lation of the diet and restriction of mental and physical effort must, however, in every instance, be insisted upon. If the symptoms are urgent and the patient wishes to get the most speedy and permanent benefit, he should consent to spend a week entirely in bed, and preferably in a nursing home away from the usual domestic environment. During this resting period his routine ought to be somewhat as follows: In the early morning a tumblerful of water as hot as can be borne, to which a small teaspoonful of citrate of potash has been added, should be sipped slowly. This should be followed by a hot bath at from 98° to 102° F., in which immersion may continue for from eight to ten minutes. After vigorous friction with a rough towel, he must return to bed and to breakfast, which should consist of café au lait or milk tea, sweetened with saxon; ordinary toast and caseoid or other starchless bread in equal proportions, with abundance of butter; bacon, tongue, cold ham, eggs, cold game, or white fish. About ten o'clock he should be massaged for an hour, and thereafter remain for another hour quietly at rest. Luncheon, about 1 o'clock, should consist of a grilled chop or steak, or a cut from a joint, cooked green vegetables, a compôte of fruit *au naturel* or sweetened with saccharine, a biscuit or oatcake with butter and a morsel of cheese, an alkaline table water, to which may be added, if desired, an ounce of whisky or brandy. In cases where indican in the urine and offensive stools point to putrefactive changes in the intestine, the cheese should be of the "soured-milk" variety. A short sleep after luncheon is advisable. At 4.30 a cup of China tea or of cocoa infused from the nibs, sweetened with saxon and enriched with cream, will prove grateful, and may be accompanied by crisp dry toast and butter. A visit from one or two intimate friends should be arranged for the interval between tea and dinner. The patient should dine about 7, and the meal should consist of a small cupful of clear consommé, white fish, chicken or game, purée of vegetables, a simple omelette, and one or two glasses of a light Moselle or hock if desired. "Akoll" or de Voëbt's biscuits should be taken with luncheon and dinner rather than ordinary bread. Before retiring for the night at 10 o'clock, the abdomen should be gently massaged for a quarter of an hour, and the morning tumblerful of hot alkaline water ought to be repeated. For another week this plan should be continued, but with the difference that during the afternoon of each day a drive in an open carriage, followed by a short walk, is desirable. Thereafter a resumption of the ordinary duties of life may be permitted, but the engagements of every day should be limited, and the same diet plan continued until for at least a fortnight there has been no recurrence of stomach symptoms.

Medicinally attempts should be made: (a) To control the glandular secretions of the stomach and lessen the hypersensitiveness of its mucous membrane; (b) to counteract hyperacidity when it arises; (c) to overcome constipation. These indications may be met by a variety of drugs. The following combinations are the outcome of many experimental efforts in this direction, and I have found them to effect the desired result in a large proportion of cases:

- (a) Solution of atropia, solution of hydrochlorate of morphine, solution of adrenalin chloride, and spirits of peppermint in suitable doses to make up 1 drachm. To be diluted with one tablespoonful of water and taken a quarter of an hour before breakfast, luncheon, and dinner.
- (b) Magnesium carbonate, sodium bicarbonate, bismuth salicylate, and ginger. To be dispensed in a cachet and taken whenever heartburn declares itself. A second cachet may be taken after an hour if the first does not succeed in overcoming the acidity.
- (c) Acetic extract of colchicum, aloin, capsicin, and extract of rhubarb. To be made into a pill and taken every alternate evening before dinner.

Carlsbad salts or Kutnow's powder in a suitable dose is useful before the morning tumblerful of hot water if the above pill proves inefficient.

After the gastric symptoms have disappeared and the digestion has again become normal, the diet may be modified, especially in the direction of including a larger amount of farinaceous food with a limited quantity of sugar, and some advantage will accrue from suitable tonics. These must vary according to circumstances, but in many

instances the indications will be met by such a combination as this: Carbolic acid, valerian, sodium arseniate, and cannabis indica. To be dispensed in a capsule, and taken three times a day after meals.

The morning tumblerful of hot alkalized water ought to be continued as a matter of daily routine. Sugar and starches should always be taken in moderate quantity. A Turkish or electric-light bath once in eight or ten days, followed by general massage for twenty minutes, is a desirable practice in many cases.

It is important to secure, as far as possible, a clean condition of the mouth. To this end, all stumps and carious teeth ought to be removed, and the buccal cavity rinsed out twice or three times a day with a solution of suitable strength of glycothymolene, listerine, carbolic acid, or other reliable antiseptic.

RADIUM IN MALIGNANT DISEASE AND VARICOSE ULCERATION.

[WITH SPECIAL PLATE.]

By T. ROSS MACDONALD, M.B., C.M.

THE exact value and position of radium as a therapeutic agent will, of course, only be defined when all the conditions which influence its activity have been carefully studied. Prominent among these conditions must necessarily be the amount or dose to be employed and the length of its application. Similar questions, no doubt, arise in connexion with every substance advanced as a remedy for disease, but in the case of radium they are complicated by a severely practical relation—namely, that of expense. The market value of radium is so enormous and the supply is so limited that in the very nature of the case there is a pressing temptation to be content with a minimum amount. But it is at least possible that when small quantities fail larger doses would be successful; and it is only by testing this question that an assurance of the real value of radium can be obtained. Having had considerable opportunities of observing the effects of different doses, I have satisfied myself that in many cases the maximum benefit is only to be obtained by the use of relatively large amounts and by the application of these over relatively prolonged periods of time. Under these conditions I have certainly witnessed many very striking results, and some of these I propose briefly here to put on record. The selection is limited for the most part to cases which, owing to the courtesy of Sir W. Watson Cheyne, I have been able to observe and to treat in King's College Hospital. The circumstances therefore guarantee certainty in diagnosis, while the illustrations of the facts before and after treatment carry their own convincing message, and this message I could abundantly confirm from my own private note-books.

At present, at all events, the use of radium in malignant disease is almost or altogether confined to inoperable cases, and whether there will or will not be any advance from this position it is impossible to say. But there is one aspect of the subject which I believe to be worthy of careful study, and that is the use of radium in conjunction with operation and for the purpose of preventing recurrences. The amount of clinical material at my disposal on this point is too limited and the length of time since the observations were instituted is too short to justify any unqualified statement, but I am sure the question is one worthy of attention, and I have reason to believe it is also of great practical importance.

In reference to the amount of radium employed, I may say that I generally use tubes containing 250 to 300 mg. of pure radium bromide, and I am satisfied that in great measure it is on such relatively large amounts that the best results depend. Of course the initial expense is enormous, the above-named quantity of pure radium bromide being worth nearly £5,000, but, if inoperable malignant disease can be cured or even greatly relieved, the gain manifestly counterbalances the outlay. The question is not one of market value, but of therapeutic value, and if this latter is established we must hope that by some means or other the use of the remedy will be brought within the range of all sufferers. Of the therapeutic value, the following

records and accompanying photographs afford evidence which cannot be gainsaid.

For permission to publish the first three cases I am indebted to the courtesy of Sir W. Watson Cheyne.

With regard to filtration and dose, I generally use tubes containing 250 mg. of pure radium bromide, which, for deep-seated cancers, I screen with $2\frac{1}{2}$ mm. of platinum, leaving them in position from twenty-four to forty-eight hours. When possible, and with the assistance of a surgeon, I insert the tubes with the same filtration into the tumours for forty-eight hours. I also try to get cross rays by applying tubes above and beneath the growths, which methods have so far given me the best results. These doses I do not repeat for at least five or six weeks.

For superficial lesions I have used the radium unscreened for half an hour, repeated every other day for a week. Generally speaking, I seek to get my results from large doses screened to the exclusion of all rays, excepting the hard beta and gamma rays applied for a considerable length of time.

I have also used radio-active waters for gout, rheumatism, and diabetes, as advocated by Professor His, of Berlin, with good results, but I am not yet in a position to give a definite opinion upon a treatment of which I have had so short an experience; still, the results already obtained encourage me to believe that the emanations of radium and radio-active waters will receive much attention in the near future.

CASE I.—Carcinoma (Figs. 1, 2, and 3).

M. C., aged 51, was admitted into King's College Hospital, under the care of Sir W. Watson Cheyne, in the beginning of January, 1911.

Eighteen months previously she was operated upon by Sir W. Watson Cheyne for a growth under the jaw which had ulcerated, and to cover which a flap of skin had to be taken from the side of the neck. Three months after this operation she noticed under the chin a small growth which rapidly got larger, and which was followed by a small growth in the floor of the mouth. The latter caused her considerable pain, and as it increased in size she had several teeth removed, hoping the pain might be alleviated. She consulted several doctors and had various treatments, including x rays, but without avail. She was re-admitted into King's College Hospital, where, sections of the growth proving it to be a squamous-celled carcinoma, Sir W. Watson Cheyne suggested radium treatment.

I saw the patient on January 24th, 1911, and on examination found a tumour involving the floor of the mouth, tender to the touch, and about the size of a large hazel nut. Externally there was a fairly large ulcerating growth involving most of the chin and exposing the bone. This ulcerating mass extended up the left cheek to within a few inches of the ear, the surrounding tissues being much inflamed and angry-looking. The patient complained of great pain.

I applied tubes containing 250 mg. of pure radium bromide. One tube containing 100 mg., sufficiently screened with $2\frac{1}{2}$ mm. of platinum, I placed internally on the tumour in the floor of the mouth for twenty-four hours; the others, similarly screened, I placed externally on the growth on the chin, also for twenty-four hours, thereby getting cross-rays from the radium. The following day I gave two further applications higher up on the cheek for twenty-four hours, covering all parts affected almost up to the left ear.

During and after these applications the pain in the mouth and ear gradually disappeared, and almost immediately the ulcerated parts assumed a healthy appearance. At the end of five weeks, without any further applications of radium, the growth in the floor of the mouth had disappeared, and externally the wounds had all healed up, leaving a slight scab, which came away and left a healthy, clean cicatrix. Since her discharge from the hospital she has kept well and has gained a stone in weight. The accompanying photographs show the condition before, six weeks after, and ten weeks after treatment.

The quick response to treatment was a striking feature of this case, and it will be observed that after the original application of the radium no further treatment was considered necessary.

CASE II.—Epithelioma of Lip (Figs. 4 and 5).

G. J., aged 34, a boatman, was admitted on April 29th, 1911, into King's College Hospital, suffering from an epithelioma of the lower lip.

The patient, who lives in Shropshire, had some six months before admission pricked his lip with some wire netting. Afterwards the lip swelled and the wound did not heal. He then placed himself under the local doctor, who, finding no improvement under various kinds of treatment, sent him to the Wolverhampton Hospital. There, on examination, the growth was found to be an epithelioma, and an immediate operation for its removal was suggested. The patient, however, on the advice of his master, came to London for radium treatment, and was admitted into King's College Hospital, where he was seen by Sir W. Watson Cheyne, who agreed with the diagnosis made at Wolverhampton.

Condition on Admittance.—There was a growth occupying the middle part of the lower lip, about an inch in length. The margin was well defined and indurated, extending into the mucous membrane and covering the whole thickness of the lip on the outer side. Part of the growth was ulcerated, with a dirty-looking base, the rest being covered with a hard scab quite painless to the touch. Some tiny glands could be felt under the chin.

May 3rd, 1911. Two tubes, each containing 100 mg. of pure radium bromide screened with $2\frac{1}{2}$ mm. of platinum, were applied inside and outside the growth for twenty-four hours; and another tube, containing 50 mg., was applied to the glands under the chin for a similar time. On the following day the patient was photographed and sent back to Shropshire with instructions to his medical attendant as to the mode of treatment to be followed, and was asked to come back in six weeks' time for further treatment if necessary.

On June 23rd, 1911, he was readmitted into King's College Hospital, and was seen by myself, Sir W. Watson Cheyne, and others. The growth had entirely disappeared, leaving a beautiful healthy cicatrix, as can be seen in the photograph taken the following day. The glands under the chin had also disappeared, and up to the present date there are no signs of recurrence. One of the interesting features of this case, in addition to the rapid disappearance of the growth, is the loss of hair on the upper lip.

I find that radium, when properly screened and applied for a considerable length of time over hairy parts, seems to destroy the hair without causing the slightest pain or visible inflammation of any kind. The hair simply falls out, leaving a bald patch.

CASE III.—Extensive Varicose Ulceration of Leg (Figs. 6 and 7).

E. W., aged 34, was admitted into the King's College Hospital under Sir W. Watson Cheyne, March 17th, 1911. The patient, who is married and has two children, resided in India for many years. Six years ago she had an operation for the removal of varicose veins of the left leg; after which she had a severe

attack of phlebitis, since which time her leg has never been well.

Sixteen months before the date of admission a small, hard place formed above her left ankle, which gradually got larger and eventually broke down into an ulcer. She had treatment from various doctors in India, but without avail, indeed the ulceration seemed to get worse. For more than a year she has not been able to walk owing to pain. She has therefore been obliged to rest constantly in bed or on a couch. She was advised to come to England, and was at once admitted into the hospital on her arrival.

The patient, who is a strong, healthy looking woman, had a large unhealthy looking ulcer extending from the ankle to the middle of the leg and covering the whole of the outer and part of the inner surface of the leg. This extensive ulceration looked most unhealthy, and was very painful, the patient being scarcely able to endure the pain of having it dressed.

March 19th. I applied 200 mg. of pure radium bromide unscreened excepting for thin rubber over the whole surface of the ulcer, each place getting half an hour's application. The following day the ulcer freely discharged and was free from pain. From this date the wound assumed a healthy, granulating condition, and rapidly healed up, until, seven weeks later, the whole surface—without the aid of skin grafts—was covered with a healthy pink pliant skin. The patient was discharged, and has since been able to do a good deal of walking and standing, and entirely without pain. I have treated many cases of varicose ulcers in my private practice, some of them being of considerable duration, and all have, so far, yielded to treatment after six weeks.

CASE IV.—Rodent Ulcers of Nose and Cheek (Figs. 8, 9, and 10).

G. C., aged 83. Fifteen years ago a small ulcer appeared under the right eye, followed by another on the left side of the nose. During those fifteen years the patient consulted various doctors, and has had treatment of different kinds, but without improvement. The ulcers got gradually worse, causing him considerable pain, even to affecting his eyes, which were inflamed. Towards the end of July, 1911, I was called to see him with the view to radium treatment. I found him suffering

DESCRIPTION OF SPECIAL PLATE.

Fig. 1.—Case I, Carcinoma. Showing size of growth before treatment.

Fig. 2.—Case I. Showing condition six weeks after treatment.

Fig. 3.—Case I. Condition six months after treatment.

Fig. 4.—Case II, Epithelioma of Lip. Showing condition before treatment.

Fig. 5.—Case II. Condition six weeks after one treatment.

Fig. 6.—Case III, Varicose Ulceration of Leg. Condition before treatment.

Fig. 7.—Case III. Showing condition eight weeks after treatment.

Fig. 8.—Case IV, Rodent Ulcers of Nose and Cheek. Condition before treatment.

Figs. 9 and 10.—Case IV. Showing condition of the patient ten weeks after one treatment.

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.

FIG. 7.

FIG. 8.

FIG. 9.

FIG. 10.

from two large ulcers, one under the right eye, the other on the nose. The one on the nose had eaten its way through the cartilage, left nasal fossa, and tissues, exposing the bone. It was about an inch in length and in breadth, extended right across the bridge, leaving the tip of the nose almost detached. The ulcer on the cheek, under the right eye, which unfortunately does not show up in the photograph, was about an inch in length and about one and a half inches in breadth. Both ulcers looked unhealthy, and were discharging freely. I applied three tubes of radium, containing 250 mg., each tube being screened with $2\frac{1}{2}$ mm. of platinum, one on each side of the nose, and the other on the ulcer under the eye, having previously protected the eyes with screens of lead. I left them in position for twenty-four hours. Directly after the application the ulcers assumed a healthy appearance and the pain disappeared, and at the end of eight weeks they had healed. A small scab about the size of half a pea still remains on the nose—a common experience in radium treatment, but after some weeks the scab drops off, leaving a healthy surface underneath.

It is remarkable how quickly those ulcers healed in a man so advanced in years, but I have seen results almost as striking in cases of inoperable cancer of the rectum, uterus, and the breast. It is such experiences which have convinced me of the importance of using radium in relatively large amounts and of prolonging the application over several hours.

A CASE OF RODENT ULCER PRESENTING SOME UNUSUAL FEATURES:

By RUPERT FARRANT, F.R.C.S.ENG.,

SURGICAL REGISTRAR TO THE WESTMINSTER HOSPITAL; LATE HONORARY SURGEON TO THE WELBECK STREET DISPENSARY.

A CABDRIVER, aged 62, was admitted to the Westminster Hospital in February, 1911.

History.

Fifteen years ago an ulceration broke out on his face midway between his ear and eye on the right side; this ulceration extended slowly on the surface for a few months and then became stationary, and has remained in much the same condition up to time of admission. A little less than fifteen years ago an ulcer developed on the left side of his upper lip; it grew slowly for some months both in depth and breadth, alternately scabbed over and discharged, and then began to slowly heal up; no treatment was used beyond the occasional application of a little cold cream. In January, 1910, a boil started in the left groin, on the exact spot where he had had a bubo forty years before; for six weeks it slowly grew until it reached the size of a hazel nut, when it burst; rapid extension then took place along the left groin towards the middle line, across the middle line to the right groin, and around the scrotum towards the

anus. About two months after its first appearance the left leg began to swell, and a little later the foreskin and penis; the swelling had steadily increased up to the time of his admission. Beyond some slight pain in his left leg and the annoyance of the discharge he had been but little inconvenienced by it. His general health had been good. No history of cancer could be obtained on either side of his family.

Condition on Admission.

There was an ulcer over the right zygoma about the size of a farthing, quite superficial, covered with a thin black scab; the discharge was practically nil; the edges were not thickened or everted. On the left side of the upper lip there was an elliptical depression $\frac{1}{2}$ inch by $\frac{3}{4}$ inch, and $\frac{1}{4}$ inch in depth; the whole area was covered with epithelium, and represented a healed ulcer. In the inguinal region there was a large area of ulceration, with thick, rolled-over edges and adherent base; the surface was covered to a great extent by granulations exuding a foul discharge, the character, situation, and extent of which are seen in the photograph; the patient would not permit a photograph to be taken of his face. The

left lower limb, penis, foreskin, and scrotum were much oedematous. A portion of the margin was removed for microscopic examination. The following report was given:

"A cancer belonging to the rodent ulcer class. Section shows cylinders and irregularly shaped areas of cells, the outermost of which are of the spindle-celled columnar type; those placed centrally are frequently almost spheroidal and small; there are no squamous cells present."

During the time the patient was in hospital ten doses of x-rays were applied to the inguinal ulcer, each lasting ten minutes, the Fastile dose was used. After the sixth dose the depression on the face became ulcerated; this and the ulceration on the zygoma were treated by a forty seconds application of carbon dioxide snow, which completely cured them. The patient was discharged, and came up as an out-patient for x-ray treatment; the ulceration was much improved by it, but he ceased to attend before it was anywhere near being completely healed.

I think that the following points are of interest in this case: The fact that there were three ulcers, their different rates of extension, one had healed without treatment, one had remained stationary for fifteen years, there was a recrudescence in the healed one directly the inguinal one began to improve under treatment. The inguinal condition started as a boil which existed for six weeks before it ulcerated. Sir A. Bowlby¹ pointed out in 1894 that rodent ulcer started as a growth in the dermis. The ulcer on the zygoma never extended as deeply as the dermis.

The inguinal region is an unusual site for rodent ulcer, but by no means unknown. J. Hutchinson, jun.,² and T. S. Pigg³ have reported cases occurring in the groin, and there is one in the museum of the College of Surgeons. There was no cancerous history in this case. W. G. Spencer⁴ pointed out the comparative absence of cancer in the blood relations of those afflicted with rodent ulcer and the converse in epithelioma, and thought that rodent ulcer only occurred in people with a high resistance to cancer. Rodent ulcers are rarely in such a situation or of such a size as to produce marked oedema by cutting off the lymphatic supply of a part.

The pathological report corresponds to Class 2 in the classification given by Sir A. Bowlby,⁵ and this class is one of the commonest.

As to the treatment, it is to be noted what an excellent effect the carbonic acid snow had on the superficial ulcerations and the x-ray treatment on the inguinal, though it was not given a fair chance to effect a cure.

I am indebted to Mr. Stonham and to Dr. Worrall for their courtesy in allowing me to publish this case.

REFERENCES.

¹ Transactions of the Pathological Society, vol. xlv, p. 161. ² Ibid., vol. xlviii, p. 221. ³ Ibid., vol. xl, p. 300. ⁴ Ibid., vol. xlv, p. 181. ⁵ Ibid., vol. xlv, p. 160.

THE BACTERIOLOGY OF THE COCKROACH.

BY

C. CONYERS MORRELL, L.R.C.S.EDIN.

In view of the importance of a correct understanding of the part which insects play in the distribution of micro-organisms, I venture to contribute the results of a series of observations and experiments which I have recently carried out upon the common and widely-distributed cockroach *Blatta* or *Phyllodromia germanica*.

LIFE-HISTORY AND HABITS OF COCKROACHES.

The Blattidae or cockroaches belong to one of the least specialized of insect orders, the Orthoptera. There are about 800 species recognized, a few of which are domestic, the remainder rustic. Of the domestic species the three most common are, *Blatta germanica*, *Periplaneta orientalis*, and *Periplaneta americana*. These have, during the last three centuries, become very widely distributed throughout both hemispheres. *Germanica* has the greatest economic importance. The domestic species very closely resemble one another in their life-history and mode of life.

The cockroaches undergo an incomplete metamorphosis. The female lays her eggs, sixteen or more in number, in a horny capsule, each egg reposing in a minute sack. As the eggs are formed this capsule is extruded, and is trailed about by the female for several days before being deposited in some warm crevice.

The larvae when hatched are minute creatures closely resembling the adults in appearance, but of an ivory white