

of a gall-bladder shadow is not only strong evidence of a gross lesion of the gall bladder but a clear indication for cholecystectomy.

GROUP III.—POOR GALL-BLADDER SHADOW.

At Operation Diseased Gall Bladder.

In this group there were 7 cases. In 4 cases gall stones were faintly outlined as negative shadows by the surrounding dye-laden bile (see Fig. 5). In the other 3 the hazy outline and indistinct shadow indicated deficient concentration. In all cases at operation, whilst the gall bladder contained bile, its wall was the seat of gross pathological change and cholecystectomy was performed.

GROUP IV.—GOOD GALL-BLADDER SHADOW + CALCULI.

At Operation Functioning Gall Bladder.

In this group there were 3 cases. In one case the gall bladder contained several calculi, but the wall was not thickened and it contained clear bile (see Fig. 4). In this case an ideal cholecystectomy was performed. In the other two cases the gall-bladder wall, although not functionless, showed naked-eye evidence of pathological change and cholecystectomy was performed.

GROUP V.—CASES OF OBSTRUCTIVE JAUNDICE.

The method was employed in 8 cases of obstructive jaundice. Contrary to the experience of Carman, we found no serious untoward effects. In 4 cases there was no reaction, in 4 slight nausea, and in 2 transient vomiting. *In no case was any shadow visible in gall bladder or ducts.* In 6 of these cases a stone in the common duct was the causative factor, and in 4 of those the gall bladder was shrunken and functionless. In one of the four the whole biliary duct system was distended with "white bile." In two a previous cholecystectomy had been performed. In one case of carcinoma of the head of the pancreas the biliary passages were filled with thick tarry bile which had effectually prevented further biliary excretion. In the last case a carcinoma of the hepatic ducts (already referred to) completely blocked the passage. The lesson to be learned from this group is that in jaundiced patients the method gives little, if any, help in localizing the lesion.

GROUP VI.—DEFORMED GALL-BLADDER SHADOW.

At Operation Local Cholecystitis.

In one case an hour-glass-like shadow in the radiogram was found at operation to be due to a localized hard inflammatory mass in the wall of the gall bladder, the remainder of which appeared healthy (see Fig. 6). A cholecystectomy was performed, and on slitting up the organ a dense fibrous mass, three-quarters of an inch in diameter, was found in an otherwise healthy wall.

COMMENTARY.

Our experience in this series of cases leads us to believe that in cholecystography we now possess a valuable aid in the diagnosis of gall-bladder disease. When a gall-bladder shadow is visible, if it be of normal density and contour, gross disease may be excluded but mild cholecystitis may be present. Gall stones casting no shadow in the ordinary radiogram may be shown up as negative shadows. Care must, however, be exercised not to mistake gas in the overlying colon for a gall stone. Given correct technique the absence of a gall-bladder shadow indicates one of three conditions:

- (1) Obstruction of the cystic duct by a stone within it or in Hartmann's pouch, or by fibrosis, catarrh, or neoplasm.
- (2) A gall bladder so filled by stones that dye-laden bile cannot enter.
- (3) A gall bladder so diseased or shrunken as to be functionless.

In cases where a preliminary radiogram has shown doubtful shadows suggestive of gall stones, the accurate localization of the gall bladder gives confirmatory evidence, the method being thus comparable to pyelography in cases of renal calculus. In such a case, under the care of Mr. Henry Wade, the preliminary x-ray photograph showed what appeared to be a renal calculus as well as gall stones. The sites of the calculi were accurately defined by pyelography

and cholecystography, and both conditions successfully dealt with at one operation. When a palpable lump is present in the right hypochondriac region it is possible by cholecystography to determine whether it is a new growth in the liver or a distended gall bladder. In a case which was lately under our care the patient had recently been operated on for an endothelioma of the thigh. He developed a painless, rounded, and mobile swelling under the right costal margin associated with an intermittent rise of temperature. A cholecystogram showed that the gall bladder was functioning normally and was situated below the margin of the swelling, thus confirming the diagnosis of secondary growth in the liver.

In order to simplify the test the dye may be given by the mouth, either in capsules or in pill form. Carman has practised this method of administration extensively in the Mayo Clinic and recommends it for general use. We have used the oral method in but a few cases. The results were so inferior to those obtained by the intravenous administration of the dye and the latter so much more accurate and certain that we now practise it exclusively.

The outstanding feature of cholecystography is that it is a means, not only of demonstrating anatomico-pathological changes in the gall bladder, but also of testing the functional capacity of the organ. Whilst modifications and improvements of the method will doubtless follow further experience, we believe that it will have a permanent place as a method of physical diagnosis.

In conclusion we desire to express our thanks to Mr. Henry Wade for permission to include three cases which were under his care in this series, and to Mr. Leslie Stewart for his help in the investigation of these cases.

REFERENCES.

- ¹ Graham and Cole: *Journ. Amer. Med. Assoc.*, 1924, lxxxii, 63. ² Graham, Cole, and Copher: *Ibid.*, 1924, lxxxii, 1777. ³ Graham, Cole, and Copher: *Annals of Surgery*, September, 1924, 473. ⁴ Graham, Cole, and Copher: *Journ. Amer. Med. Assoc.*, 1925, lxxxiv, 14. ⁵ Whitaker and Milliken: *Surg., Gynecol. and Obstet.*, January, 1925. ⁶ Carman: *Lancet*, 1925, ii, 67. ⁷ Cohen and Roberts: *BRITISH MEDICAL JOURNAL*, 1925, ii, 54.

EMBRYOMA OF THE TESTIS:

SUDDEN DEATH FROM THROMBOSIS OF PULMONARY VEINS.

(With Special Plate.)

BY

A. E. WEBB-JOHNSON, C.B.E., D.S.O., M.B.,
F.R.C.S., F.A.C.S.,

SURGEON TO THE MIDDLESEX HOSPITAL.

It is not at all uncommon for a patient with a tumour of the testis to seek advice in the first instance on account of secondary deposits, either in the loin or even in the posterior triangle of the neck when metastases have travelled along the thoracic duct; but the extreme case of death occurring without any tumour having been noticed must be almost unique.

An officer, aged 31, was admitted to No. 14 General Hospital, Boulogne Base, on November 15th, 1915, as a "walking case," having been sent down from the front with a diagnosis of "lumbago." He was admitted in the late evening, and went to bed. He complained of pain in the right lumbar region, which he said was proving distinctly trying under the conditions of life in the front-line trenches. Under other conditions he did not think the pain would have worried him. He stated that he only had it on movement, and that he was quite comfortable when in bed. He first noticed it at the end of September. He remained on duty until November 5th. For two or three days after reporting sick he had a slight rise of temperature.

The morning after admission to the base hospital he was up and about, attending to his toilet and visiting some of his friends, who were in neighbouring rooms. As he was talking to a brother officer he suddenly fell down, and appeared to be in a dying condition. The medical officer saw him immediately, and within a few moments there were several of us in attendance. In spite of every effort to resuscitate the patient, it was soon obvious that he would be dead in a few minutes. His appearance was that of a man receiving no oxygen into his circulation, although there was some shallow respiration. The pulse rapidly failed, and within about ten minutes of the appearance of symptoms he was dead. A *post-mortem* examination was made, and since his symptoms were suggestive of pulmonary thrombosis or embolism the thorax was examined first. The lungs and heart were removed together, along with the contents of the posterior mediastinum. The pulmonary veins were opened, and some *anti-mortem* thrombus was found in them. A small soft, almost gelatinous, mass, about

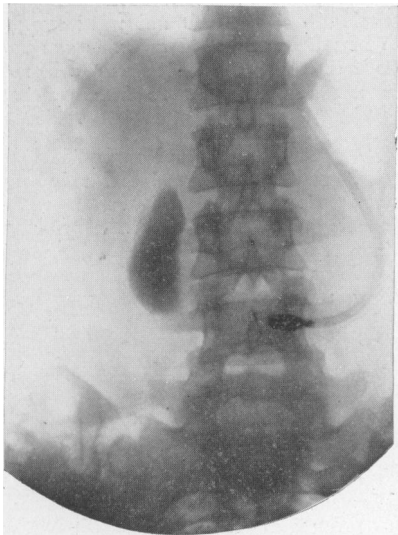


FIG. 1.—Normal gall-bladder shadow, thirteen and a half hours after injection. Duodenal tube seen not to have passed pylorus. At operation, healthy gall bladder and ducts

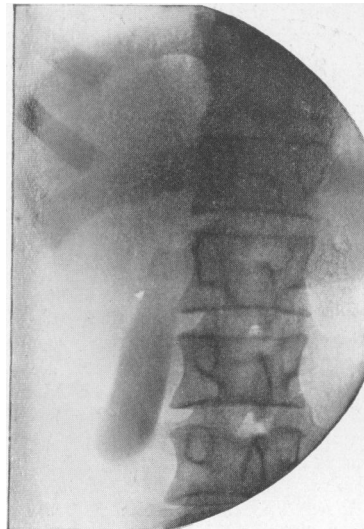


FIG. 2.—Normal gall-bladder shadow, fourteen and a half hours after injection. At operation, healthy gall bladder and bile ducts.

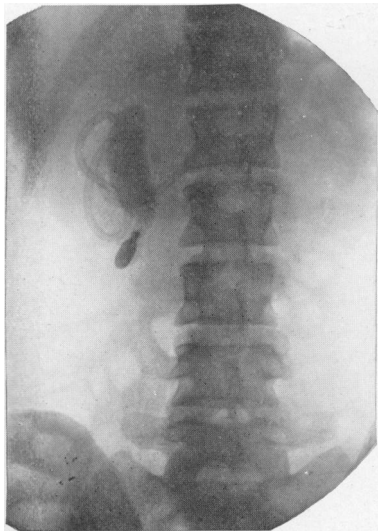


FIG. 3.—Normal gall-bladder shadow (encircled by coils of duodenal tube). Fifteen hours after injection of dye.

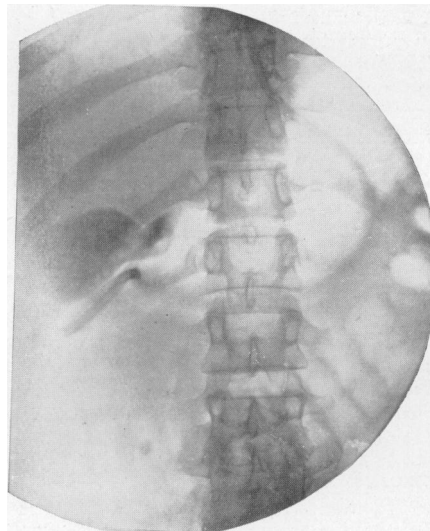


FIG. 4.—Gall bladder containing numerous stones. The gall-bladder shadow is dense, indicating little impairment of its concentrating function. At operation the gall bladder, though containing stones, showed little pathological change and was not removed.

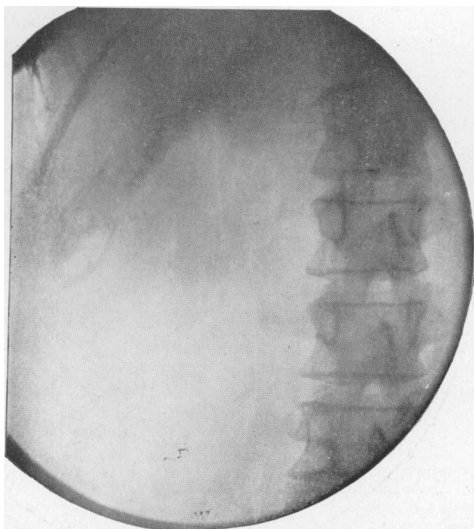


FIG. 5.—Gall bladder seen overlying tip of last rib and containing several large stones. The shadow is faint, indicating impaired concentrating power. At operation, gall bladder thickened and fibrotic, containing stones.

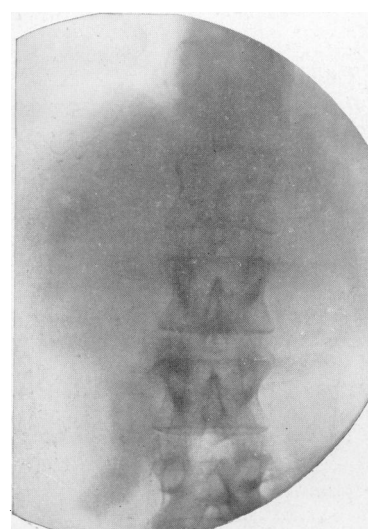


FIG. 6.—Gall bladder angular with slight hour-glass contraction. At operation, localized infiltration of wall.

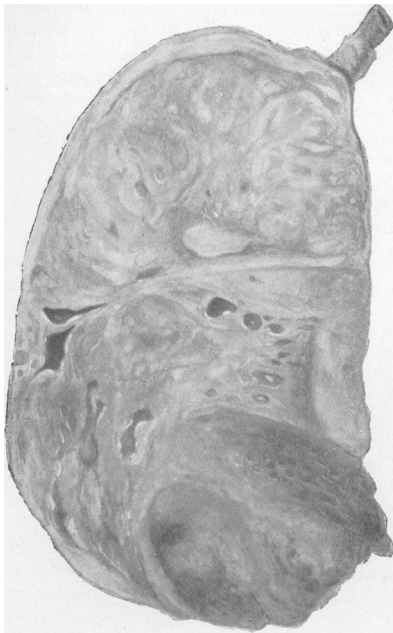


FIG. 1.—Section of mass in the posterior mediastinum, showing the involvement of the thoracic duct.

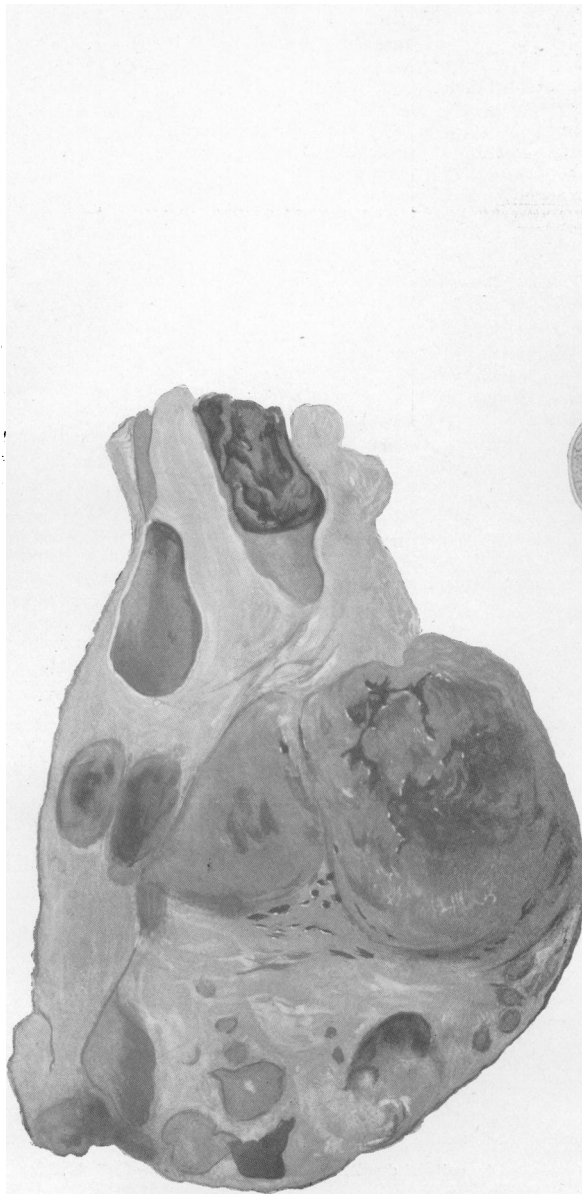


FIG. 2.—Section of mass in the lumbar region, showing the inferior vena cava running through it.

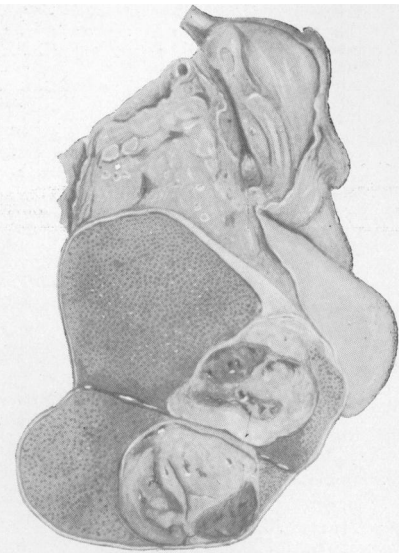


FIG. 3.—Testis cut across (actual size), showing primary tumour at lower pole.

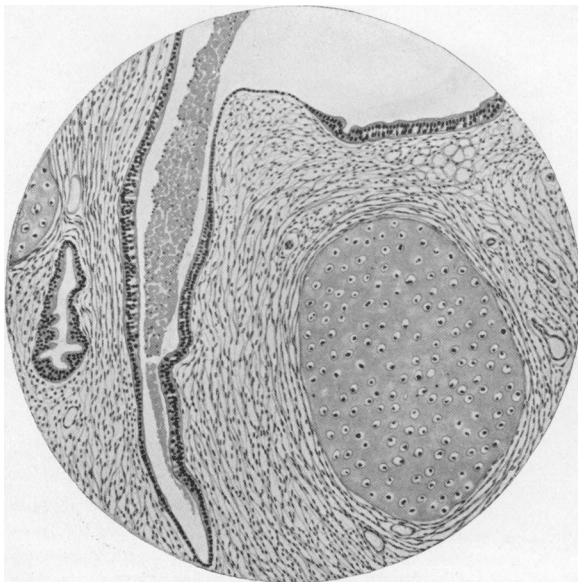


FIG. 4.—Microscopic appearance of section of primary tumour (low power).

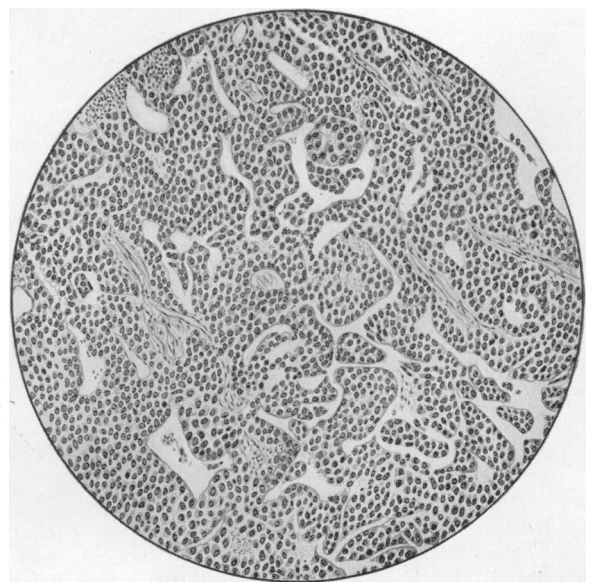


FIG. 5.—Microscopic appearance of section of primary tumour (high power).

the size of a chestnut, was found in the posterior mediastinum, with the thoracic duct running through it (Fig. 1).

Exploration of the abdomen revealed the presence of a mass the size of a clenched fist in the right lumbar region, with the inferior vena cava running through it (Fig. 2). The kidney was healthy, and the mass in the lumbar region did not involve the adrenal body, so it was thought that it must be due to glands secondary to a primary growth elsewhere. Palpation of the testis revealed no gross abnormality, but there was a small prominence about the size of a pea on the lower part of the body of the testis, near the globus minor of the epididymis. The testis was removed, and, on cutting it across, the small tumour, shown in Fig. 3, was seen.

All the specimens were sent to the Bland-Sutton Institute of Pathology at the Middlesex Hospital, where they were examined by Professor Browning. He found that the primary tumour in the testis was a small embryoma, with the usual characteristics of these tumours. Its microscopic appearances are well shown in Figs. 4 and 5.

The pathology of these tumours has been investigated by Nicholson, and his paper in the *Guy's Hospital Reports*, lxi, 1907 (p. 249), should be read by all interested in the subject. The origin of embryomata of the testis is not absolutely definitely determined, but Nicholson says: "There can be no doubt that these tumours, which contain derivatives of the three blastodermic layers, must have originated in a cell which is analogous to an ovum (including a spermatozoon) or one of its earliest divisions—that is, a cell which is still capable of producing the three primary layers of the embryo."

These tumours are benign at first, but a malignant stage may supervene in any or all of the component layers. The result may be a mixed tumour, a hypoblastic tumour like a columnar-celled carcinoma, a mesoblastic tumour (sarcoma or myxosarcoma), or an epiblastic tumour such as a "dermoid," or a growth resembling a chorion-epithelioma. And, as Nicholson says, "not only may one layer be greatly in excess of the others, but one tissue may assume this supremacy."

In the present case the lumbar glands were metastatic deposits from the tumour in the testis. The small mass in the posterior mediastinum was of a similar nature microscopically, and was evidently a metastasis which had been arrested on its way along the thoracic duct and had grown in that situation.

The case presents many points of interest. In the first place, it must be extremely rare for a malignant growth of the testis to lead to death without either primary or secondary tumours having been suspected. Certain lessons are emphasized by the *post-mortem* findings. It is clearly shown that the size of a primary tumour is no indication of the extent of malignant disease. It is also dramatically demonstrated that the examination of the male abdomen should always include an examination of the contents of the scrotum. We are accustomed to insisting on this in clinical teaching, but it is not often that the lesson is driven home so tragically in the *post-mortem* room.

VENESECTON AND BLOOD TRANSFUSION IN CARBON MONOXIDE POISONING.

BY

SIR C. GORDON-WATSON, K.B.E., C.M.G., F.R.C.S.,
SURGEON TO ST. BARTHOLOMEW'S HOSPITAL.

THE recent tragedy in which a medical man lost his life after undue exposure to motor exhaust fumes in his garage calls attention to the value of blood transfusion in carbon monoxide poisoning.

In the *BRITISH MEDICAL JOURNAL* of April 25th (p. 812) Dr. James Holmes (Bury) writes suggesting venesection and transfusion as a possible method of treatment in these cases, which he states has not, so far as he knows, been tried. The great value of venesection and blood transfusion in carbon monoxide poisoning was brought forcibly to my notice in 1917 when I was consulting surgeon to the Second Army in France.

The following account of six cases of carbon monoxide poisoning, two of which were treated by venesection and blood transfusion, at which I assisted, is, I think, worthy of record. The men were admitted on June 20th, 1917, to

No. 53 Casualty Clearing Station, suffering from the effects of a 5.9 German high-explosive shell, which set fire to their dug-out.

The notes of the cases were taken at the time by the medical officer in charge. Unfortunately I am unable to give him the credit which is his due, as his name has escaped me and is not attached to the notes which he very kindly made for me at a time when all the medical officers were overworked in dealing with the casualties after the battle of Messines. It seems possible that some other gas or gases besides carbon monoxide may have been responsible for the remarkable ashen hue displayed by these men. The cases, however, were regarded as carbon monoxide poisoning by the mining medical expert to the army. I feel certain that the two cases treated by venesection and transfusion would otherwise have succumbed.

Ten men were in an old German dug-out when the side was blown in by a shell. The dug-out was set on fire, due to shavings on the floor, and bedding filled with shavings strewn about. A heap of Mills's bombs, at least twelve in number, was lying near the window where the shell struck, and these also exploded, together with much small arm ammunition as the fire increased. Six of the men were brought to the casualty clearing station, none of the others escaping. Four of the men were almost black as to lips and ears, with a dirty earthy colour of the skin; two were a deep dusky red. There was no marked obvious respiratory distress, except that in some of them respirations were increased. There were no bronchial symptoms, no cough, no expectoration.

It does not seem to be realized generally that the explosion of ammonol (the explosive of Mills's bombs) in a confined space, owing to deficient oxidation, gives rise to a large evolution of carbon monoxide gas. The explosion of the cordite of the small arm ammunition does so also in a lesser degree.

The cases presented certain differences, each showing some special characteristic. Little effect was produced by oxygen. Even when administered pure, without air, for prolonged periods the dark colour was not in the least changed. Artificial respiration combined with the administration of oxygen was not tried. Two of the worst cases were transfused, with marked benefit, and they probably owe their lives to this measure being carried out.

The blood had the same characters in all—thick, black, tanny, flowing from the veins with difficulty and clotting at once. In the first case bled the coagulation did not take place for some time. The blood clotted solidly, and when left a dark chocolate-coloured fluid formed from which a clear straw-coloured serum separated. The blood was examined by the pathologist, who was unable to detect any definite change spectroscopically; he did not think haemolysis had taken place. Smears of blood examined showed nothing definitely abnormal.

The urine passed by all the patients was exactly the same in colour—a dark straw colour with a biliary tinge, though bile was not detected on examination. Albumin was not present, and no sugar in any case, the urine being examined in all for these constituents.

The pupils were widely dilated in all and did not react to light. None of the patients showed any nerve manifestations, the reflexes were normal, and no paralytic symptoms were observed.

All the men extricated themselves from the fire, the severe symptoms coming on later. The one case least affected states that he was dizzy and unable to stand after getting out of the dug-out and had to lie down. He vomited severely on his way to the ambulance and he was the only man of the series who vomited.

The account given deals with the cases up to the fourth day.

An effort was made to ascertain the percentage of haemoglobin, but the blood was so thick that it would not spread evenly and the light could not be seen through in the type of instrument available. Major Ellis, the pathologist, was unable to give the haemoglobin percentage, although he made various trials.

Two surprising, almost startling, features of the cases were: (1) that these men developed so dark a colour—almost black in the mucous membranes—and yet had so little respiratory