deepened by the addition of ether upon the mask or a change to the C_2E_2 mixture.

Shock or the exhaustion of the nervous centres, which is rapidly produced after a transient primary stimulation by traction, stretching or prolonged manipulation of certain highly sensitive structures such as the mesentery, the peritoneum within Douglas's pouch, and the pedicles of abdominal organs and tumours, can best be met by the use of ether during such stages.

In my opinion ether possesses a specific action in blunting and in some cases preventing the transmission of nerve stimuli more effectually than chloroform, and when used at particular stages of an operation which may be proceeding under chloroform protects the patient from the occurrence of the respiratory and circulatory shock which otherwise appears as the result of the operative measures.

When ether is contraindicated and the reflex effect of surgical stimuli disturbs the breathing so far as to interfere seriously with efficient oxygenation by causing laryngeal spasm, the hypodermic injection of morphine grain $\frac{1}{4}$ proves of considerable value in additionally narcotizing the peripheral nerves and allowing respiration to proceed unhampered by the surgical manipulations. Besides shock, lowering of general blood pressure, with feeble respiration due to anaemia of the medullary centres, may occur from haemorrhage alone. The anaesthetist should inform the surgeon that the loss of blood is affecting the patient when he first observes a change in the depth of respiration, other causes in his judgement being excluded, before blanching of the skin has definitely appeared.

Recovery of vascular tone and respiration is remarkably rapid from the moment of complete arrest of haemorrhage, and this is the most urgent and vitally important treatment. The injection of a pint and a half or more of hot saline solution into the rectum, with raising of the feet and lowering of the head, are next in value. A funnel, tubing, and silver nozzle for the transfusion of saline fluid into a vein of the arm should always be at hand in case of more severe haemorrhage.

Syncope due to the removal of the weight of fluid or tumours from the splanchnic area may be anticipated and prevented by the surgeon removing the tension slowly, and the anaesthetist lowering the patient's head at the same time.

After an operation conducted in either the Trendelenburg or the lithotomy position, if haemorrhage has occurred it is best not to let the patient down flat at its termination, but to keep the feet raised for some hours afterwards to prevent the supervention of cerebral anaemia before the blood pressure has returned to normal level.

In deep stages of anaesthesia the vasomotor mechanism is paralysed and whenever shock or haemorrhage begin to appear the anaesthesia should be lightened so that the vasomotor system may recover its activity and readjust the disturbed blood pressure.

These points being all carefully put into practice preserve the vitality of the patient in such a manner that a period of many hours in which the general state borders on collapse after abdominal operations is replaced by a condition of general warmth and good colour, rapid recovery of consciousness and normal circulation.

STERILITY AMONG X-RAY WORKERS.

By ALFRED C. JORDAN, M.D., B.C.CANTAB.,

MEDICAL RADIOGRAPHER, GUY'S HOSPITAL, AND ROYAL HOSPITAL FOR DISEASES OF THE CHEST.

THE fact is now well-known that azoospermia is produced by exposure to x rays. What is not yet appreciated is the fact that a worker who has taken "every reasonable care" to avoid exposing himself unduly to their action becomes sterile after working daily for a year or so. By "reasonable care" I mean that he has had his x -ray tube enclosed in a protective box, has worn a protective apron, has conducted x -ray treatment with the tube in a protective shield, and has himself kept at a distance of a few yards from the tube.

Dr. Albers Schönberg, of Hamburg, has adopted the expedient of erecting a cabin, lined with sheet lead, in the middle of his skiagraphy room; within this cabin is the

switch-board from which he starts the current. There is a small window of lead-glass, through which he is able to observe the tube and the patient. As he takes all his skiagrams with the tube unshielded, no less complete measure would suffice to afford him and those working with him sufficient protection. Unfortunately, he is precluded by his method from carrying out a very important branch of the work—namely, the examination with the fluorescent screen. For surgical work this can, perhaps, be dispensed with and no great loss ensue; in the examination of the chest and stomach, however, the screen examination is of great importance, and it becomes necessary to devise other means of protecting the operator.

The tube-box which is ordinarily supplied in this country is far from efficient; the top has a quantity of red lead or white lead packed between wooden boards, and the sides are of lead-glass, or often of ordinary plate-glass. More often than not there is an area between the side and the top which is almost entirely unprotected. If a box of this description be carefully examined at close quarters with the screen while the tube is in action, it will be seen that quite an appreciable quantity of x -rays filters through the walls of the box.

The means which I suggest as probably sufficient are the following: The tube-box should be made entirely of wood, and should be completely lined on the outside with an efficient protective rubber material with the exception of an aperture at the top which is controlled by an adjustable diaphragm. A view of the tube may be obtained through a small lead-glass window covered with a flap of the protective material. The rubber material which truthfully answers the description of "protective" is manufactured by Messrs. Müller of Hamburg, and tested by Dr. Albers Schönberg, probably the most exacting man in Germany where the question of protection from x rays is concerned. The operator should always wear a protective apron reaching from the shoulders to below the knees, and, as these two means are not sufficient, he should also have an upright rectangular wooden screen, 3 ft. 3 in. in height and 2 ft. in width, lined on both faces with 3-lb. sheet lead, and should place it close to the couch between himself and the tube box. A larger screen (say 4 ft. square) should be supplied for use while x -ray treatment is in progress. The screens may be mounted on castors. Screens of the sort I describe are not in the operator's way to an uncomfortable extent. For treatment the tube should always be completely enclosed. Eventually I believe sheet metal shields and tube-boxes will be available, but this cannot well be before static machines have been so far improved and developed as to be used in place of induction coils, as is done with great success in Paris, in Dr. Sabouraud's treatment department.

I would urge those who are taking up x -ray work not to allow themselves to be influenced by the unsympathetic remarks of their colleagues, who perhaps consider them to be taking excessive precautions; surely their worst enemies would not desire them to injure themselves, did they appreciate the actual facts of the case.

I am not aware of any reliable data bearing on the interesting question of the possibility of recovery from sterility, once it has become complete; assuming the condition to be recognized early enough, say while there are still immobile spermatozoa, it would appear possible that two or three years of complete abstinence from x -ray work might result in some degree of recovery, but I do not see how a man could expect to recover otherwise unless he were to take such extreme measures of precaution as would preclude the possibility of his doing really useful work.

Considering the entirely undefended position of the testes, it is no matter for surprise that they should be affected by very small doses of x rays, provided the doses be repeated often enough. Wisdom suggests the advisability of inserting a small protective apron under the clothes as an additional measure. This expedient is in fairly general use, but it is merely an adjuvant, and cannot be relied upon in the absence of the other measures I have described.

MISS MARY ANN MELLOR DAVIDSON, of Higher Broughton, Salford, who died on May 17th, left £1,000 each to St. Mary's Hospital, Manchester; Manchester Royal Infirmary and Dispensary, and Stockport Infirmary.