can be accomplished with but slight physical effort. The controls are placed at the end of the stretcher, which is remote from the radium, so that the operator may adjust the patients, while himself being not only out of the field of radiation but at a considerable distance from it. In the same way the bomb controls are placed sufficiently far from the radium for adjustment to be effected without exposure to the radium.

It may be mentioned for the sake of those who are interested in technicalities of design that, in spite of the substantial appearance, the maximum stress normally occurring in the hollow wooden beams of the stretchers amounts to 500 lb. to the square inch in tension and 300 lb. in compression. The maximum normal stresses in the steelwork are 10,000 lb. to the square inch, in the non-corrosive aluminium castings 5,000 lb., and the maximum bronze-bearing pressures 1,000 lb. to the square inch. In the case of a suddenly applied load (patient) these stresses may be momentarily doubled.

The procedure in putting a patient into position is as follows. The appropriate stretcher is pushed round until it occupies a position near the door (in the photograph this is near the foreground). Here the patient is either lifted on to the stretcher or, if able, mounts into position by a convenient pair of steps. Then the patient is made comfortable and the exact situation of the lesion located. The stretcher is then pushed into the

approximately correct position. The height is adjusted by the wheel A, the tilt by the wheel B. Longitudinal and lateral adjustment requires only a slight pressure of the hand to push the stretcher as desired. The position can then be fixed by adjusting the clamps D and E. The desired tilt of the bomb is effected by the wheel C. Once the patient is correctly adjusted the radium is moved from its shielded position into its working position by means of the lever F.

The bomb itself consists of a circular lead block some 17 inches in diameter and 5 inches in thickness. It is slung in an aluminium casting round its circumference, which is in turn attached to the steel beam supporting it. The beam rotates in ball bearings in the head of the stand G. In the centre of the lead is a hole passing through it some 8 inches in diameter. Into this from either side are screwed lead annuli of desired dimensions, so that an opening from 4 to 6 inches in diameter can be obtained. The radium, in 20 tubes, can be moved radially into this hole by means

of a Bowden cable terminating in the handle F. Thus the tubes are always disposed in a circle, the diameter of which can be varied at will. An investigation of the field from this arrangement of radium is now in the process of being performed. The preceding article by Dr. Flint and Mr. Grimmett describes the field from the "bomb" illustrated in the *Journal* of February 8th, 1930.

FATAL DERMATITIS FOLLOWING THE USE OF IODINE SPIRIT SOLUTION.

BY

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For some twenty years solutions of iodine in spirit of varying strength up to 5 per cent. have been in use for the preparation of the skin preliminary to surgical operation. While a certain amount of skin irritation has been noted in a few cases, there would seem to be no record of a fatality occurring from the use of such a solution, and an account of the course of a case where death followed its use seems worthy of publication.

A married woman, aged 37, was admitted to my wards in Dundee Royal Infirmary, on the recommendation of Dr. G. F. Whyte, for the radical cure of a femoral hernia. There was nothing unusual in the clinical features of the case, or in the account given by the patient of her previous health. Fifteen years previously she had been operated on by another surgeon for acute appendicitis, but no information is available as to the method of skin preparation employed at that time.

The routine skin preparation then employed in my clinic was that on the day previous to operation the skin of the operation area was shaved; the part was washed with ethereal soap and water, dried with a sterile towel, painted with surgical spirit, and, when that had dried, it was painted with a 2½ per cent. solution of iodine in spirit. When this had dried the part was covered with a sterile dressing retained in place by a bandage, this preparatory dressing being removed on the operating table after anaesthesia had been induced, and just before the final preparation of the operation area, which, in a clean case, consisted of the application of a single coat of the 2½ per cent.

iodine solution with a gauze pad held in forceps by the surgeon or assistant. The solution kept in the theatre for this purpose is stored in a coloured glass bottle with a glass stopper; sufficient for use in each case is poured into a sterile enamel dish, a fresh supply being employed for each patient, and no other iodine solution being kept in the theatre. At the conclusion of the operation the area is again painted with the solution; a sterile dressing of gauze and cotton-wool is applied and retained in place with a domette bandage.

The solution used is a 2½ per cent. solution of resublimed iodine in pure industrial alcohol. A small quantity of chloroform, in the proportion of one fluid drachm to four fluid ounces, is added to the iodine solution to prevent the evolution of the irritating iodine vapour so common to alcoholic solutions of iodine. Industrial alcohol (the industrial methylated spirits supplied for hospital and special pharmaceutical purposes) is a mixture of plain spirit with 5 per cent. of its volume of methyl alcohol, and is preferable to the mineralized spirit since it contains no pyridine or methyl violet, and less methyl alcohol.

In the case under review nothing unusual was observed in the appearance of the skin at the time of operation. The solution employed in the wards and in the theatre for the preparation of the patient was used in several other cases without untoward effects.

The first sign of anything being amiss was observed on the day following the operation, when the patient complained of an intense irritation in the region of the wound. On examination the whole area prepared for the operation was found covered with an erythema with a few pustular spots. A mild boric dressing was applied, and, since this failed to give relief, the application of 10 per cent. ichthylol in glycerin was tried. On the following day the temperature rose to 103°, the erythema being intense and almost plum-coloured, with white spots scattered over the whole area. The pulse rate was 140, and the heart was found to be slightly enlarged, with soft systolic bruits in all areas. There were no abnormal physical signs in the lungs or abdomen; urine was freely passed, and the bowels moved normally. There was

slight delirium. The white blood cell count was 12,800 per c.cm. On the third day after the operation delirium was well established, and the pulse became imperceptible. On the advice of Dr. F. M. Milne, dermatologist to the Infirmary, sodium thiosulphate in 5 per cent. aqueous solution was applied to the affected area, with the result that the erythema disappeared in a few hours. The patient died seventy-two hours after the operation with cardiac failure and delirium as the terminal features.

Since the certificate of death stated that the cause was "iodine poisoning," the case had to be reported to the Procurator Fiscal for inquiry. The authorities accepted our medical report as fully explaining the reason for the patient's death, and did not order a post-mortem examination, and, as we were unable to obtain permission from the relatives, the exact pathological changes could not be determined.

Comment.

It comes as a shock to a surgeon when any commonly practised procedure has an unexpected fatal issue, and a careful investigation followed into the circumstances of the case. Inquiry was made as to possible idiosyncrasy, and it appeared that there were grounds for suspecting this, in that, when on holiday in Aberdeen at one time, the patient had been supplied by a chemist with iodine (in what strength of solution we could not ascertain) for the treatment of an abrasion on the toe, and that its application was followed by a severe local reaction. The actual solutions used in the preparation of this patient were used for other patients without ill effect, and there was no departure from the routine preparation already described. It was possible that the strength of iodine solution standing

in an open vessel in the warm atmosphere of an operating theatre might have been increased by evaporation. This had been guarded against by the use in each case of a supply freshly poured from a stoppered bottle. Milder forms of dermatitis appear sometimes to be caused by the use of water to cleanse blood from the skin surrounding the area of the wound after the completion of the operation. Aqueous solutions of iodine are more irritant to the tissues than alcoholic solutions, this being noted when catgut prepared in aqueous iodine solution is used for ligatures, as it seems to favour the production of serum in the wounds. Should any cleansing of the skin round the wound be required after operation spirit or ether should be employed.

It would appear, therefore, that in this case there was a definite and pronounced individual idiosyncrasy to iodine. The actual cause of death was apparently analogous to that in superficial burns from the absorption of toxic products of skin destruction. An interesting feature of the case was the immediate relief to the irritation given by the application of sodium thiosulphate.

Even an exceptional case like this has caused me to review the method of skin preparation preliminary to operation, and I have adopted with success a 1 per cent. solution of iodine in carbon tetrachloride. Over a period of some months only one patient has shown any trace of skin irritation. For many years I used a 3 per cent. solution of picric acid in spirit, and its penetrating power appeared to be great, but the occurrence of dermatitis in a series of cases led me to abandon it.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

EMBOLISM OF THE ABDOMINAL AORTA.

In view of a case recently published in the *British Medical Journal* (November 30th, 1929, p. 1002) I think the following one of a very similar nature is worthy of publication.

A widow, aged 54, had suffered from chorea at the age of 10. Beyond this no other details are available. For many years she had suffered from "rheumatism," but had had no acute attacks. In time she complained of shortness of breath, and had been treated for auricular fibrillation and myocarditis for some years. For the past six months she had had attacks of acute pain over the precordium, radiating to the left shoulder and arm. With treatment these attacks gradually subsided, and I did not see her for about two months. She then sent for me, complaining of acute pain in the lower central abdomen, radiating down both thighs to a little below the knees. The onset had been sudden, and was associated with loss of power and coldness in both lower extremities. When I saw her, three hours after the onset, she was sitting up in bed, very distressed, cyanosed, gasping for breath, and continually clutching at her legs. Her heart was fibrillating, with an apical rate of 110 per minute, and there was a systolic apical murmur. Her feet were cold, but the legs were still warm, and very pale, as were also the thighs. No peripheral pulse could be felt. She could then bend her knees, but had no movement at the ankle-joint. Power at the hip-joint was still present, and she could raise her knees off the bed. The plantar reflexes and knee-jerks were feebly elicited, but no ankle reflexes could be obtained.

She was given 15 grains of potassium bromide and 15 minims of digitalis every four hours, while the legs were well wrapped up in warm coverings. The next morning she felt more comfortable, but still complained of pain in the thighs, and had lost all power below the knees as well as all reflexes and sensation. Three days from the onset she had an anginal attack, and her breathing became "rattly," while the chest was filled with moist sounds. She was given morphine 1/4 grain, atropine 1/100 grain, and digitaline 1/50 grain. Two hours later she felt much more comfortable. By this time she had lost all power in her legs and thighs, the skin of which had assumed the blue mottling seen post mortem, and no reflexes or sensation could be elicited, apart from a small area on both thighs extending downwards for about two inches below Poupart's ligament, and running round the thigh, rising somewhat posteriorly.

The morning after the anginal attack, following a restless night, her colour had much improved, though the heart was still

fibrillating. Her legs were in the same condition, and micturition had by now become automatic. She remained in this state till the same evening (four days from the onset), when she had some severe convulsions in both arms. Her bronchi became choked with mucus, and she died. No post-mortem examination could be obtained.

The diagnosis appeared obvious at the first visit—embolism of the abdominal aorta—and, apart from palliative treatment, nothing could be done, as the patient would not consider removal to hospital.

Two points are of interest: (1) The reflexes and sensation, as also the muscular power, did not disappear for about fifteen hours from the onset. (2) The small area where there was still warmth and sensation, the skin of which must have obtained blood from a collateral source.

Hull.

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TAENIA SAGINATA INFECTION.

INFECTION by tapeworm does not appear to be very common in these days of strict control of slaughterhouses and meat inspection, so that the following case, which presented some unusual features, may be of interest.

A Jewess, aged 56, had complained of severe pain in the epigastrium for over six weeks, with occasional vomiting after meals. The usual gastric sedatives had no effect. An examination of the stools for occult blood revealed the ova of *T. saginata*, but no history of the passage of proglottides could be obtained. A drachm and a half dose of the extract of male fern was given on an empty stomach the morning after the discovery of the ova. Within ten minutes the patient collapsed and fell into coma, with twitching of the muscles of the face. Ether was injected intravenously, and the patient vomited some of the drug shortly afterwards. She remained, however, in a stuporous condition for about two hours. The bowels then moved, and she gradually recovered consciousness. A fully matured specimen of *T. saginata* was passed later and the patient made an uninterrupted recovery. No castor oil was taken by the patient for the expulsion of the worm, but I learnt later that she was in the habit of taking a dose of olive oil every night before retiring.

I have to thank Professor R. T. Leiper for his kindness in identifying the species of tapeworm in this case.

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