Report

ON

THE RADIUM TREATMENT AT THE ROYAL INFIRMARY, EDINBURGH, DURING THE YEAR 1914.

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SIXTY-THREE patients attended for radium treatment during the past year; of these, 36 were in-patients, 27 were out-patients; 34 of the patients suffered from, in all but 1 case, inoperable malignant disease, 23 of these from carcinoma, and 11 from sarcoma. There were 12 cases of rodent ulcer, 6 of exophthalmic goitre, 2 of otosclerosis, 1 of middle-ear deafness, 1 of Paget's disease, 1 recurrent wen, 1 simple tumour, 1 naevus, 1 leucoplakia, 1 warty tumour, 1 hypertrophied tonsils.

Though a cure was not effected in any of the malignant cases, nor, considering their advanced nature, was it to be expected, yet in practically all of those who were treated more or less benefit was produced by the relief of pain, the cessation of discharges, the healing of ulcerated surfaces, the removal of local growths and the prolongation of life. In some of the cases radium was used as a prophylactic after the surgical removal of a growth, and sufficient time has not yet elapsed to ascertain its effect. Remarkable results were produced in some of the malignant cases; thus an epitheliomatous growth was entirely removed, first from the posterior wall and then from the anterior wall of the vagina, so that not a trace of it remained; there has, however, been a recurrence which is being treated. In a rapidly growing periosteal sarcoma of the lower end of the femur in a boy of 13 the application of radium caused the growth to shrink and to become dense, hard, and fibrous, so that whereas, to use the words of the surgeon, Mr. Hodsdon, it bled like an aneurysm on the first introduction of radium; two months later, on a second introduction, it scarcely bled at all, and it was so hard and dense that it was only with difficulty that the radium could be inserted. This was an illustration of the well-known effect of radium in converting a sarcomatous growth into a fibrous one.

Malignant disease of the buccal cavity, the pharynx, larynx, and posterior nares appears to be less amenable to radium, but this may be partly due to the difficulty of administering a sufficient dose in such positions.

The beneficial effect of radium in rodent ulcer is now well recognized. Of the 12 cases treated during the year, 9 were easily cured; the remaining 3 have not yet been long enough under treatment for the effect to be produced. In each case the cosmetic result leaves no room for improvement. In small superficial rodent ulcers a single application may be sufficient; but it is important, in order to prevent a recurrence, that the deeper parts, as well as the superficial, should be adequately treated. Several of the cases had previously received, without sufficient benefit, applications of carbonic snow or large doses of the x rays. Though this may render them, as the Radium Institute reports indicate, more refractory to radium, yet none have failed to yield to it.

In the 6 cases of exophthalmic goitre treated during the year, radium was of undoubted benefit, in 1 case apparently bringing about a definite cure. Its action consists in producing a sclerosis of the thyroid gland, following upon an obliterative endarteritis. As the treatment of this condition by radium was novel, great care was exercised in the earlier cases by giving small doses and keeping careful observation of the patients. Larger doses, which more rapidly produce a beneficial effect, are now administered. A diminution in the exophthalmos and tachycardia are amongst the first results to be observed.

Summary of Cases (excluding Rodent Ulcer).

1. *Sarcoma* under the left eye. An advanced case, with abscesses and an opening into the antrum of Highmore. A dose of 2,280 mg.h. was given with temporary benefit.

2. *Recurrent epithelioma* following lupus in a male, aged 41, recommended by Mr. Wallace. A growth affecting the region beneath the right ear was removed by

Mr. Wallace, healed well, except a small patch, which healed after a dose of 240 mg.h. of radium. Five months later a recurrence occurred below, into which three tubes of radium were inserted, and removed after a dose of 5,040 mg.h. Six weeks later Mr. Wade reported a great improvement, the growth having practically disappeared. A few weeks later a recurrence occurred above, and radium treatment was given up.

3. *Sarcoma* of the scapula in a female, aged 29, recommended by Mr. Miles. Radium used prophylactically after surgical removal of the scapula, and inserted anteriorly. A dose of 360 mg.h. only was given, owing to the proximity of the subclavian vessels. Three weeks later a rapidly growing recurrence higher up, not where the radium had rested. Two tubes were inserted into the recurrence, and a dose of 2,520 mg.h. given. A peculiar feature of this case was that the temperature of the patient always fell, and remained down during the radium applications. The radium relieved the patient's pain, which had been constant, but the patient rapidly sank.

4. *Recurrent scirrhus* in a female, aged 37, recommended by Mr. Miles. Breast removed in August, 1912. Some time afterwards a swelling began over the sternum. On admission on February 3rd, 1914, there was a large swelling over the sternum, measuring 3 by 2½ in., and projecting about 1½ in. A tube was introduced into the growth and radium applied externally in different positions, shielded by 1 mm. of silver. The dose amounted to 5,270 mg.h. Six months later the growth had disappeared. Photographs had been taken before and after treatment. Two months later two recurrences, one to the right, one above. A dose of 5,700 mg.h. was given, with the result that the swellings were markedly reduced. This patient has ceased to attend.

5. *Recurrent carcinoma* of the rectum in a female, aged 27. An aluminium tube containing radium was placed in a rubber tube and attached to a twisted silver wire. This was introduced so as to lie against the ulceration, and a dose of 1,030 mg.h. administered. Mr. Hodsdon considered that this treatment was beneficial, the induration became less, and pain was diminished. The patient went home, and has not since attended for more treatment.

6. *Epithelioma* of the lower jaw. It was large and unsuitable for radium treatment.

7. *Epithelioma* of the lower lip in a male, aged 55, recommended by Mr. Cathcart. The diseased area was about the size of a filbert nut; there was a crack in it above, but the mucous membrane was not invaded. A dose of 400 mg.h. was administered. Dismissed three weeks later greatly improved. Told to return in three weeks, but did not do so for many months, when the condition was so much worse that an operation had to be performed. The case was one which would probably have entirely yielded to radium had the treatment been persisted in.

8. *Secondary metastatic sarcoma* in a female, aged 27, recommended by Professor Alexis Thomson. Eight days after the growth had been removed from the back of the neck a tube of radium was introduced into the wound, and a dose of 960 mg.h. administered. A year later her family doctor, Dr. Gemmell, wrote to say that he had examined her and could find no hardness or swelling near the cicatrix, and that she had made a marvellous recovery after we had expected her cure impossible.

9. *Epithelioma* of the vaginal walls in a patient of 40, recommended by Dr. Barbour. Duration some months; pain and watery discharge. There is a raised warty growth over upper two-thirds of posterior vaginal wall, also in anterior fornix. Microscopic examination shows it to consist of a squamous celled epithelioma. Operation unadvisable owing to risk of a rectal fistula. 15 mg. of radium protected by 1 mm. of silver were fastened into a speculum and introduced so as to be in contact with the warty growth. A dose of 384 mg.h. was given. Six weeks later the patch was smaller and there was less discharge; 25 mg. of radium in an aluminium tube were attached to a pad protected on the upper surface by lead foil and placed in contact with the growth. A dose of 1,050 mg.h. was given. Some local peritonitis and lung trouble followed. In four months' time when the patient returned no trace of the disease could be found on the posterior vaginal wall, but there was a decided plaque-like growth on the anterior wall. Twenty mg. of radium protected by silver, 1.3 mm. thick, were placed against the growth and left in, except for douching, for seven days, dose 3,200 mg.h. Six weeks later the growth had disappeared except for a trace in the anterior fornix. Two months later she returned with a hard lump on the anterior wall. The growth was rapidly increasing. By the application of 30 mg. of radium in aluminium, a dose of 5,060 mg.h. was given. A month later she returned complaining of pelvic pain, rectal discomfort

and discharge. On examination under chloroform, the posterior vaginal wall, where the original growth had been, was found to be thickened, indurated, and grey coloured. The anterior wall presented the same appearance. Immediately below the cervix was a growth of the size of a gooseberry. The pathologist reported that this showed very extensive necrosis, so that it was impossible to recognize what the original tissue was. The patient is being kept under observation.

10. *Recurrent sarcoma* of the right orbit, growing rapidly and very vascular. A case of Dr. Sim's. A dose of 1,920 mg.h. was given, but the patient died a few days later with head symptoms.

11. A *scirrhous* of the left breast in a patient of 75, recommended by Mr. Caird. There was a hard tumour with an ulcerating crack and the glands were involved. To relieve pain a dose of 120 mg.h. in aluminium was given to the crack. The pain was relieved, and there was great local improvement. The patient ceased to attend.

12. *Fibro-sarcoma* of the right side of the neck in a man of 34, a patient of Mr. Struthers. Duration six years. Aching pain. Neck circumference, 17½ in. 20 mg. in aluminium inserted through an incision, and a dose of 5,400 mg.h. given. Six weeks later, growth no smaller, but more movable; pain removed. A large fresh deep incision showed a softened area where the tube had lain. Microscopically there were areas of necrosis round the positions in which the radium had been. By means of another tube a dose of 3,840 mg.h. was given. Considerable reaction with a discharging sinus followed. Four months later the growth was found to be much smaller and more movable. The patient has ceased to attend.

13. *Myeloid sarcoma* of enormous size of the side of the face and back of the head in a man of 54, recommended by Mr. Dowden. As a palliative a dose of 3,360 mg.h. was given.

14. *Recurrent carcinoma recti* in a female of 54, recommended by Mr. Hodsdon. Previous operation a year ago; colotomy performed, rectum removed. Now a fistula into the vagina, constriction, tenderness, and pain. 20 mg. in aluminium introduced, and a dose of 3,840 mg.h. given. Considerable amelioration followed with relief of pain.

15. *Recurrent scirrhous* in a woman of 47, a patient of Mr. Caird. As the disease was very extensive the patient was recommended for x-ray treatment.

16. *Recurrent carcinoma* of bowel round a colostomy opening in a female of 41, recommended by Mr. Cathcart. Diabetic. A tube was inserted into the growth, but ulcerated out in three days. The patient died complaining of head symptoms.

17. *Sarcoma* of tonsils in a man of 50, recommended by Dr. Logan Turner. Four months' duration. Cannot open mouth much or swallow solids. An ulcerating mass chiefly on right side. 20 mg. in an aluminium capsule at the end of a rod were held for some eight hours a day by the patient close to, but not actually touching, the ulcer. After a dose of 1,310 mg.h. the patient ceased to attend. No beneficial effect, except that the ulcer appeared to get cleaner, was observed.

18. *Carcinoma* of cervix and vagina, advanced ulcerating, in a patient of 49, recommended by Mr. Brewis. 20 mg. in aluminium and rubber were placed in contact with the growth, and a dose of 3,500 mg.h. given. This removed the agonizing pain from which the patient suffered, but she died within a week of the radium treatment.

19. *Carcinoma* of the floor of the mouth in a man of 70, a patient of Mr. Miles. Inoperable and unsuitable for radium treatment.

20. *Recurrent sarcoma* of the femur in a female of 23, recommended by Professor Alexis Thomson. After amputation above the knee joint two tubes of radium were inserted and a prophylactic dose of 3,360 mg.h. was given. Eight months later her doctor reported that she was going on very well indeed.

21. *Recurrent scirrhous* in a female of 70, recommended by Dr. Scott Carmichael. The first operation nineteen months earlier; steady pain since. Second operation June 26th, 1914, when a lump was removed and a tube of radium inserted as a prophylactic. Dose 1,440 mg.h., aluminium screen. On being asked to report herself in January, 1915, the patient wrote to say that she was too ill to attend.

22. *Malignant enlargement* of the cervical glands on both sides in a male. Considered unsuitable for radium treatment.

23. *Epithelioma* of the upper lip, invading the mucous membrane, in a male of 58, recommended by Dr. Porter. Taken to see Mr. Cathcart, who recommended operation.

24. *Epithelioma* of the left tonsil of eight months' duration in a male, aged 41, recommended by Mr. Cathcart.

Cervical glands enlarged. Twenty milligrams of radium in a capsule were held by the patient against the affected area daily, screened by aluminium, until a dose of 1,065 mg.h. had been given. Considerable sloughing followed, but no improvement of any consequence. The patient was referred back to Mr. Cathcart.

25. *Recurrent epithelioma* of the upper jaw in a patient, aged 46, recommended by Mr. Hodsdon. Two years ago first operation. Now a hard mass growing in a cavity above his dental plate. By means of some radium attached to the end of a wire which the patient held against the growth, a dose of 600 mg.h. was administered. Screen aluminium. The patient ceased to attend.

26. *Paraffin epithelioma* of the right hand in a man of 57, recommended by Dr. Steven. Advanced case. The patient was recommended to Mr. Wade for advice. An operation was advised.

27. *Recurrent periosteal sarcoma* of the left knee. Male, aged 23, recommended by Professor Alexis Thomson. Previous operation four years earlier. Now there is a swelling the size of a small egg, which Professor Thomson excised, and at the same time inserted 20 mg. of radium in aluminium. A dose of 2,880 mg.h. was administered. Six months later his doctor wrote to say that there was no recurrence, and that the leg was regaining strength.

28. *Periosteal sarcoma* of the lower end of the femur in a boy, aged 13. The parents refused operation. Duration five months, immobility, pain, and swelling. Greatest circumference of knee 13 in. On September 22nd, 1914, Mr. Hodsdon made an incision, and inserted 30 mg., contained in two aluminium tubes, into the swelling. Blood gushed from the growth as though it were an aneurysm. Radium, shielded by silver 1 mm. in thickness, was also applied externally. The position of the internal tubes and of the external capsules was shifted from time to time. A total dose of 8,760 mg.h. was given. The boy was sent home. In two months' time, when he returned, it was observed that the swelling had diminished in size, the pain had disappeared, the part was less tender, and he could move it more freely. It had been growing rapidly. By a fresh incision, a tube was pushed down deeply, so as to be in contact with the bone. The part incised scarcely bled at all, and the tissues had become hard and fibrous, making it difficult to introduce the tube. A dose of 3,840 mg.h. was administered. The knee now became more swollen and tender, and the temperature rose. It was evident that the contact of the radium tube with the diseased bone was setting up a severe reaction. The boy shortly afterwards returned home. Six months later his doctor wrote to say that the right lung was affected and that the patient was sinking. The knee remained *in statu quo*, but was discharging pus from the cavity in which the tube had lain. The radium appeared to have arrested the local growth, but had not prevented a metastasis.

29. *Epithelioma* following lupus erythematosus and excessive x-ray treatment affecting the chin in a woman of 67, recommended by Dr. Gardiner. Case unsuitable for radium treatment.

30. *Epithelioma* of the vulva in a patient aged 61, recommended by Dr. Barbour. Case unsuitable for radium treatment except after an operation.

31. *Recurrent metastatic sarcoma* of right side of chest in a male of 35, recommended by Sir Robert Philip. Case unsuitable for radium treatment.

32. *Exophthalmic goitre* in a female of 28, recommended by Professor Gulland. Swelling of neck began in August, 1913, but the patient had been getting weaker before then. On admission, tachycardia (140), marked exophthalmos, tremulous, sweating, glycosuria. In March, 1914, the patient was given, by external application through silver 1 mm. thick, a dose of 360 mg.h. to the thyroid. On April 24th, 1914, the patient returned much better. Gave her a dose of 400 mg.h. On September 14th the pulse was 80, exophthalmos less, better in every way. Gave her a dose of 540 mg.h. On October 17th, 1914, gave her a dose of 400 mg.h. On December 23rd, 1914, the patient returned practically restored to health: pulse 70, no exophthalmos, thyroid cannot be palpated. Professor Gulland writes in reference to this and another case: "This case had a considerable number of applications at long intervals, and has immensely benefited thereby. She has, in fact, within a year returned to normal—an unusually good result. The second case has had only one application, and naturally did not do so well, though she also greatly improved."

33. *Exophthalmic goitre* in a girl of 27, recommended by Dr. Boyd. Duration three years. Breathlessness, nervousness, tremor of hands, pulse 120, thyroid enlarged, exophthalmos slight. This patient was given a total dose of 1,750 mg.h., administered as in the last case. On January 15th, 1915, Dr. Boyd wrote: "The patient seems

to have benefited very much from radium, and I think a second dose would be very desirable."

34. *Exophthalmic goitre* in a woman of 32, recommended by Professor Gulland. A mild case of three months' duration. Slight exophthalmos, weakness, nervousness, palpitation, oedema, thyroid slightly enlarged. Medicinal treatment so far unavailing. A dose of 600 mg.h. administered externally as in the last case. This is the second patient referred to in Professor Gulland's letter, in which he described her as being greatly improved. The other three cases of exophthalmic goitre were only given treatment at the end of October, and they have not yet returned to report themselves.

Otosclerosis.—Two cases of otosclerosis and one of middle-ear deafness were treated with radium during the year. They are as follows:

35. A female, aged 52, recommended by Dr. J. S. Fraser. Deaf for twenty-five years, and regarded as hopeless. Dr. Fraser writes: "The raised voice before treatment could only be heard at 6 in. in both ears. After six applications of radium (dose 106 mg.h.) there was no improvement, and the patient stated that the noises had been worse. The raised voice was only heard at 4 in. in the ear which had been treated. This was a case of advanced otosclerosis."

36. Early otosclerosis in a female, aged 22, recommended by Dr. J. S. Fraser, who writes regarding her as follows: "She had been slightly deaf since childhood. Before radium treatment the low voice was heard at 1 ft. in the right ear. Radium treatment was commenced in February, 1914. I saw the patient again in May, after she had had a dose of 125 mg.h. of radium, and was suffering from a considerable amount of dermatitis of the external meatus on the right side, probably due to the radium. I saw her for the last time on November 6th, 1914, and found that the right meatus had quite healed. The hearing was about the same as before—namely, low voice at 1 ft."

37. Case of middle-ear deafness in a female of 45, recommended by Dr. J. S. Fraser, who writes as follows: "Patient had been deaf for ten months and complained of noises in the ears. Before radium treatment the raised voice was heard at 1 ft. by the left ear. After a dose of 55 mg.h. she stated that the noises were not so bad as before. The voice was heard at about 18 in. by the left ear. I do not think that the difference between 1 ft. (before treatment) and 18 in. (after treatment) is of any importance, as a small difference in hearing like this might easily be due to the room being more quiet or to the voice used being rather louder. In conclusion, I am afraid we must report that these cases of chronic progressive middle-ear deafness have not benefited from radium treatment, but this is only to be expected."

38. *Nævus* of the scalp in an infant 1 year old, recommended by Mr. Cotterill. Had been treated by injections of carbolic acid and glycerine. There was a scab in the centre and a raised red ring around. A dose of 115 mg.h. was sufficient to cure this condition.

39. *Paget's disease* in a female aged 72, recommended by Mr. Miles. To right of nipple is a well defined crescentic area, red, slightly elevated, and hard. Glands not palpable. Nipple normal. A dose of 1,200 mg.h. was administered, guarded by silver and cork, so as to spread the effect. The patient has not reappeared for treatment.

40. *Warty tumour* in a girl aged 18, recommended by Dr. Ogilvie. Duration about two years. Has had nitric acid and other applications without benefit. On the left cheek is a wart the size of a threepenny piece considerably elevated above the surface. Radium-treatment begun on March 24th, 1914, and a dose of 58 mg.h. administered. On June 2nd, 1914, the wart was found to have disappeared and the skin to be practically normal.

41. *Leucoplakia*. As this case was only admitted for treatment in December, 1914, it is too early to make any report.

DR. IRVIN S. KOLL, Instructor in Genito-Urinary Diseases, University of Illinois Medical College, has published in the *Journal of the American Medical Association* (January 23rd, 1915) a memoir on the experimental effect of the colon bacillus on the kidney. One hundred experiments were made to show the comparative action between the colon bacillus, the typhoid bacillus, and the staphylococcus under different conditions, these bacterial invasions being compared with the effect of a soluble toxin made from each. The bouillons were injected into the ureter just below the pelvis, into its sheath extraperitoneally at about its middle third, or under the renal capsule. Among the conclusions at which Dr. Koll arrived, the clearest appeared to be the fact that a non-traumatized kidney will, in the absence of ureteral obstruction, overcome spontaneously the invasion of these virulent micro-organisms. The pathological changes are due to a direct toxic action, and the soluble toxins of the organisms are carried to the opposite kidney, where a similar picture is seen.

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THE PHTHISICAL SOLDIER AT THE FRONT.

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It is an interesting fact that in the present war—the largest and bloodiest which has ever been waged—there are men playing their part nobly and well who are or have been the subjects of a disease which at all times claims the greatest number of victims. At a recent meeting of the Sanatorium Subcommittee of the Newcastle Insurance Committee, among the names read out as those of persons requiring domiciliary treatment, I was struck by that of a soldier who had just returned from Mons and the Aisne. As the man was an old patient of mine, having five years ago occupied a bed in my infirmary ward under the care of Dr. A. E. Parkin, then my assistant physician, I have thought that the circumstances under which this soldier took part in the campaign might be not without interest to some of your readers.

M. C., aged 26, married, a labourer, formerly a coal miner, was a private in the Royal Army Medical Corps in 1906. Five years ago he had pleurisy with effusion, and, as already stated, was treated in the Royal Victoria Infirmary of this city. Subsequently, as there were evidences of pulmonary tuberculosis, he spent six months in the Barrasford Sanatorium as a patient, and later was employed for twelve months in looking after the horses, in leading coals, chopping firewood, and in doing the many small out-of-door jobs which are required at such an institution. His health at this date improved considerably. He returned to Newcastle and became employed as a plater's helper in one of the shipyards on Tyneside. The work of a plater's helper is hard; it proved at any rate too hard for him, for he suddenly broke down in health, and in February, 1913, he consulted Dr. Mitchell, of Walker. Since then he has been sometimes under Dr. Mitchell's care, sometimes under that of Dr. Dickinson, of the Tuberculosis Dispensary, Newcastle-upon-Tyne, to both of whom I am indebted for the opportunity of renewing acquaintance with an old patient.

On August 5th, 1914, M. C. was examined in Aldershot by a medical officer and passed as fit for active service with the R.A.M.C. He was attached to the Connaught Rangers, and on August 15th he was sent to the front. His work, which was hard, was in connexion with transport. He was in the retreat from Mons, and on two occasions was close up to the firing line. When the British retreat was converted into an advance he went on to the Aisne. This was no light task. The army was eleven days on the march, on three of which he carried on his back a haversack weighing 7 lb. Along with the other soldiers he walked some days twenty miles. This he did well, with the ordinary two hours allowed for rest at middle day. Food was not always just to hand when it was required, but when it came up there was plenty of it and it was always good. Previous to going to the war he had had hæmoptysis, but at the front he had good health nearly all the time. He felt perfectly fit and the outdoor life suited him. The prolonged strain, loss of sleep, and exposure to wet and cold ultimately, however, told upon him. He caught what appeared to be a severe cold, but as there were signs of extensive pulmonary catarrh he was invalided home.

He is a man of average development and of smart soldierly appearance. The upper half of the left side of the chest is dull on percussion; here numerous moist small crackling râles can be heard with signs of excavation. The right lung remains almost normal. There is no displacement of the heart generally nor of the apex beat, but the second sound over the pulmonary artery is loudly accentuated.

The case is probably one of many. The presence of tuberculous soldiers at the front is not limited to the British lines. At a meeting of the Société Médicale des Hôpitaux de Paris,¹ M. E. Rist drew attention to the case of a tuberculous French soldier who had been the subject of profuse and recurrent hæmoptysis, of elevated temperature, progressive emaciation, and who during the course of a whole year had undergone artificial pneumothorax treatment at the hands of Dr. L. Bernard, receiving every fifteen days an insufflation of nitrogen. This man was able not only to undergo the fatiguing operations associated with mobilization, but also successfully to finish a number of forced marches, and to take part in at least one battle; all this ultimately rather taxed his strength, yet when he returned to the hospital M. Rist found the artificial pneumothorax still well maintained. It had a positive pressure of 3 cm. of water. This pressure was probably partly the result of a slight increase of pleural effusion. Half a litre of serous fluid was withdrawn and a re-insufflation of nitrogen made. M. Rist states that the patient remains in robust health, he has no fever, no