre, in his work on anaesthetics,¹ gives the result of an experiment conducted on a dog weighing between 12 and 13 kilogrammes; before anaesthesia, a weight of 75 kilogrammes, applied to the sternum, was required in order to arrest respiratory movement; after insensibility had been produced by chloroform, 58 kilogrammes sufficed, whilst at the end of one hour a weight of only 25 kilogrammes (or one-third of the original weight) was required to bring about the same result. The experiments conducted at Hyderabad point to a similar conclusion; in two cases where the chest was enclosed in a plaster-of-paris jacket, and the abdominal movements were also restricted, the animals are reported to have succumbed very quickly.² As regards actual clinical experience, I have twice met with cases where under chloroform an absolute cessation of respiration occurred as the direct result of impeded thoracic and abdominal movement in the semi-prone position; this was at once rectified by simply replacing the patient in the supine position, and thus removing the mechanical impediment. Furthermore, several cases have occurred where a fatal result is to be attributed to a prolonged use of chloroform in the prone position, although unfortunately, as far as I am aware, they have not been reported.

A very brief consideration of the condition of things will, I think, render obvious the possible dangers which may be met with clinically. In the prone or ventral position the superincumbent weight of the trunk acts directly upon the most mobile portion of the chest walls, and must necessarily interfere materially with their free expansion, whilst at the same time the descent of the diaphragm is similarly hampered by compression of the abdominal walls. If now, on the one hand, the narcosis induced be a deep one, the chances are greatly in favour of this mechanical embarrassment so far interfering with respiratory action that both it and the circulation are in a short time seriously, if not irretrievably, compromised. If, on the other hand, the narcosis be a light one, it may well happen that in the new position the range of inspiration, and with it the intake of chloroform vapour, are so much interfered with that an actual retrogression of symptoms occurs; in this way a stage of narcosis which, although moderate in degree, is yet sufficient to guard against the occurrence of reflex respiratory obstruction, masseteric spasm and the like, may pass gradually into one of a lighter degree, in which these dangerous complications are most liable to supervene. Such conditions occurring in the course of a shallow breathing may be readily overlooked by any but the most experienced and vigilant administrator, and in the particular position which I am now considering, where the openings of the mouth and nose, the pupils, the eyeballs, and the face generally are more or less concealed from observation, there will be a great liability to fall into error as regards the

¹ A. Dastre, *Les Anesthésiques*, Paris, 1890, p. 92.

² Lauder Brunton, *Med. Soc. Trans.*, vol. xiii, 1890, p. 271.