two were examined at later dates and both remained free from discharge, one after ten weeks and the other after four months. Three cases in which a slight discharge persisted were afterwards treated by zinc or copper ions and the discharge disappeared. These cases were seen again after two, three, and six months respectively, and no discharge was visible. In the remaining six cases the patients said that the discharge had diminished. In these the discharge was not purulent in appearance, and in one it was clear and resembled mucus. In one of the two cases in which gonococci were not found before the diathermy the discharge disappeared after the treatment; the patient was told to report again but did not do so. The other case could not complete the treatment as she had to leave London; her doctor reported that the discharge was "much less." The patient from whom the gonococci could not be made to disappear was probably reinfected as her husband also had gonorrhoea and was under treatment at the centre.

The question whether complete cure of gonococcal cervicitis or urethritis has been obtained cannot be answered by the absence of gonococci from the discharge. Complete subsidence of discharge is in its favour. Often, however, some discharge continues, and the question will arise in such cases whether the discharge is pathological. A discharge of pure mucus is not evidence of gonococcal infection. If, however, pus is present in the discharge it must be considered as pathological. A point in the treatment will often be reached in which although the discharge is mainly mucus there are still present small numbers of leucocytes. After ionization and diathermy in which sloughing has taken place leucocytes will be present as the result of the formation of granulations. Often, on the cessation of treatment, these will disappear and the discharge will finally clear up after a short time without further treatment. It is to be remembered that these treatments to the cervix *tend to maintain this muco-purulent discharge*. It becomes therefore a matter of judgement founded on experience when the treatments should be left off in the expectation that the discharge will eventually cease.

Treatment of Gonococcal Prostatitis by Diathermy.

At present we have not obtained sufficient evidence to enable us to make a definite conclusion on the action of diathermy on gonococcal prostatitis. Our results so far seem to show that the new treatment possesses therapeutic action in this disease. We treated one of our cases of arthritis by applying diathermy to the prostate only, and obtained the effects already mentioned—namely, abolition of pain, reduction of swelling, and increase of movement. We also noted the disappearance of pain and tenderness from the epididymis in a case of gonococcal infection of this part after application of diathermy to the prostate only. The following case also is suggestive. The patient gave a history of gonorrhoea. In his perineum there was a fistula leading to his urethra immediately behind a stricture of the passage mentioned. He complained of severe pain in the right lower limb. There was tenderness on pressure over the back of the thigh and flexion of the hip caused extreme pain. It was decided to apply diathermy to the prostate only. Complete and permanent relief of pain was produced, and the only symptom which remained was some discomfort on stooping with the knees extended.

It has already been mentioned that some of the cases of arthritis did not obtain relief until the urethra and prostate were also subjected to diathermy. In all these cases, save that described above, both prostate and urethra were treated simultaneously. We are therefore unable to state the region on which the diathermy exerted its therapeutic action—whether the urethra or prostate or both. Further light on this question would be thrown by the application of diathermy to cases in which only the anterior urethra was infected and to others in which the clinical evidence pointed to subsidence of infection from the anterior urethra with persistence in the prostate. This investigation is at present occupying our attention.

DIATHERMY FOR MALIGNANT DISEASE OF THE MOUTH, PHARYNX, AND NOSE.

WITH NOTES ON SEVENTEEN SUCCESSFUL CASES.

BY

NORMAN PATTERSON, M.B., CH.B. EDIN.,

F.R.C.S. ENG.,

SURGEON, THROAT AND EAR DEPARTMENT, LONDON HOSPITAL.

FOR the last eight years I have been employing diathermy in the treatment of carcinoma affecting the mouth and pharynx. Unfortunately, the great majority of the patients treated were suffering from advanced disease; this was true of all the early cases, and of nearly all those treated in hospital. A very considerable number of patients were suffering from secondary deposits in the glands on one or both sides of the neck, and in some cases the glandular involvement was extensive. Cutting operations of magnitude had, therefore, frequently to be carried out in the neck; diathermy is rarely, if ever, of any use in dealing with the malignant extensions in the neck. Faulty technique and the too timid use of the diathermy electrode accounted for some of the failures in the earlier series of cases. Owing to the great size or unfavourable position of the growth, or the general cachectic condition of the patient, many of the cases dealt with would now be deemed unsuitable for any sort of treatment. Haemorrhage during the separation of the sloughs was a not infrequent occurrence. Since I have adopted ligature of the main vessel or vessels supplying the part in cases requiring extensive diathermy, or in patients with thickened arteries and high blood pressure, severe haemorrhage has not been met with.

When the growth is small, superficial, and situated some distance from important and vital structures, and when the glands are free from involvement, or only slightly invaded, there is an excellent chance of a complete and lasting cure. My experience is that, if local recurrence is going to take place, it will generally happen during the first six months. This, of course, does not apply to recurrences in the neck. When the primary growth is very extensive, deeply rooted, and situated in a locality unfavourable to its free destruction, and more especially when the secondary deposits in the neck are massive or fixed, there is little likelihood of effecting a cure, and there may be great risk in subjecting the patient to operation. However, most of the cases recorded in this article were described by others as "inoperable," and some of them were very extensive; it is difficult, therefore, to draw the line between cases which should be subjected to treatment and those which should be left alone. Much depends on the general condition of the patient and the special experience of the surgeon. Every practitioner should be alive to the grave significance of an ulcer or indurated area occurring in the tongue, mouth, or pharynx of a patient over middle age. The condition rarely proves to be simple, or due to any other cause than malignant disease. It is well, therefore, to regard every doubtful case as one of cancer until it is proved to be due to some other cause. To the practised observer the diagnosis of epithelioma is generally easy. Over and over again the author has seen patients who have been diagnosed as suffering from "septic ulcer," "cyst," "gumma," when the real trouble was epithelioma. Many cases of supposed syphilis are repeatedly injected with salvarsan or soaked with iodides. It is important to remember that a great many patients with buccal or pharyngeal cancer will give a positive Wassermann reaction.

In the majority of cases the growth is visible on ordinary inspection—it is generally best to use reflected light. If it is situated at the base of the tongue, low down in the pharynx, or in the neighbourhood of the larynx, a laryngeal mirror will be required for its inspection. In nearly all cases palpation with the finger is possible, and it should never be omitted, as the cartilaginous hardness of an epithelioma is one of its most characteristic features.

Microscopic examination of a fragment of the tumour

will clinch the diagnosis. There is one objection to this method—namely, that even such a small operation is followed by more rapid advance of the growth, and this is especially the case if some of the surrounding healthy tissue is removed at the same time. Before removing a portion for microscopic examination, consent should, therefore, be obtained for an early operation, should such an operation be found to be necessary.

So far the only treatment of cancer which has stood the test of time is that which aims at the total removal or destruction of the tumour and its extensions. The writer has come to the conclusion, after considerable experience, that in cancerous growths situated in the pharynx and mouth the ultimate results are likely to be infinitely better when the primary growth is dealt with by diathermy, rather than by a cutting operation. He stated (*Lancet*, 1920) his reasons for this opinion, which he has had no cause since to modify. Many brilliant successes would be obtained if the disease could only be diagnosed and treated in its early stage.

The glands have not been removed in every case; this is owing to the fact that consent has not always been obtained. Removal of glands (and this generally means thorough clearance of both anterior and posterior triangles by "block" dissection) should be carried out even when no enlarged glands can be discovered on palpation. In one of the author's cases—not recorded in this series because he has a recurrence—a man suffering from a small epithelioma involving the uvula, and just extending on to the soft palate, was treated by diathermy. There was no enlargement of the glands, but the patient was urged to have the triangles of the neck cleared out on both sides. He absolutely refused. Four years later malignant glands have developed on both sides of the neck; the region of the palate has remained perfectly healthy. It is generally advisable to destroy the growth in the first instance, and subsequently to remove the glands. Occasionally the two operations can be carried out at the same sitting. If the surgeon is in doubt whether or not he can make a thorough clearance of the neck, then the gland operation should precede that on the primary growth. If the glands cannot be dealt with it is little use applying diathermy to the primary tumour, except as a palliative measure. It is sometimes advisable to operate on the glands in the first instance, and to deal subsequently with the primary tumour, as consent for the neck operation may be difficult to obtain after the growth itself has been destroyed. Before commencing treatment it is well to try and obtain consent for two or three operations, and to impress on the patient the importance of the removal of glands. If the diathermized area approaches or invades the fascial planes of the neck—and this is most likely to occur in cancer of the floor of the mouth—a clear interval of a fortnight or three weeks should be allowed between the destruction of the primary growth by diathermy and the neck operation. If this rule is not observed alarming sepsis may occur in the neck, which may lead to a fatal issue. Preliminary ligature of the external carotid should be adopted, as stated above, when secondary haemorrhage is to be feared.

The following cases have been successfully treated. In some of these it might almost be stated that a cure has been effected; in most of them it is to be hoped that the disease will not recur.

Case 1.

A man complained of sore throat, and on examination there was discovered an extensive epithelioma of the right tonsil and right side of the tongue and of the floor of the mouth. This was treated by diathermy, and the patient went on well for a time. Later, however, he returned to hospital with a carcinomatous tumour involving the right side of the tongue and the right side of the mouth, and there was a large, hard mass in the right submaxillary region. The tumour in the mouth was subjected to vigorous diathermy, and the mass in the neck was removed by dissection. The patient, nearly eight years later, is actively engaged as a tram conductor and at present there is no sign of growth.

Case 2.

An elderly lady was found to be suffering from endothelioma of the base of the tongue. With the aid of suspension laryngoscopy the growth was removed by diathermy (excision method). There was no recurrence six years after operation.

Case 3.

A man, aged 52, complained of soreness of the floor of the mouth and a lump at the right side of the jaw, of two months' duration. On examination a carcinoma of the middle of the floor of the mouth was found; the tongue was freely movable, and there was an enlarged hard gland in the right submaxillary region; the glands on the left side were not enlarged. The growth was freely destroyed by diathermy, and a fortnight later the glands were removed in the usual way. There was no recurrence more than six years after.

Case 4.

A woman, aged 58, presented a cauliflower-like growth (epithelioma) on the right side of the hard palate, and on transillumination the right antrum was dark. The upper jaw was resected, and three weeks later the cavity was thoroughly subjected to diathermy. The patient went on well for a year and ten months, when she reappeared with a small nodule in the scar, which was destroyed by diathermy. Six months later she came to hospital with a large mass in the upper part of the neck, which was removed, together with the fascia and glands in both anterior and posterior triangles, the internal jugular vein, and the upper portion of the sterno-mastoid muscle. She is well six years and three months after the original operation.

Case 5.

A man, aged 55, complained of soreness of the throat, of seven weeks' duration; there were enlarged glands on the left side of the neck. An epithelioma of the posterior part of the tongue on the left side was found, invading the anterior pillar of the fauces and the tonsil. The growth was removed by diathermy, and subsequently the glands on the left side of the neck were removed. There was no recurrence five years and three months after operation.

Case 6.

A man, aged 57, complained of pain on swallowing for several months; he was an excessive smoker, but a total abstainer. Examination showed a large epithelioma of the right tonsil and palate, which was removed by diathermy. A year later the glands on the right side of the neck were thoroughly removed. There was no recurrence four years and five months after operation.

Case 7.

A man, aged 46, had suffered from repeated sore throat during the previous three years, and six weeks before he was examined he began to have pain on swallowing; he had lost weight during the past year. On examination an extensive carcinoma of the base of the tongue, right tonsil, and soft palate was found. Diathermy was applied to the growth, and a fortnight later an extensive removal of the glands on the right side of the neck was performed, and the external jugular vein resected. A fortnight later, again, the glands were cleared on the left side of the neck, and at the same time diathermy was applied to a small area of growth which had been missed at the first operation. A month later a suspicious area was seen and diathermy was applied to it. There was no recurrence three years after the last operation.

Case 8.

A man, aged 67, had a small superficially placed epithelioma of the left tonsil and anterior pillar; there were no enlarged glands. The growth was thoroughly destroyed by diathermy. Three months later a hard gland was discovered over the bifurcation of the left carotid. The anterior triangle was dissected, and three months later, a small gland being felt in the left posterior triangle, this region was cleared. There was no recurrence over three years after the first operation.

Case 9.

A middle-aged lady had an epithelioma of the posterior pharyngeal wall, just above the arytenoids. Suspension laryngoscopy was employed to bring the growth into view, and it was destroyed by diathermy, together with a good margin of the surrounding tissue. After three years there was no recurrence.

Case 10.

A man, aged 64, had noticed a small lump on the left side of his tongue for four months. Examination showed an epithelioma of the tongue and floor of the mouth; no glands were palpable. Diathermy was employed, and the tongue was divided down the centre and cut across well behind the growth. There was no recurrence two years and three months after operation.

Case 11.

The patient, a man, had noticed a hard lump on the right side of the tongue for two or three months. On examination an epithelioma of the tongue and floor of the mouth was found; no glands were palpable. The growth was removed by diathermy, and a fortnight later the anterior triangle of the right side was cleared. Six weeks later the glands were removed from the left side of the neck. There was no recurrence two years after diathermy.

Case 12.

A man, aged 72, had noticed "a little bladder" on the roof of the mouth for six weeks. He was a moderate smoker (wooden pipe). An epithelioma of the roof of the mouth was found on examination; there were no enlarged cervical glands. The growth and its surroundings were thoroughly destroyed by diathermy, and there was no recurrence one year and ten months after operation.

Case 13.

A man, aged 69, had noticed dryness of the throat for four months; the teeth were very foul and he smoked about $3\frac{1}{2}$ ounces of tobacco a week. An epithelioma was found involving the left tonsil and extending to the anterior pillar and soft palate; the tongue showed leucoplakia. The growth was diathermized, an enlarged gland in the neck was removed for examination, and the external carotid was tied; the gland was found to be inflammatory. There was no recurrence one year and eight months after operation.

Case 14.

A very old gentleman, aged 75, was found to have a large epithelioma of the right tonsil, extending on to the mucous membrane covering the lower jaw. The patient refused to have the glands removed, but he consented to preliminary ligature of the external carotid, which was carried out, together with a thorough diathermy of the primary growth. The patient made a speedy recovery, and there was no recurrence one year and seven months after operation.

Case 15.

A woman, aged 71, had an epithelioma of the right side of the tongue and adjoining portion of the floor of the mouth, adherent to the lower jaw. There were enlarged glands in the neck. The growth was thoroughly removed by diathermy, and subsequently the glands were removed from both anterior triangles. There was

no recurrence one year and four months after the operation. It will be noted that this was a case of carcinoma of the tongue occurring in a woman.

Case 16.

A man, aged 38, was found to have a carcinoma occupying the whole of the right antrum. The bone was so extensively involved that it was found impossible to remove the tumour completely, and the growth was therefore scraped away with a sharp spoon, and the whole of the cavity subjected to diathermy. A fistula subsequently resulted, and it is hoped at a later date to close the fistula by a plastic operation. There was no recurrence over two years after diathermy.

Case 17.

A man, aged 64, complained of difficulty in swallowing for a month, and of pain in the region of the back of the tongue. He smoked $1\frac{1}{2}$ ounces of tobacco a week, was a heavy drinker at one time, but had been temperate for the last ten years; he was in the habit of drinking very hot tea; his teeth were very septic. A carcinoma of the uvula and soft palate was found, involving the upper extremity of the anterior faucial pillars on both sides. The growth was freely destroyed by diathermy, and although no enlarged glands were felt, the anterior and posterior triangles on both sides were cleared out by "block" dissection. There was no recurrence two years after operation.

REPORT ON A CASE OF DIABETES TREATED WITH INSULIN.

BY
E. I. SPRIGGS, M.D., F.R.C.P., D. V. PICKERING, M.B.,
AND

A. J. LEIGH, B.Sc., A.I.C.

(From the Duff House Laboratories, Ruthin Castle, North Wales.)

THE following observations were made in co-ordination with the scheme of work arranged by the Medical Research Council at various hospital centres.

A man aged 47 was selected as a moderately severe case of diabetes mellitus, who had been observed with some detail over a period of eight years. He was an officer in a Highland regiment and noticed thirst and polyuria a month after the outbreak of war; but he could, at that time, march twenty-five miles. Four months later (January, 1915) he went to Belgium, was speedily exhausted, sent home in February, and came to Duff House, Banff, in March. Since then he has been readmitted five times. He is accurate and conscientious, and has, in the intervals, followed the régime prescribed by his medical advisers here and at home.

In the eight years this patient has been observed under each of the three methods of treatment which have been in vogue in the present generation—namely, (1) restriction of carbohydrate, without restriction of other foodstuffs; (2) the fasting treatment, with subsequent restriction of all foods; and (3) insulin.

Table I gives the weight, state of the urine, the blood sugar, and the calories and carbohydrates in the food at the beginning and the end of each of his former visits to Duff House.

The ascertained maximum tolerance, without glycosuria, for calories and carbohydrate at each visit is shown in Table II.

TABLE II.—Showing the Maximum Tolerance for Carbohydrate and Calories on the same Five Occasions.

Year.	1915.	1918.	1919.	1921.	1922.
Calories ...	3,190	3,176	2,334	2,304	£35
Carbohydrate	56	61	166	127	25
Glycosuria ...	0	0	0	0	0

The table shows that the complaint was at first of a mild type and responded well to treatment; but the deterioration of tolerance is clearly seen. In the last two years especially the patient has found increasing difficulty in keeping anything like sugar-free. His present occupation is not exacting, entailing mainly the duties which fall to the lot of a country gentleman of moderate means and quiet tastes who looks after his garden and animals. But he had been less able to do work and had become progressively more miserable and depressed of late.

The insulin used at first for this patient was prepared here by one of us (A. J. Leigh), who had the advantage of seeing the method carried through at the National Medical Research Council laboratories at Hampstead, and would like to acknowledge his indebtedness to Drs. Dale and Dudley. The mode of preparation was that of Collip, modified by Dale and Dudley. In one point we varied the procedure; this was that we got the use of a small building at the slaughterhouse and minced the fresh pancreas directly it was taken out of the animal, adding the alcohol on the spot and transferring the mixture to the laboratory afterwards. On May 9th and

TABLE I.—Showing the Condition on Admission and on Leaving on Five Previous Occasions.

Date.	Weight in Kilos.	Glycosuria. Grams in 24 hours.	Ketonuria as Acetone. Grams in 24 hours.	Blood Sugar Percentage.	Diet.		Treatment.	Remarks.
					Calories in 24 hours.	Carbohydr. Grams in 24 hours.		
1915. March 24 ...	72½	15	Trace	0.17	2,800	25	Strict diet till glycosuria remained steady; then carbohydrate tests	
May 19 ...	74	4	Small amount	0.16 (May 17th)	3,000	80		
1918. March 16 ...	67	0	0	0.15	3,000	25	Returned for a week for observation	With steady restriction of carbohydrate urine had become sugar-free.
March 21 ..	67	0	0	0.12 (Mar. 22nd)	3,064	41		
1919. July 4 ...	74½	Trace	0	0.12 (July 6th)	2,904	73	Returned for further tests. Carbohydrate gradually increased	Tolerance had improved still further.
August 19 ...	70½	0	0	0.17	2,197	138		
1921. May 2 ...	62½	12	Trace	0.13	1,535	27	Fasting and limitation of total food	In interval fasting treatment had been started owing to much glycosuria and feeling out of sorts. Tolerance reduced, but good.
June 23 ...	62½	0	0	0.16 (June 24th)	2,393	105		
1922. March 21 ...	63	74	Trace	0.14	1,947	11	Limitation of diet (less drastic towards end)	More ground had been lost. Patient insisted on increase of diet beyond his tolerance, contrary to advice.
April 14 ...	63	86	0	0.26	2,556	63		