

isolated efforts of individual private practitioners under present conditions. If pneumonia were dealt with on similar lines to diphtheria as regards diagnosis, specific treatment, and notification the outlook would be more promising. In connexion with pneumonia, however, I suggest that it would be desirable not only to provide pathological facilities and vaccine or serum, but also some sort of clearing-house, preferably as a department of the public health service, which would collate clinical records. This would eventually permit of a sufficiently wide scrutiny of results to settle the matter to the satisfaction of all except perhaps the occasional crank who refuses to be influenced by evidence.

#### Conclusions.

I may summarise my conclusions as follows: (1) A medium dose of stock pneumococcal vaccine is free from risk; it appears to be of decisive value in many incipient cases; it should be used with the least possible delay. (An autogenous vaccine or Rockefeller serum involves some delay; they can be used later, if required.) (2) Any estimate, favourable or unfavourable, of specific treatment is comparatively worthless where the diagnosis is based solely on clinical evidence. (3) Hæmocultures are more frequently positive in incipient pneumonias than in the later stages; when positive at the onset they are helpful in treatment as well as diagnosis; when positive in the later stages they provide one of the most reliable foundations for accurate prognosis.

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## LIPIODOL IN THE DIAGNOSIS OF PREGNANCY.\*

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SINCE the discovery of X rays efforts have been made in different maternity hospitals to obtain radiographs of the foetus during pregnancy, in order to make diagnosis clear and to throw light on conditions not recognisable by ordinary clinical methods. This problem has been partly solved by the newer apparatus, for it provides us with rays of such quality as to allow the taking of radiographs of the foetus after the third month of pregnancy. These rays comprise a certain percentage of hard and white rays, from which must be eliminated the secondary rays and the reflections produced by the Potter Bucky diaphragm, in order to obtain a picture of the bony structure of the foetus. There is no other way to make clear or to confirm a diagnosis in the early stages; X rays are absolutely indispensable for the diagnosis of a twin pregnancy, an anencephalous foetus, or a dermoid cyst in case of non-appearance of the period for the first month or two. The exact appreciation of a pelvis narrowed in its different diameters can only be had after a good radiograph, and all the cases diagnosed by us have been successfully operated upon, for, before starting operation, we knew exactly what we had to deal with.

#### Apparatus and Method.

The best method of taking a good radiograph is to use a modern equipment—an apparatus which produces 100 kilo volts, 80 milliamperes, tube Müller, Metro, or Medor, double reinforcing screen, films Victor, &c. These are the elements that must be relied upon in order to give a full measure of security.

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The photographer's art is indispensable in these cases in order to obtain the highest possible definition and clearness. It is also of great importance to have the bowels evacuated and that the foetus and patient should be motionless. A purgative and an enema must be given the day before the radiograph is taken, and on the day of examination another enema is given with 40 drops of laudanum (Sydenham) in 50 c.cm. of water, and 10 to 20 drops are given to the patient one hour before the radiograph is taken. In this way a successful radiograph may be obtained from the fourth month of gestation.

#### Radiography Before the Fourth Month.

What I am about to explain is something different, something essentially new—viz., the taking of radiographs before that stage, a method entirely my own. It was perhaps by a scientific inspiration that, after the injection of lipiodol into the trachea, as used by Prof. Sergent, I conceived the idea of adopting the method with the uterine cavity, and so making possible a diagnosis of pregnancy. When a period or two is missed you can never be quite sure that a patient is pregnant, for the uterus might be small or it might be ante- or retro-flexed. In such cases a precise diagnosis is only possible by the use of X rays to show whether the cavity be occupied or not. In the different pregnant patients in whom we have injected lipiodol into the uterine cavity we did not provoke an abortion, while, on the other hand, the radiograph has enabled us to arrive at a positive diagnosis.

#### Usefulness of the Method.

In these conditions we have laid down fixed rules. When a woman after conception, and after one or more missed periods, wants to know if she is pregnant, and the clinical examination is indecisive, lipiodol must be injected into the uterus. A radiograph should then be taken in order to give absolute certainty. Under no other conditions must we proceed, in order to avoid dangerous eventualities.

If the injection has been successfully made the radiograph of the uterine cavity filled up with lipiodol shows: 1. That the cavity is not well filled if the foetus is more or less developed, the lipiodol penetrating round the foetus, and showing that the cavity is occupied. 2. The round shape of the stain with the radiograph of a tube together with the clinical symptoms indicating the pregnancy. 3. When the foetus is larger, the liquid penetrates very little, in a line more or less curved, and the form of the radiograph of the uterus indicates the pregnancy. 4. If the period is missed once or twice and the patient thinks herself pregnant, the injection of lipiodol into the uterine cavity may show in triangular shape and at the same time one or both tubes may fill up with the liquid. In such a case the radiograph shows that the uterine cavity is unoccupied and there is no pregnancy. 5. Every radiograph of the uterine cavity must be complete in order to show the neck and cavity for a satisfactory diagnosis to be made from it, together with the clinical symptoms. 6. The radiograph may thus allow us to diagnose sterility due to obstruction of the tubes; for it may be observed that they do not fill or fill up badly. 7. In cases of pyosalpingitis and old salpingitis a radiograph of the tubes can be obtained and the diagnosis confirmed.

The procedure to be described is entirely new and is submitted now to others for the test of further experience. Hitherto we have had no means of trustworthy diagnosis of pregnancy in the first months. The problem is a serious one, for in all maternity homes there are records of cases of early pregnancy which have been operated on for fibroma. The injection of lipiodol into the uterus does not provoke abortion if definite rules are observed.

#### Technique of the Method.

We have applied this method in the case of all our patients who have presented themselves without any special selection and without any disturbance further than a careful disinfection of the

vagina and the bladder. For that purpose we give, before taking the radiograph, a mild laxative in order to clean out the bowels; at the same time we douche the vagina with rivanol and instil twice a day silver nitrate solution or choleval into the bladder if there be cystitis. Four hours before we give 20 to 30 drops of opium, in order to keep the patient quiet. On the day of the injection we clean the vagina with liquid formalin soap, we brush the neck of the uterus with tincture of iodine, and with the most careful antiseptic precautions we introduce a large metallic cannula into the uterine cavity until the Brandt ring can pass. Then we inject 1 to 2 c.cm. of lipiodol, we take the radiograph, and inject, if possible, another 2 to 5 c.cm. and take a second radiograph. At the same time, if a better radiographic picture is wanted we inject 40 to 60 c.cm. of air into the bladder. The patient must be lying on her shoulders and in the Trendelenburg position.

In the cases in which diagnosis is doubtful between a tumour and pregnancy we inject the first day 2 to 5 c.cm. of lipiodol, and the following day we inject air into the tubes in order to cause a pneumoperitoneum of 150 to 200 c.cm., the patient being in the Trendelenburg position. Afterwards we inject 5 to 10 c.cm. of lipiodol in order to show the uterine cavity. We use the liquid warm, without employing much force, with a light pressure, and without moving the cannula within the uterus.

During the injection the eyes of the patient must be observed, for the pupil is dilated when the liquid enters the tubes. The pupillary reaction is characteristic. When the injection enters the tubes it produces a little colic, and first there is a dilatation and afterwards a contraction of the pupils. If the woman has had salpingitis, this reaction is much stronger, but the passing of the liquid through the tube does not cause any pain. The lipiodol runs all over the uterine walls and penetrates into the tubes if these are free, but if they are obstructed on account of a former salpingitis they do not fill up. In these cases it is necessary to persist with the injection once or twice more in order to get them filled.

In cases where we wish to know if the tubes are permeable, whether for the diagnosis of sterility or of salpingitis, the technique is different. In these cases we previously empty the bowels, make the patient urinate, and give her 30 drops of opium in some water one hour before. Then we introduce 10 to 20 c.cm. into the uterus with a big cannula, the neck of the uterus being well closed in order to avoid the passing of the lipiodol into the vagina. The lipiodol fills up the uterus and passes into the tubes. If the lipiodol drops out into the vagina we repeat three or more times, until we are sure that it has passed. Before taking the radiograph we fill the bladder with air. In the cases of salpingitis the tubes do not fill up with the first injection; and it is necessary to repeat the injection until we obtain a good radiograph.

By this procedure it is possible to find out the causes of sterility in women, whether that be obstruction of the tubes or malposition. In cases where the tube is twisted the radiograph will give us a clear view of all details. If we are confronted with a tumour of doubtful nature we induce pneumoperitoneum by the ventral way or by way of the tubes, and then the injection of lipiodol is made into the tubes and the radiograph taken, the patient being in the Trendelenburg position. By this means the clear space in the pelvis due to the pneumoperitoneum reveals the tumour of the uterus and the relations of both with other organs.

Finally, I wish to mention that in Buenos Aires Dr. Uslenghi, Dr. Martinez, and the author have tried to provoke abortion in tuberculous patients by this means when it was indicated, but we did not succeed.

*Corrigendum.*—In the legend to Dr. C. C. Chesterman's illustration of the effects of trypanamide in sleeping sickness (THE LANCET, Nov. 7th, p. 966) the word "trypanamide" where it twice follows "ago" should read "trypanosomes."

## A CASE OF POLYCYTHÆMIA RUBRA RELIEVED BY X RAY TREATMENT.

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THE case about to be described has been under close observation for 12 months, and is of interest because of the great improvement effected by X ray treatment applied to the long bones of the limbs, with the object of arresting overproduction of blood. It is suggested that the method may also be useful in treating certain cases of high blood pressure.

### *Clinical Record.*

The patient was an unmarried woman, aged 42, whose mother died of Bright's disease at 38, and the father at 48 of "meningitis." During life his appearance and symptoms were similar to those of his daughter. The patient had had no severe illnesses until 1919, when she first noticed a blotchy non-pruritic rash on the left forearm. In April, 1919, she had two attacks of what was thought to be a severe nettle-rash of the face. The blotches on the left forearm came at intervals, but in other respects she was well till May, 1921, when she felt giddy and sick, and fell in the street. About a month later she woke one morning and felt a sharp pain down the left side of the head and left arm; the arm was numb and the hand has been weaker since. The power is gradually coming back, but the fingers are still weak. At that time the left knee-jerk was found to be exaggerated, and there was some staggering on walking. Headache and giddiness increased gradually. In the autumn of 1923 she noticed swelling and numbness of the left hand; and when examined in Paris in November, 1923, the blood was found to contain  $7\frac{1}{2}$  million red cells per c.mm. and blood pressure was 175 mm. Hg. The patient was put on a lacto-vegetarian diet with rests, and remained without much improvement till admission to Ruthin Castle in June, 1924.

On examination the face was high-coloured, fingers tended to be clubbed, and there was a blotchy, dark pink rash on the left forearm. The pulse was regular, of good volume, the artery wall not palpable during diastole, blood pressure 204/120 mm. Hg. The cardiac impulse was in the left nipple line, and the aortic second sound was accentuated. The electrocardiograph showed a normal P.-R. interval and an inverted T in lead III. The blood had 130 per cent. hæmoglobin measured by Sahli's apparatus, and contained 7 million red cells and 8000 white cells per c.mm. The differential count showed a normal distribution of these white cells. The viscosity of the blood was greatly increased; its withdrawal through a needle of ordinary bore was difficult and the blood clotted rapidly. There was no loss of power or altered sensation in the distribution of any of the cranial nerves, but distinct weakness and slight diminution in the circumference of the left arm and forearm. The muscles of the leg appeared normal. The knee-jerks were active and normal, and the left arm-jerks were increased in comparison with the right. Both plantar reflexes were normal. Sensation to touch and pin-prick in left arm normal, but there was inability to name objects by touch (astereognosis).

The edges of the liver and spleen were firm and palpable. The urine contained 0.5 per cent. of albumin, and there were a few casts and epithelial cells in the deposit. The urea concentration test was at the third hour 2.4 per cent., a low normal value. The basal metabolism rate was 100 per cent. of the normal. Sugar-tolerance curves for glucose and lactose gave normal figures. The fractional test-meal showed super-acidity. X ray examination of the alimentary tract showed an abscess of the right upper premolar tooth, enlargement of the liver and spleen, and considerable delay in the colon. The diagnosis was made of essential polycythæmia rubra, with thrombosis of a vessel supplying the cerebral centre for the left arm and hand.

*Treatment.*—The patient was treated as follows: The lacto-vegetarian (anticonstipation) diet, which had been tried for some time, was continued and the affected tooth removed. One grain of thyroid was administered twice a day and an intestinal douche twice a week. X ray treatment to the long bones was given twice weekly, on 25 days for 15 minutes each treatment, from July 4th to Oct. 17th, with the object of arresting the overproduction of blood. Light therapy was applied from hands to feet on the other 4 days a week, 12 minutes for each treatment, passing 8000 r. Fig. 1 shows curves of the blood count and blood pressure before, during, and after the treatment.

Initially, the colour became normal, headache and giddiness disappeared, and the spleen was no longer palpable. A subjective feeling of well-being accompanied the return of