dose of radiation which would destroy the mature Graafian follicles but would not be sufficient to damage the undeveloped follicles; so that menstruation would become established after a period of amenorrhoea lasting for some months, and there would be a possibility of future pregnancy.

Phillips has tabulated the records of 165 patients, in 128 (77.5 per cent.) of whom normal menstruation was restored. These were mostly adolescents and young women under the age of 25. The treatment was by radium in every instance, and a small dose averaging under 500 mg.-hours was given. It would appear that this treatment is still in the experimental stage, and that the dosage cannot yet be expressed numerically with accuracy. The question as to the liability to subsequent normal pregnancy is even less clearly defined.

Corscaden, Kasabach, and Lenz (1938) record sixty-nine further cases which received a substerilizing dose of radium or x rays for menorrhagia, fibroids, or dysmenorrhoea. Eleven pregnancies occurred among six women in this series: five patients aborted; four children lived beyond infancy, and two died at the age of 6 weeks and 6 months. This is only a small series, and the larger numbers of Murphy and Goldstein (1929) and of Miller *et al.* (1936) indicate that preconceptional irradiation should have no harmful effect on subsequent pregnancies, and that certainly it does not cause any increase in the percentage of abnormal children and monsters. It may be thought that the four surviving children in Corscaden's series are sufficient indication that this method of treatment is of value; it is obviously much to be preferred to the alternative of hysterectomy in those cases of severe bleeding which sometimes occur at puberty. It should only be used, however, when all else has been tried, and patients should be warned of the possibility of permanent menopause which may result (with the present state of our knowledge) in a certain proportion, especially of those aged 30 and over.

Further, if one accepts the action of radium as being mainly on the ovary—and it appears that this is, the only way that the greater difficulty in sterilizing young women can be explained—it would seem advisable to use x rays rather than radium: the dose to the ovaries can be assessed with greater accuracy and there is less damage to the endometrium, with consequently a greater chance that an impregnated ovum can be retained.

REFERENCES

- Clark, J. G., and Norris, C. C. (1927). *Radium in Gynecology*, Philadelphia.
 Corscaden, J. A. (1935). *Amer. J. Roentgen.*, **33**, 810.
 — Kasabach, H., and Lenz, M. (1938). *Radiology*, **30**, 203.
 Donaldson, Malcolm (1938). *Proc. roy. Soc. Med.*, **31**, 1009.
 Finzi, N. S. (1933). *Ibid.*, **26**, 637.
 Forsdike, S. (1922–3). *Ibid.*, **16**, Obstet. Sect., 69.
 Malpas, P. (1937). *J. Obstet. Gynaec. Brit. Emp.*, **44**, 86.
 Martindale, Miss L. (1938). *Proc. roy. Soc. Med.*, **31**, 1010.
 Miller, J. R., *et al.* (1936). *Amer. J. Obstet. Gynec.*, **31**, 518.
 Murphy, D. P., and Goldstein, L. (1929). *Amer. J. Roentgen.*, **22**, 207, 322.
 Patterson, Moore (1933). *Proc. roy. Soc. Med.*, **26**, 643.
 Phillips, Leonard (1938). *Ibid.*, **31**, 996.
 Radiumhemmet (1937). Report, p. 82.
 Regaud, C., and Lacassagne, A. (1927). *Radiophysologie et Radiothérapie*, **1**, 42, Paris.
 White, Norman (1933). *Proc. roy. Soc. Med.*, **26**, 646.

Small-pox has become an extinct disease in Poland, where the law on compulsory vaccination and revaccination is strictly enforced. Complications of vaccination are rare, and no cases of post-vaccinal encephalitis have so far been reported in Poland. In many towns where immunization against diphtheria is also compulsory protection against the two diseases is carried out at the same time.

THE TREATMENT OF NON-MALIGNANT UTERINE HAEMORRHAGE*

BY

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The treatment of non-malignant uterine haemorrhage in women approaching the menopause—the only class of case which I propose to consider—calls for a nicety of judgment which is, I think, ideally to be expected of the gynaecologist with special training in radiotherapy. Those in whom the surgical instinct predominates habitually subject women to major operations which, as I hope to show, can be avoided in many cases by the substitution of radiotherapy. Radical operation entails a primary mortality which is inseparable from hysterectomy; moreover, in every practice there occur, not infrequently, cases which for one reason or another are bad surgical risks—heart and lung disease, obesity, and so forth. On the other hand, the indiscriminate use of radiotherapy will in some cases involve the retention of a dangerously unhealthy uterine cervix, and in other cases, notably submucous fibroids, a liability to sloughing, with the possibility of catastrophe.

It is my practice to use total abdominal hysterectomy in all cases showing an advanced degree of chronic cervicitis, in the presence of large fibroids causing symptoms, unless myomectomy is indicated, and in those judged to be submucous. I avoid sterilizing operations so far as possible by trying medical treatment and sometimes curettage in women who desire to add to their families. In all other cases, including bad surgical risks, I prefer to use radium. Deep x rays are not at the moment available for my patients, so in the field of radiotherapy radium for me is Hobson's choice.

My impression has been that radium is most valuable in suitable cases, and for the purposes of this discussion, and with the permission of my colleagues of the Birmingham and Midland Hospital for Women, I have investigated the results of cases treated in that hospital during the years 1935 to 1937. These results I propose to present here.

Analysis of Cases Treated with Radium

Of 226 patients presumed to have been reached by a questionnaire 199 replied. I have felt justified in assuming that those who failed to reply are a fair sample of the whole; probably any woman with a grievance would have seized this chance of airing it.

Diagnosis.—The cases are classified as follows: subinvolution seven, metropathia haemorrhagica twenty-two, fibroids twenty. Two cases are included in which radium was applied to bring about sterilization. The remaining 148 cases I have not attempted to diagnose scientifically, but have used the term "chronic metritis."

Dosage.—A single 40-mg. or 50-mg. needle was used, with screenage equivalent to 1 mm. of platinum. The needle was left *in situ* for from twenty-four to forty-eight hours, in a few cases for seventy-two hours. The dosage of radium element varied from 960 to 3,600 mg.-hours, the great majority receiving about 2,000.

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Results

The results I will discuss under headings, including the usual objections to the use of radium therapy—namely, the complaints of discharge and pain following the application.

Bleeding.—A total of 187 cases (94 per cent.) have complete amenorrhoea. Of the twelve cases in which bleeding was not entirely arrested, hysterectomy followed in two cases; two others are still suffering from menorrhagia. The cases in which hysterectomy was performed were those of chronic metritis at ages 33 and 34, the doses being 1,800 and 1,200 mg.-hours, and it seems probable that a larger dose or a further application would have brought about a cure. A case of chronic metritis at the age of 38 (dosage, 1,920 mg.-hours) had no relief at all, and a case of a fairly large fibroid at 48 (1,920 mg.-hours) is in a similar condition. Three women state that they now have normal periods; they are aged 34 (dose 1,800 mg.-hours), 37 (1,200 mg.-hours), and 35 (1,200 mg.-hours). Five state that they have had a period occasionally. Only four patients (2 per cent.), therefore, are dissatisfied on account of abnormal bleeding. As regards the cessation of bleeding after the treatment in the remaining 187, ninety-five had no further loss. In forty-three the bleeding ceased during the first month; it continued longer than a month in fifteen, the longest time being seven months. Thirty had from one to four periods after the operation; two have an occasional period; one had a single slight loss, and one lost for eleven weeks nineteen months after treatment.

Discharge.—This is a most difficult symptom to evaluate, especially as it was present in many cases before the treatment. Eighty-two patients (41 per cent.) replied that they noticed no discharge; thirty-two had a slight discharge, and eighty-one a moderate amount, lasting for varying periods. Two had a profuse discharge—one for a month only; the other, a patient who had no relief from her menorrhagia, still discharges freely. The one significant point I have been able to make on the subject of discharge is that only two patients complain of discharge under the heading "Ill effects of the treatment."

Pain.—It is even more difficult, from the answers to a simple questionnaire, to reach satisfactory conclusions on this symptom. In 138 cases (69 per cent.) there was no pain at all. Pain was slight or moderate in a further forty-eight. Fourteen cases (7 per cent.) had what they consider severe pain for periods of from a few days up to three months. One woman says she had severe pain for a year. Again, it is significant that only one woman mentioned pain in reply to the question on "Ill effects."

Ill Effects.—No ill effect at all was noticed in 123 (62 per cent.) of the cases. Of the remaining seventy-six, seventeen (8.5 per cent.) mentioned definite menopausal symptoms, such as sweats and flushes—a surprisingly small proportion. Three others noticed an increase in weight, seven had headaches, and fifteen complained of weakness and "nerves." Two complain of dyspareunia (I have not been able to examine these patients), one seems to have had a femoral thrombosis, one cystitis, one severe diarrhoea, and one had thyrotoxicosis later, of which the abnormal haemorrhage was probably an early symptom. The remaining few complaints were irrelevant.

Results from the Patients' Point of View.—In response to the question "Was the result of the treatment entirely satisfactory to you?" 184 (92.5 per cent.) replied "Yes," and twenty-eight patients were moved to add notes expressing extreme satisfaction and gratitude with varying

degrees of eloquence. Only fifteen (7.5 per cent.) were less than completely satisfied.

I entered upon this investigation with, I hope, an unbiased mind, and I have been greatly impressed by the almost uniformly satisfactory results. They seem to me striking evidence of the value of radium therapy in selected cases of uterine haemorrhage in women approaching the menopause. I would only add that of 411 cases so treated during the past four years the only death was that of a patient who afterwards proved to be suffering from purpura, a record which I am sure could not have been equalled had radical measures been adopted in all these cases.

DANGER OF PRIMARY ABDOMINAL TUBERCULOSIS IN CHILDREN

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The object of this paper is to present a series of cases of primary abdominal tuberculosis in children which terminated in a fatal meningitis, and to emphasize certain points in order to direct the attention of practitioners to the danger of primary abdominal tuberculosis in the child.

Primary tuberculosis of the lung has been extensively studied in children, and it is well known that in this form of tuberculosis the greatest risk to life results from generalized dissemination of the disease, usually manifested by a terminal meningitis. This risk is particularly great in the first three years of life, so that the prognosis in a case of primary tuberculous infection of the lung depends mainly on the age of the child.

Investigations into the fate of children infected with primary abdominal tuberculosis have been chiefly centred on identification of the type of bacillus responsible, human or bovine, or to the percentage incidence as compared with that of primary pulmonary infection, notably by Griffith (1932, 1934, 1937, 1938) and Blacklock (1932, 1935). Many significant facts have emerged from their investigations, two of the most important for the purposes of this paper being, first, that in 80 to 82 per cent. of cases of primary abdominal tuberculosis the infection is due to the bovine type of bacillus, and, secondly, that generalized dissemination takes place from a primary abdominal focus of infection in a high proportion of cases (32.4 per cent. in Blacklock's (1935) series of 372 cases).

For many years it was denied on the Continent that miliary tuberculosis could follow a primary abdominal infection, and only lately has this contention been refuted by the work of Griffith and Blacklock in this country and of Klercker (1931) in Sweden. The clinical importance of their investigations is even greater than is suggested by the figures quoted above, as these results were necessarily obtained by post-mortem examination, and, as will be seen later, the post-mortem figures do not nearly approximate to the total number of cases of miliary tuberculosis in children.