A "very clear history of the incident" cannot be obtained by the clinician, and its importance in diagnosis and treatment has been much exaggerated. It is of great value to know that the case is from a bombed house or shelter, and this is nearly always known. With this knowledge the most accurate diagnosis of the state of the lungs will be made by a consideration of the state of the patient (see above) and not from a knowledge of the size of the bomb. The peculiar behaviour of blast on houses is now so familiar (e.g., I have seen a shop window within six feet of a bomb crater in the road with only a single crack) that it is just as likely as not that the clinician would be misled by a "very clear history of the incident." The clinician will not be misled if he applies sound clinical methods, which should include repeated radiographs, if possible, and special attention to the phrenico-costal sinus region.

The knowledge that the case has occurred in a confined space will also help the clinician if he keeps in mind the important observation of Hadfield and his colleagues that these patients are prone to suffer from carbon monoxide poisoning.

Summary

Cases of pulmonary concussion from civil life and bombed houses have been compared.

Pulmonary concussion is almost the rule in cases from bombed houses, but not from bomb injuries in the open.

The mechanism of the lesion is considered. In bombed houses mechanical factors may add to the effect of the blast pressure.

The state of the patient is probably of greater importance than the size of the bomb or the distance from it. Knowledge of the details of the bomb may be misleading. In houses the positive pressure cannot fall until walls and roof are blown open.

The actual lesion is mainly haemorrhage from alveolar capillaries. Only a little blood gets into the bronchioles, etc., in these parts. Rupture of goblet cells and liberation of much mucus indicates a severe lesion. Secondary inhalation of blood gives a different picture.

Certain parts of the lungs are predisposed to injury. Thus we find subpleural "rib markings," injury in the phrenico-costal sinus region, and deep and posterior lesions in the region of the hilus. A consideration of primary (compression) and reactionary (counter-pressure of air locked in alveoli) forces may explain differences.

The abdomen is typically compressed with the thorax. The most important lesions here are tears of the liver and spleen.

The lesion itself is not progressive, but the reaction is. Treatment is largely anticipation of complications. The usual methods of artificial respiration may cause pulmonary concussion.

I am indebted to Detective-Sergeant J. S. Fayers for the photomicrograph.

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ELECTRO-ENCEPHALOGRAPHY IN TRAUMATIC INTRACRANIAL HAEMORRHAGE

BY

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Electro-encephalography is becoming more and more important in the detection of various intracranial lesions, and Berger's contention that the phenomena which he described would afford a means of diagnosing certain pathological conditions of the brain may be said to have been generally upheld. So far, however, electro-encephalography has not been used to any extent in the investigation of cases of head injury; consequently it would appear desirable to record such evidence as may be obtained concerning its value in these cases, particularly when intracranial haemorrhage has occurred. Records from cases of traumatic intracranial haemorrhage are conspicuously few. In this country Prof. Rendle Short and Miss Dunster (1940) have published the findings in the case of a patient aged 42 with a middle meningeal haemorrhage upon whom operation was successfully performed. A tracing from a case of chronic subdural haematoma in an Italian aged 41 is included in a paper on electro-encephalography by Balado, Romero, and Noiseux (1939) of Buenos Aires; and some examples of intradural haemorrhage, both extra- and intra-cerebral, have been noted by Jasper, Kershman, and Elvidge (1940) of Montreal. The case here noted is a further instance of an encysted subdural haematoma following head injury which at the time of operation presented singularly few symptoms.

Case Report

On July 24, 1940, a marine aged 20 was knocked out in the boxing ring, and on regaining consciousness a few minutes afterwards had a severe headache. An hour later he vomited. He did guard duty that night, however, and was able to go out on a route march next day. His headache, which was now chiefly in the left frontal and occipital regions and at times was accompanied by pain in the back, continued, so he reported sick and was admitted to hospital. There was neck rigidity at this time, his temperature was 99° F., and his pulse was consistently slow (48 to 50). Both optic disks were blurred; the tendon reflexes were normal and the plantar responses flexor. Leucocytes numbered 10,000 per c.mm., x-ray examination of the skull was negative, and the cerebrospinal fluid pressure in the lumbar pond was 250 mm. of water; the fluid itself being deep yellow in colour, with a protein content of 120 mg. per 100 c.cm. The chief symptoms now were headache and photophobia, but these got better as he rested in bed. On August 29 Surgeon Captain Macdonald Critchley and I were called in to see him. He was inclined to be fatuous, the left knee-jerk was brisker than the right, and the left plantar response was extensor. High papilloedema with exudates and retinal haemorrhages was present in both optic disks. On September 24 Mr. W. Grey Walter, to whom I am much indebted for the tracing (see Fig.), carried out electro-encephalography at the Burden Institute under the direction of Dr. Golla, and reported: "There is a very low potential discharge at varying frequencies in the right fronto-temporal region, most definite in the neighbourhood of the Sylvian point. The small size and irregular frequency of this discharge would suggest that it is vestigial and not associated with any active destructive process." On September 7 the patient felt quite well, was free from headache, and declined operation. The highly choked disks, however, were still present, and, because of these and the slight left pyramidal signs and the electro-

The London Hospitals Street Collections Central Committee (36, Kingsway, W.C.2) has issued a leaflet with reference to Hospitals Day in 1941, which includes a message from the Patron, H.M. the Queen. As in 1940, all participating hospitals will have the opportunity of collecting both in May and in October; the dates chosen are Tuesday, May 6, and Tuesday, November 7. A list is given of the hospitals co-operating and the amount received by each from last year's combined street collections, which totalled over £46,000.

encephalographic findings, it was considered that he had a chronic subdural haematoma overlying the right cerebral hemisphere.

Operation.—Operation was carried out on October 3, a right subtemporal craniotomy being performed under pentothal-nitrous-oxide-oxygen anaesthesia. When the dura was

Electro-encephalogram in a case of traumatic intracranial haemorrhage (subdural) in a man aged 20.

opened a blood cyst was exposed, occupying the Sylvian fissure and overlying a large area of the cortex. Part of the cyst wall was removed and its contents were evacuated by washing with Ringer's solution and by suction through small soft rubber catheters. The cerebrum was flattened and depressed beneath the cyst, but gradually expanded to take up the space this had previously occupied. Six weeks later the optic disks were normal and the patient was returned to duty.

Commentary

Various diagnoses had been suggested, among which were tuberculous meningitis, intracranial tumour, and subdural or subarachnoid haemorrhage. On clinical grounds these were eventually reduced to haemorrhage or a tumour which might have been either in the right frontal region or in the posterior fossa, the subtentorial site being suggested particularly by the intensely choked optic disks. Ventriculography would in all probability have at once determined the location, but this was conveniently done by electro-encephalography, the great advantage of which, as Rendle Short and Miss Dunster have pointed out, is its relative simplicity and harmlessness—unlike ventriculography and aero-encephalography, which are not simple or altogether devoid of the risk of unpleasant consequences. As these writers also point out, it remains for the future to show how accurate localization by electro-encephalography will prove to be; but meanwhile it is important to record experiences of it as these are encountered. It might be anticipated that a meningeal haemorrhage (vide Rendle Short's case, previously referred to) and a subdural haematoma (case here recorded) would behave electro-encephalographically somewhat similarly because in each case the cerebral cortex is separated from the skull by a comparatively good conducting medium—namely, the haematoma. This was found to be the case by Jasper and his co-workers (1940), who point out, however, that, in contradistinction to such extracerebral collections of blood, an intracerebral haemorrhage may sometimes be detected and localized by the delta activity arising from surrounding grey matter damaged by the haemorrhage in the substance of the brain. If this is confirmed, electro-encephalography will be still more valuable in the investigation of cases of intracranial haemorrhage by providing some guide to subsequent surgical procedures.

One further feature of the case here recorded may be noted. Normal disks and normal vision are now present after a high degree of choking (approximately 5D) of both optic disks from the end of July until early in October, when the patient consented to operation. How long the retinae are capable of withstanding a high degree of choking of the nerve heads before showing signs of optic atrophy and visual impairment is an important

problem still not completely decided, but among other factors the age of the patient is probably important. In this particular case the retinae of a man aged 20 were able to sustain a high degree of papilloedema for some nine to ten weeks without subsequent atrophy of the optic disks or any evidence of visual impairment.

Summary

The electro-encephalographic findings in a case of traumatic intracranial subdural haemorrhage are noted. These, together with those of the few cases hitherto described, constitute cumulative evidence of the value of electro-encephalography as an aid to the detection and location of traumatic intracranial haemorrhage.

The retinae of a man aged 20 were able to withstand high choking of the optic disks for some ten weeks without subsequent interference with function, vision returning to normal after operation and the papilloedema subsiding without signs of atrophy.

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BLOOD CONCENTRATIONS FOLLOWING LOCAL APPLICATION OF SULPHON- AMIDE COMPOUNDS TO WOUNDS

BY

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WITH A NOTE BY

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The insertion of sulphonamide compounds into wounds to prevent or reduce bacterial infection is a procedure that is now widely practised, and it will doubtless become more important in the future because of its promising results and the increasing number of wounds to be treated. The present paper describes the concentration of the compound which occurs in the blood following this procedure.

The observations have been made mostly with sulphanilamide and sulphathiazole. Each compound was applied as a powder sprinkled into the wound. In fresh wounds this was done at the time of the first operation, following débridement; the wounds were then closed by primary suture whenever possible, and compound fractures were put up in plaster. These procedures were performed by the surgical staffs of the New End Hospital and of the Hampstead General Hospital. The compounds were also inserted into a number of sinuses with chronic sepsis and into large ulcers associated with varicose veins of the leg. The powder was prepared in 5-gramme lots in small glass bottles with screw caps, such as are used for bacteriological specimens; these bottles can then be sterilized by dry heat or by any other method desired for the operating theatre. The estimations of the compounds in the blood were made by the method of Marshall and Litchfield (1938). Concentrations are expressed as mg. per 100 c.cm. of sulphanilamide or of sulphathiazole respectively.

The concentration of sulphanilamide found in the blood of these patients is shown in the table and the graph; the latter refers only to cases which received a single application of the compound. The figures are irregular, as might be expected from the diversity in size and conditions of the wounds, but the blood concentration