an ascending Landry's paralysis. The electrocardiogram commonly shows a low flat T wave, prolonged Q-T intervals, and depressed ST segment, the degree of change being dependent on the extent to which plasma potassium is lowered. The low plasma potassium is often associated with a metabolic alkalosis, the plasma bicarbonate being raised; this change may be related to the entry of sodium into the cells to replace a potassium deficit therein.

In the diagnosis of potassium depletion most importance should be attached to a clinical assessment of the possibilities of potassium loss by diarrhoea or vomiting, or by polyuria. A test dose of 10 g. of potassium chloride is normally excreted within 24 hours, and retention of such a dose indicates a potassium deficit of some magnitude. A plasma-potassium level of less than 4 mEq per litre demonstrates depletion of extracellular potassium; but a normal plasma potassium cannot be taken as excluding potassium deficiency, as this may be confined to the cells; moreover, even if the total extracellular potassium is low, this may be masked by loss of extracellular fluid due to concurrent sodium depletion and hence potassium concentration. A rise in the plasma bicarbonate may precede any fall in plasma potassium, since sodium enters the cells at a stage of potassium depletion before the extracellular potassium is involved; but the diagnostic value of this change is lessened by its lack of specificity. Appropriate electrocardiographic changes are useful evidence of potassium depletion, but their absence does not exclude it.

Treatment of Potassium Depletion

An ordinary diet supplies 2-5 g. of potassium daily, and this gives some guide to what must be supplied in treatment. A pint (570 ml.) of milk supplies about a gramme of potassium, and undiluted fruit juices supply a similar amount. Strong coffee has about half this potassium content, and drinks made from meat extracts rather less than coffee. It is therefore possible to give about a normal amount of potassium in a fluid diet, but not to give any great surplus to correct depletion. Potassium chloride can be given in doses of 5 g. at a time without provoking nausea, and the taste can be partly disguised with sweetened milk. About 10-15 g. a day by mouth is a suitable dose for a patient who is recovering from diabetic coma, and should make up the probable deficit in a few days.

When the renal excretory function is normal potassium can be given by mouth without risk, as the amount tolerated orally is well within the excretory powers of normal kidneys. In patients with renal impairment potassium salts should not be given unless the level of plasma potassium can be frequently checked. Oral potassium is the treatment of choice for patients with no gastro-intestinal illness, and intravenous potassium should be limited to those who have a low plasma potassium and who cannot take adequate quantities by mouth.

The risks of giving intravenous potassium are quite definite, and fatal accidents have been reported. The danger lies not so much in the total amount of potassium given as in the speed with which the plasma potassium concentration is increased. The margin of safety is small, as an increase to 10 mEq per litre of plasma potassium produces definite electrocardiographic changes and the risk of cardiac arrest. The concentration of potassium in fluids for intravenous use should not exceed 70 mEq per litre, corresponding to 0.5% potas-

sium chloride, and the rate of giving such a solution should not exceed 4 ml. a minute. Too high a concentration of potassium in plasma causes peaking of the T wave in the E.C.G., cardiac irregularity and arrest, and may also cause paralysis. If any of these signs appear during potassium infusion the potassium should be stopped, a glucose infusion begun, and 5 units of insulin given intravenously. A conservative attitude towards intravenous potassium therapy is justified, and at present it should be limited to patients with actual paresis and a low plasma potassium. Increasing knowledge of the effects of intracellular potassium deficit may broaden the indications for intravenous potassium therapy, but at present it seems best to limit it to patients with an extracellular potassium deficit causing definite clinical symptoms.

LEGAL IMPLICATIONS OF MEDICAL PRACTICE IN U.S.A. AND GREAT BRITAIN

BY

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In considering any legal question regarding the U.S.A. one has to bear constantly in mind the fact that it is not one country, in the British sense of the term, but is in fact the "United States" of America. This aggregate of 48 states is governed by two sets of statute law—the federal law enacted by Congress and applicable to all states, and the state law which is peculiar to, and applicable only in, the state in which it is enacted. While many of the legal aspects of medical practice are fairly uniform throughout the whole country, there are many more which vary from state to state. It would be clearly impossible in one short paper to deal with all the minutiae of variation from state to state, and, in any case, this would be of little interest to British medical readers. It is proposed, therefore, to handle the matter in a general rather than in a detailed fashion.

The Lawful Practice of Medicine

At common law any person who wished could practise medicine. This is precisely the position which existed in Great Britain before the passing of the Medical Act of 1858. In Great Britain any unregistered person may still lawfully practise medicine if he wishes to do so, subject to certain well-known limitations, and provided he uses no title which would lead a member of the public to believe that he is a registered medical practitioner. The American Congress has no power under the Federal Constitution to regulate the practice of medicine. It is a matter over which each individual state has jurisdiction. In all the states medical practice is regulated by statute, and it is provided generally that before undertaking the practice of medicine one must first secure a licence or certificate from a designated body or board.

The practice of medicine by an unlicensed person, or the aiding and abetting of an unlicensed person to practise medicine, constitutes a criminal offence. As in Britain, therefore, the possession of a degree in medicine

does not entitle a person to practise. The procedure in Britain to secure registration and permission to practise, once one has a degree from a recognized institution or examining body, is simple compared with that in the United States. There is no body in America corresponding to our General Medical Council, no direct control over the standards of teaching or examination in individual medical schools, and no system of external examinerships.

However, before a candidate can present himself for certain state examinations he must produce evidence that he has passed the final and qualifying examination for the degree of M.D. (the basic qualification) of an institution approved by the Board of Registration in Medicine. No state will recognize the qualifications of any learned institution. Before a medical graduate may practise he must pass the examination set by the Board of Registration in Medicine for the particular state in which he desires to settle. This would tend to hamper the movement of practitioners from one state to another but for the existence of a certain amount of reciprocity between states. In addition the National Board of Medical Examiners holds examinations, and in all but two states success in this examination will be accepted in lieu of a pass in the state examination. The individual state may provide for the revocation of the right to practise for adequate reasons. The grounds most commonly set forth in the statutes as sufficient to justify revocation of a licence issued to a doctor are: (1) Procuring a criminal abortion even though discharged "not guilty" at a criminal trial; (2) advertising; (3) using an assumed name; (4) giving information about contraception or abortion; (5) aiding an unlicensed person to practise unlawfully; (6) violating the law regarding narcotics or intoxicating liquors; (7) because of gross indecency or immorality; (8) following conviction for a crime—moral turpitude; and (9) unlawful disclosure of a professional secret.

Osteopaths may be licensed to practise in America. To achieve this they must be graduates of schools of osteopathy approved by the American Osteopathic Association and they must pass an examination set by the Board of Registration in Medicine. Once they are licensed, osteopaths may do anything a "legitimate" medical practitioner can do, but they are held responsible in law to the same extent as a medical practitioner and must therefore show a reasonable degree of skill in diagnosis or they would constantly be liable to civil suits. Naturopaths, chiropractors, and the like may be licensed to practise following examination by the appropriate state board. However, by court decision it has been held that, while physicians may prescribe drugs and use a knife, the holders of other qualified certificates may do neither. As in Britain, an unlicensed practitioner may not recover fees in a court of law.

To become a recognized consultant a practitioner in any specialty must fulfil certain requirements as regards postgraduate training and must pass an examination set by the American Board of his specialty.

The Medical Practitioner's Liability in Tort

Every person is liable for his own tortious acts, but, in addition to this, the American doctor may also be responsible for the negligent acts or omissions of others. He is responsible, as his British colleague is, by virtue of the doctrine of "respondeat superior," for the wrong-

ful acts of his agents and unqualified employees done in the course of their employment. In addition to this, however, where doctors practise in partnership, each partner is liable not only for his own acts but also for those of his partner. He would also presumably be responsible for the act of his qualified assistant, even though he took no part in the procedure complained of and would have disapproved of it had he been consulted.

Further, when two or more independent physicians are caring for a patient, each is answerable for his own conduct and for the wrongful acts or omissions of the other or others which he observes and lets go on without objection. Not only may the doctor be liable for the negligence of another than himself, but he may also be liable to a third party—that is, to someone other than the patient and therefore "a stranger to the contract." For example, when he has rendered negligent and harmful service to a married woman, he may be liable to the husband for expenses and loss of services, society, and companionship.

Civil Actions for Malpractice

As in Britain, an American practitioner is required to exercise a reasonable degree of skill and care in the treatment of his patient. If he fails to do this, and the patient suffers injury, the doctor is liable. Also, as in Britain, if a practitioner poses as a specialist and is sued for negligence, he must prove that he possesses those extra attributes which would entitle him to pose as such. Similarly, a doctor's duty to the patient may be terminated at any time by his being discharged by the patient. The physician may also withdraw from the case, but only after reasonable notice has been given to the patient, and when there is reasonable opportunity of filling his place. A physician is not obliged to accept any patient and does not by implication guarantee the results of his treatment.

Actions for malpractice are far more frequent in the United States than in Britain. Some 4,000 such actions were brought against American practitioners in 1937. The intensified competition and economic stress of the last two decades, the breakdown of the traditional patient-doctor relationship, and the increase in "suit-consciousness" due to the large number of personal injury actions partially explain this trend. Where an established doctor-patient relationship exists malpractice suits are rare. It is usually during the first course of treatment that the cause of action arises. There are no professional organizations in the United States devoted exclusively to medical defence. Insurance companies provide cover for doctors to meet contingencies of this sort.

It is in actions of this kind that the so-called "expert witness" makes his appearance. The ordinary witness must, with few exceptions, testify regarding facts. The expert witness may give evidence which is a combination of fact and opinion, or, perhaps, evidence of opinion only. An expert must prove his qualifications to speak as an expert. Generally, in America any licensed practitioner will be found qualified to give expert evidence regardless of the special medical subject-matter under consideration. The fact that the witness has had more or less experience in the special field may affect the weight of his testimony, but apparently not the question of his qualification to function as an expert.

It appears that in America the professional pseudo-expert witness is something of a menace. With reference to this, Regan (1949) writes: "While it is not solely in malpractice actions that highly coloured testimony is given by so-called expert witnesses, it is nevertheless true that in no other field has the 'professional' expert become so prominent or so burdensome. The 'professional' expert witness, the apparently conscienceless physician preying on his colleagues, is, by his profit-seeking efforts, directly and actively contributing to the perversion of justice. It is submitted that he is a menace to the public welfare, and his presence and his activity should be recognized by bench and bar. There is, at present, no effective method of controlling or of punishing him."

The Minnesota plan (Workman, 1947) was developed to try to ensure that medical experts give only fair and honest evidence. This plan contemplates that judges, lawyers, and doctors will be asked to call to the attention of appropriate committees of the medical and bar associations any conscious deviations from the truth that they may observe in the testimony of expert witnesses, and that the transcript of the evidence will be submitted to an impartial group of doctors. Unfortunately, there is no effective machinery by which the culprit may be dealt with. It is suggested that, in a suitable instance, the matter may be reported to the Board of Medical Examiners. It is questionable if, under the provisions of the majority of the Medical Practice Acts, Boards of Medical Examiners have effective authority. In those states where "gross immorality" is defined as unprofessional conduct, it is probable that the Board of Medical Examiners might be upheld if a professional expert witness who consciously deviated from the truth had his licence revoked. The difficulty is in proving that what a person declares is his opinion is not his opinion, but is one given for the special occasion. It really lies with the courts to test the qualifications of the "expert" to speak as such on the subject at issue.

Ordinarily a malpractice action will fail unless some doctor comes into court and gives testimony which, in effect, condemns the defendant physician's conduct in the case. The plaintiff's expert may generally be relied upon to express the opinion that the defendant's conduct of the case was not consistent with the standard of practice in the locality, that the defendant did something which the ordinary reputable doctor would not have done, or omitted to do something which the ordinary reputable practitioner would have done, and, as a result, the injury occurred.

Negligence on the part of a doctor will not be presumed; it must be affirmatively proved. In the absence of expert testimony when the doctrine of "*res ipsa loquitur*" is not applicable, it will be presumed that the doctor exercised the ordinary care and skill required of him in treating his patient. The plaintiff must show not only that the physician failed to fulfil the legal duty owed to the patient but that, as the result thereof, the injury complained of proximately occurred. A physician is not liable for an honest error of judgment.

In some cases medical expert testimony is not necessary. This is so when the doctrine of "*res ipsa loquitur*" is held to apply. The inference of negligence on the part of the defendant, to which the application of the doctrine gives rise, is sufficient to take the case to the jury and to sustain a verdict and judgment for the

plaintiff. The doctrine of "*res ipsa loquitur*" applies to cases of slipping instruments; foreign bodies left in the tissues; burns from hot-water bottles, compresses, lights, etc.; x-radiation injuries; infection through the use of an unsterilized instrument; and injury to a portion of an anaesthetized patient's body outside the field of treatment or operation. This latter aspect of American medical law is quite different from the British. Here, the doctrine of "*res ipsa loquitur*" does not apply in such cases. Each case must be judged on its own merits, and, if it is proved that in spite of all reasonable precautions the accident happened, then the practitioner will not be judged negligent. In Britain the courts are reluctant to find against a practitioner unless he really has been negligent in some regard.

Coroners and Medical Examiners

The provisions for dealing with sudden, suspicious, unexplained, or violent deaths vary greatly from state to state. In most states the office of coroner exists. The coroner is an official voted to office on the basis of a popular political vote. He may happen to be a medical man, but might be a tradesman with no knowledge of law or of medicine, and in many less-developed areas the local undertaker is also the coroner. In a few states the coroner must be a medical man. The right to order a necropsy is incident to the coroner's duty, and the coroner may, in his discretion, employ a pathologist to conduct the post-mortem examination. Because election to office is on a temporary basis, and is subject to political favour, it can readily be seen that such an arrangement might become corrupt. In a few jurisdictions the office of coroner has been abolished (Massachusetts, New Hampshire, and New York City) and medical examiners have been appointed instead. In a number of others (Connecticut, New Jersey, and Rhode Island) both the office of coroner and that of medical examiner are in existence.

Where a medical examiner has been appointed all unexplained, suspicious, or violent deaths must be reported to him and he is required to investigate them. If a coroner holds office the medical examiner reports to him those cases which require a public judicial inquiry. If there is no coroner the medical examiner reports such cases to the District Attorney (Public Prosecutor), and an official public inquiry or inquest is held before a judge of the District Court. Where there is a medical examiner he has full authority to make post-mortem examinations when he deems it "in the public interest," and to collect such information as he may require for purposes of his investigation.

Medical examiners do not have absolute power to perform a necropsy as coroners in Britain have to order one. It is felt that before he can do so there must be some suspicion of unnatural death. He must be in a position to justify a necropsy should the relatives object and later bring suit against him for performing one without consent. Because of this the medical examiners rarely make post-mortem dissections in those cases in which there is some sort of medical history on which a diagnosis could be made and no evidence, on external examination of the body, to support the thesis of violence. In jurisdictions having medical-examiner systems, a necropsy is performed in approximately 10% of the cases reported. The medical examiner must furnish a certificate giving the cause of death, the manner of death,

and whether accidental, suicidal, homicidal, or natural. He thus has to return a verdict on the case much as a coroner in Britain has to do, but he cannot hold an inquest. In large cities the medical examiner is a medical specialist usually in charge of a university department. In small towns he is a local practitioner, who may deal with a case on his own authority, but who usually calls on a pathologist when a necropsy becomes necessary.

Sterilization

Eugenic sterilization laws are on the statute books of 29 of the states. There is no comparable legislation in Great Britain. In general, these laws provide for the sterilization of persons suffering from certain hereditary mental diseases and deficiencies who have been committed to hospitals for the insane. In most states sterilization of a private patient is a crime unless justified by medical necessity.

Artificial Insemination

In the United States artificial insemination, so far as its practice with human beings is concerned, apparently has no established legal status. There is no legislation on the subject. There is a presumption in law, which is widely accepted, that a child born in wedlock is legitimate. With its unestablished legal status, even if not contrary to law, the practice of artificial insemination, using a donor other than the husband, is hazardous to the doctor who performs it. The position in both countries, therefore, is uncertain, as there is almost complete lack of authority either by statute or by judicial decision. There seems to be a need in both countries for legislation on this subject.

Professional Secrecy

The principles of the Hippocratic oath apply to the obligations of American doctors. However, in the United States, in contrast to Great Britain, therapeutic privilege is not allowed, and if a patient is seriously ill and likely to die there is a duty on the doctor to tell him so.

As is generally known, a doctor in Great Britain may be ordered by a court to divulge information obtained from the patient by reason of their professional relations, and should he refuse to do so in defiance of the court he may be held to have committed contempt of court. In most jurisdictions in America, communications between a doctor and his patient, arising from the professional contact, are deemed of such a confidential nature that the courts do not demand disclosure even in the interests of justice, and statutes have been enacted excluding them as evidence, on objection. Further, hospital records are treated in the same way. However, where a person is examined by a doctor at the instance of the police, and the patient does not object when the purpose of the examination is explained to him, he cannot thereafter object to the doctor's divulging his findings in court. If a patient is suffering from a contagious disease the doctor may disclose to others the patient's condition if the latter refuses to do what is necessary in the interests of public health. Such a situation would be covered by qualified privilege in English law.

Criminal Responsibility

In general the M'Naghten rules of English law are the basis for determining criminal responsibility in all the states and in federal courts. In Britain irresistible

impulse is not accepted as a defence, but in 12 American states it is. If a person indicted for murder or manslaughter is acquitted by the jury by reason of insanity, he is committed to a state institution for life, or till the Governor of the state and his council are satisfied that his discharge will not cause danger to others.

Commitment of the Insane

For the most part the certification of the insane is left to the psychiatrist in the United States. In correspondence to the British "reception order on petition," a person may be committed to an institution for the insane by a judge of the Superior Court, or of a District Court of a county. The petition must be supported by two medical certificates, one of the signatories must be a consultant psychiatrist, and the judge may, if he considers additional medical evidence desirable, appoint a third psychiatrist to examine and report. No staff member of the institution to which the patient is to be committed may sign one of the certificates. As an alternative to final commitment, the judge may commit the patient for observation for a period of 40 days, pending determination of his mental condition. Two medical certificates as above are required. Within 30 days the superintendent of the institution must discharge the patient, if found sane, and notify the judge, or, if found insane, report to the judge recommending commitment or discharge under guardianship. Temporary care of persons violently insane may be effected without court order on certificate from two doctors qualified as above, by the superintendent of any institution for the insane. This is effective for five days. Temporary care of insane persons requiring immediate attention may be arranged on the request of a doctor, sheriff, or police officer. This is effective for ten days.

Dangerous Drugs and Narcotics

The drugs of addiction whose distribution is covered by the law are roughly the same in both countries. The laws governing this matter in the United States are part federal and part state. Under the Harrison Narcotic Law a doctor wishing to administer or dispense narcotics must apply to the local Collector of Inland Revenue and pay a tax of \$1.00. In return he receives a special tax stamp, which includes a Narcotic Registration Number assigned to the doctor and to his premises. Stock narcotics for emergency use or dispensing are obtained by ordering on an official Government order form from wholesalers or manufacturers, not from retail pharmaceutical chemists. A duplicate copy must be retained by the doctor for two years, and a daily record of the kind and quantity of narcotic dispensed, and the name and address of the recipient, are required.

The regulations governing the writing of prescriptions for narcotics is substantially the same in both countries.

In addition to all this, in the United States there is a large group of substances which can only be "dispensed by or upon the prescription of a physician." The term "dangerous drugs" is applied to these, not as in Britain to drugs of addiction. Under the current federal interpretation of the law a pharmacist cannot redispense a prescription for any of these preparations unless the doctor clearly indicates that he desires this to be done, the number of times it may be done, and/or the period of time within which it is permissible.

Registration of Births and Deaths

In Britain a medical practitioner has no responsibility regarding the registration of births; in the United States he has. A doctor is required to make a report to the clerk of the city in which the birth occurred, within 15 days of every birth of which he has been in charge. Illegitimates retain the mother's surname, and the facts concerning the father are not returnable except on written consent of both parents.

There is no certificate of stillbirth in the United States. In all cases of stillbirth the doctor must return a certificate of birth and one of death. Such certificates must be completed if a child is born dead after 20 weeks of intrauterine life. In some states premature births must be notified to the Board of Health (Public Health Department) in order that special provision may be made for care of the infants. Deaths may be certified in three ways. The practitioner in attendance may certify if he knows the cause of death and was in attendance during the last illness. If a person has been disabled by recognized disease unrelated to any form of injury and dies without medical attention, then death may be certified by a Board of Health physician. Often such cases are reported to the medical examiner, and, if the cause of death is reasonably certain and there are no suspicious circumstances, he may decline jurisdiction and leave the Board of Health to certify the death. The third method is where the medical examiner certifies the cause and manner of death as detailed above.

Reporting of Gunshot Wounds

In a community where so many members possess firearms, and are accustomed to their use, it is not surprising that the incidence of fatal shooting is high. By law, therefore, every physician attending or treating a case of bullet wound, gunshot wound, powder burn, or any other injury arising from or caused by the discharge of a firearm shall report the case to the police and to the commissioner of public safety. The purpose of this law is not only to prevent concealment of homicidal attack but also to expedite police investigation in cases of stray bullets, and to eliminate the public hazard of weapons in incompetent hands. No corresponding duty falls on the British medical practitioner.

The material for this paper was accumulated while I was a Research Fellow in Legal Medicine at Harvard University Medical School, Boston, Mass., U.S.A., and in receipt of a Smith-Mundt grant from the United States Government. I wish to express my gratitude to the State Department for making this period of study possible and to the staff of the Department of Legal Medicine at Harvard University for their courtesy and kindness.

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According to reports in the *New York Times* (November 9) attempts are being made both in Japan and in Washington to isolate the organism causing the virulent haemorrhagic fever recently contracted by troops in Korea. 25 deaths have been attributed to the fever, sometimes known as Koka disease or Korin fever, states the Surgeon General, and a total of 196 cases has been reported. The fever was first recognized by the Japanese Army in 1939, and it first appeared among United Nations troops in June this year.

Nova et Vetera

ABRAHAM VATER (1684-1751)

Though the name of Abraham Vater is familiar to every student of anatomy and to every surgeon, on the occasion of the second centenary of his death, which falls on November 18, Sir Thomas Browne's words have a peculiarly sober ring: "To be content that times to come should only know there was such a man, not caring whether they knew more of him." One of the most versatile men in the annals of medicine, Abraham Vater, son of a distinguished German doctor, was born in Wittenberg on December 9, 1684. After taking a doctorate in philosophy from his native university in 1706 and a doctorate in medicine at Leipzig four years later, he travelled in Germany, England, and Holland. In 1719 he was appointed professor of anatomy and botany at the University of Wittenberg, and in 1737 was elected to the chair of pathology and therapeutics. Known to-day chiefly as an anatomist, Vater, though he specialized in that subject, sacrificed nothing thereby to the breadth of outlook of the scientist, writing extensively on surgery, gynaecology, pharmacology, pathology, therapeutics, chemistry, and botany. He is eponymously commemorated in the ampulla of the common bile-duct, which he described in 1720 in his *Dissertatio anatomica qua novum bilis diverticulum circa orificium ductus choledochi . . .*, and in the corpuscles of Pacini-Vater (*Oeconomia sensuum ex speciali organorum sensoriorum et sigillatim ex papillarum nervarum textura mechanice demonstrata, 1717*). His other contributions to anatomy include research on the mechanism of the closure of the foramen ovale and a section in the *Opera omnia anatomico-medico-chirurgica* by Fredericus Ruysch, his former teacher in Amsterdam.

Preparations and Appliances

NEW OPERATING-TABLE FITTINGS FOR OPERATIONS ON FRACTURES OF NECK OF FEMUR

Mr. A. N. BIRKETT, F.R.C.S., orthopaedic and accident surgeon, Nottingham, writes: Operation on fractures at the hip has now become a standard procedure in most traumatic centres throughout the world. Insertion of Smith-Petersen pins for fracture of the surgical neck of the femur and the insertion of various forms of pin-plate for basal or intertrochanteric fractures are straightforward surgical procedures, provided satisfactory apparatus is at hand. Efficient mechanical fixation of the patient and injured limb must be maintained; free surgical access must be possible; and rapid facilities for x-ray examination, in a manner that does not impede the surgeon, must be available.

About 11 years ago I had made, at the Nottingham General Hospital, a special pelvic rest and special leg irons which gave satisfactory service until the end of the war. More recently I have had the original apparatus replaced by one made to fit a modern operating-table. The pelvic rest, made of metal and plastic, allows the introduction of a curved cassette between the legs so that a lateral view of a fractured neck of the femur can be readily taken and repeated, the cassette being fixed so that it can be handled by non-sterile personnel in the theatre. The antero-posterior film cassette can also be introduced without interference with sterile towels. When using this pelvic rest no difficulty is found in taking quickly both antero-posterior and lateral views with one x-ray machine.

The fixation of the patient on the table is arranged with leg pieces holding the lower limbs with the knees in flexion.