the skin or accessible cavity, whether it be simple or malignant, prefer to apply the current locally by the well-known electrodes of Oudin and Bissérie, still many of them like to combine the general with the local treatment. Further, in one reported case which caused considerable interest owing to the so-called cure of a tumour in the region of the cervix uteri, the treatment was entirely general.

In dealing with neoplasms I have seen improvement with the high-potential currents as well as the high-frequency. The latter I regard as more powerful, while the former is less painful. The methods and results obtained are described in the *Transactions* of the Glasgow Medico-Chirurgical Society during the last two years. Suitable electrodes for introducing into the nasal and pharyngeal cavities for both currents are also there described, and one or other was chosen not because they were better than the *x* rays, but simply because they could be applied where it was impossible to use the latter.

While it is not within the scope of this paper to deal with the general physiological and therapeutic effects of these currents it is necessary in trying to do so briefly to explain what is occasionally seen when treating patients for malignant disease. For example, improvement without cure may take place in this as well as in any other chronic affection; but the same remark may be made about any other form of treatment which relieves suffering or gives strength to the patient. While the physiological effects of the static machine have been studied—and the general invigoration and soothing effects of these are well known—still more work has been done in connexion with high-frequency currents. In this connexion let me say that the profession is greatly indebted to Dr. Denoyes, of Paris, for the collection of facts to be found in his work on high-frequency currents published last year. The results therein described as having been obtained by d'Arsonval, Tuerton, Quillaume, Tripet, and others on the circulation, respiration, and secretion may be studied with advantage by every one engaged in this work. Now, it is generally claimed for these currents that they will produce analgesia, changes in the arterial tension, increased activity in the action of the skin on the respiratory and secretory organs, and in some cases diminution of toxicity when these currents have been passed through a diphtherial toxin. Many patients in general terms describe the immediate effects as exhilarating, although this is often followed by a period of marked depression. Accepting these statements for the moment as being accurate, let us ask the question how far they may explain improvements in patients suffering from malignant disease. Pain may be soothed and it is quite possible that vasomotor changes by alteration of the blood supply may reduce the fungating mass which is giving off offensive discharges or blood. Nutrition may improve, the patient's weight may increase, sleep may be less disturbed, and yet as far as the malignant tumour is concerned the patient may not be cured, indeed he may be very far from it. The more carefully one watches relief to each of these symptoms the more one is impressed with the necessity and difficulty of giving the true value to each. As an example of this let me quote two cases bearing upon the subject of pain. In one case of severe neuralgia of the second division of the fifth nerve, where after months of intense suffering and consequent loss of general health and when nearly everything else had been tried of a constitutional or local nature to increase the strength or assuage the pain the removal of the teeth and afterwards of the alveolar process by surgical procedure had failed, the pain completely disappeared after three weeks' treatment by direct local application with Oudin's electrode, using high-frequency currents. There was no recurrence for six months, at the end of which time the patient I believe died of malignant disease of the liver, but the medical attendant assured me the pain in the face never returned. So far this case raised considerable hopes in the method. In a second case, however, where, after months of suffering and great deterioration of the general health and where 1 in. of the third division of the fifth nerve had been cut out after opening the canal, recurrence took place with the same intense pain. The same method above described was tried with success because for one year there was no pain. The patient herself anticipated when recurrence took place that another course of high-frequency currents would be followed by the same result, but the application of them, and in mild doses, exaggerated the pain so much that I at once recommended an operation sufficiently extensive to remove the whole of the inferior dental nerve on the affected side. For these and other reasons, I do not look upon high-

frequency currents as a substitute for operation, although they may sometimes stand between the ordinary remedies and operation. The same necessity for lapse of time before forming an opinion, and the need of great care in drawing conclusions applies to nearly every other symptom which may be ameliorated by the methods of treatment to which we at present refer.

Granting, therefore, that high-frequency or other currents may cause improvement locally or constitutionally in those afflicted with malignant disease, the grave question has to be faced, in view of the expectancy which has been raised in certain quarters, how far they have as yet effected cures.

Had these hopeful views of cure been expressed or founded upon the results which have already been obtained by means of the *x*-ray tube, they would probably have been more easily understood. Reference to medical literature will show that most workers prefer the latter. Dr. James Allan (*West London Medical Journal*, July, 1902) reports disappearance of the tumours with high-frequency currents in two cases of sarcoma and one of epithelioma, and other cases have been recorded, a number of these being in the region of the uterus. With high-frequency and high-potential currents in genuine malignant disease so far in my experience, while I have seen amelioration I am not in a position to speak of any case as cured. Not only so, but I have taken the opportunity, wherever it was possible, to ask many active workers if they could refer me to any real cases of cure where the diagnosis had been verified by microscopic examination. The invariable answer has been amelioration, not cure. While this applies more particularly to superficial cases, or where the disease was within accessible cavities, it does much more so in what the public mean by cancer, that is to say, the gravest cases of all and those situated in the internal organs, for all of which very little, if anything, has been done. In making this statement I do not wish it to be assumed that developments in the future may not take place, or that even better results will not be obtained, but I am speaking mainly of the results as they present themselves at this time.

THE X RAYS IN THE TREATMENT OF LUPUS, RODENT ULCER, AND OTHER SKIN DISEASES.

BY

MALCOLM MORRIS, and S. ERNEST DORE,

F.R.C.S. Edin.,
Consulting Surgeon, Skin Department,
St. Mary's Hospital.

M.B. Cantab.,

The therapeutic potency of the *x* rays has of late been vaunted with so much sensational exaggeration in the daily newspapers that there is some danger of this promising method becoming enveloped in a miasmatic vapour of quackery that must seriously interfere with the development of its practical usefulness. The mischief thus wrought is twofold: False hopes of cure are excited in the minds of sufferers and their friends; and the treatment itself comes to be regarded by medical practitioners as pitch that defiles them that touch it. In this way, a thing having in it large possibilities of good may be unjustly discredited in the eyes both of the profession and the public. Hence it is at the present time especially important that the results obtained by means of the *x* rays by practitioners whose work is open to the inspection of their professional brethren should be fully and accurately recorded with the single purpose of showing what has been attempted and what has been done. Observers of equal honesty receive different impressions from the same phenomena, and even their records of facts take the colour of their mental temperament. Inexperience is generally prone to an unfounded optimism. On the other hand impatience and want of attention to detail lead to an equally unfounded pessimism. One of the obstacles to the progress of medicine is what may be called the summary mode of dealing with methods on their trial. A method should not be condemned because, applied improperly and in unsuitable cases, it fails. These are perhaps truisms, but we think it necessary to insist upon them here because we have seen enough both in this country and abroad to convince us that the want of success obtained by some who have tried Finsen's light treatment and the *x* rays is to be attributed not so much to the method as to the operator.

In previous papers¹ we have reported the results obtained

by us in the treatment of lupus, rodent ulcer, and other affections of the skin by Finsen's method, alone or combined with the x rays. It may be stated in general terms that our results, though not so brilliant as those recorded by Finsen and others, have on the whole been satisfactory. Of 65 cases of lupus vulgaris, 11 may fairly be claimed as cures, no relapse having occurred for periods varying from six months to two years. In all these, with one exception, the area of disease was small. In no case in which it was widespread has a complete cure been effected, though in many the extent of the disease was greatly reduced. In most of the remaining cases there has been noted a degree of improvement proportionate to the length of time they had been under treatment. In cases in which ulceration was a marked feature the light method was less useful, but healing rapidly took place under the influence of the x rays; the latter also was employed in cases in which the seat of the disease was a mucous membrane to which the light could not be accurately applied. Of 11 cases of lupus erythematosus, treated by Finsen's method alone, great improvement was observed in 7. Of 27 cases of rodent ulcer, in most of which the two methods were used in combination, favourable results were noticed in 12; in most of these, however, slight relapses have called for further treatment. In 9 of the 27 cases the disease was in the non-ulcerative stage and of small extent.

We would here interpose a word of caution as to the interpretation of these statistics. Mere figures do not convey an adequate impression of the beneficial effects of the treatment. In many of the cases every known method of treatment had previously been tried in vain, and in some of the worst where no visible improvement could be brought about in the disease itself, its spread was checked. It must further be remembered that our whole experience covers a period of only three years, too short a time for the definitive cure of diseases so refractory to all other methods of treatment.

In the papers to which reference has been made we have discussed the mechanism of Finsen's light treatment, the conditions which favour operation, and those which tend to hinder its effect. In the present communication we propose to deal more especially with the x rays. The use of these and of the light treatment has, however, been so intermingled in our practice that it is not altogether easy to consider them separately. By some writers, indeed, the x rays have been included under the general designation of light treatment. It may not be superfluous, therefore, to recall the fact that they have nothing to do with light in the ordinary sense of the word. The term "light treatment," as we have pointed out elsewhere,² should be reserved for the use of the rays of ordinary spectroscopic light and the ultra-violet rays; in fact for all practical purposes it may be restricted to the chemical or actinic rays, namely, the blue, visible violet, and ultra-violet, which are the therapeutically active rays.

The mode of action of the x rays on diseased tissue has not yet been clearly determined. Their action was at first believed to be mainly bactericidal. This theory had, however, to be given up for two reasons. On the one hand, it is very doubtful whether the rays possess the property of destroying micro-organisms—indeed, the majority of investigators believe that they stimulate their growth; on the other, good results have been obtained in diseases in the production and evolution of which microbes play no part whatever.³ Their effect has also been attributed to the corrosive action of minute platinum particles; to the generation of ozone in the skin (Tesla); and to electric waves given off from the tube (Schiff). They appear to have a marked influence in retarding osmosis. London⁴ thinks it possible that it is in this property of the x rays that the secret of their biological and therapeutic action lies. By retarding the osmotic processes throughout the system they cause changes in metabolism which must influence the nutrition of the tissues.

On the skin the x rays often cause an inflammatory reaction varying in intensity according to the distance and degree of exhaustion of the tube; the quantity and potential of the current; and the construction of the interruptor, coil, or other apparatus employed. Neisser compares the action of the rays on the skin to the local reaction produced by tuberculin. Kaposi held that they acted on the blood vessels, producing an alteration in tone, bringing about healing and absorption of the granuloma by fatty degeneration or molecular change. Scholtz experimented on various animals and found microscopic changes consisting of swelling and oedema of the epithelial cells and clumping and shrinking of the nuclei with vacuolation of the protoplasm of the cells. Mitoses were rarely seen, but many of the epithelial cells showed nuclei which

seemed to be in process of dividing. There was marked oedema of the corium, its fibres being swollen and staining badly. The elastin was more resistant than the collagen. The connective-tissue cells were affected in a similar manner to those of the epidermis, as were also the cells of the sweat glands and hair follicles and the intima of the larger blood vessels. There was abundant inflammatory infiltration of cells, chiefly leucocytes. Masses of leucocytes were present beneath the epidermis. The mast cells in the corium were increased. Towards the centre of the lesions there were superficial vesicles in the stratum corneum. Scholtz concluded that the rays cause a slow degeneration of the cellular elements of the skin both of epidermis and corium, the nucleus as well as the protoplasm being affected. There is also a less-marked degeneration of the fibrous elements. As soon as the cellular degeneration reaches a certain degree an inflammatory reaction occurs in which the blood vessels become dilated, and there is an extravasation of serum and leucocytes. The latter seem to act as phagocytes and completely destroy the degenerated cells. The microscopic changes caused by the action of the x rays on the tissues in various pathological conditions will be referred to in connexion with the diseases in the treatment of which they have been used.

DISEASES TREATED BY THE X RAYS.

The x rays can be used either alone, as a preliminary to the light treatment, or as complementary thereto. The diseases in which they are said to have been successfully employed are lupus vulgaris—especially the ulcerative form—scrofuloderma, tuberculous osteitis and tuberculous glands, rodent ulcer, epithelioma, sarcoma, lupus erythematosus, acne rosacea, actinomycosis, mycosis fungoides, Paget's disease, xanthoma, naevi, eczema, psoriasis, favus, sycosis, ringworm, and hypertrichosis. The list of affections in which the rays are used is constantly lengthening, and only the more important diseases in the treatment of which we have personal experience will be dealt with here.

LUPUS VULGARIS.

We have treated the majority of our cases of lupus vulgaris with the Finsen light, and the x rays have mainly been employed as a preliminary in cases in which there was extensive ulceration or considerable oedematous thickening. The effect of the rays in bringing about rapid healing of ulcers has in our experience been so marked that we look upon ulceration as a definite indication for their use. Their drying effect is particularly striking. Even one application often causes a notable diminution in the discharge from an ulcerating surface; this fact suggests that extraction of moisture from the part may be an element in the healing properties of the rays. In cases of severe deep ulceration relatively better results have been obtained than in slight superficial sores. This may be accounted for by the fact that in the deep ulcers little of the lupus growth is left and the new tissue is more healthy. When the ulceration is superficial healing may occur over a mass of deep-seated lupus, and breaking down is more likely to occur. In a case in which there was severe ulceration of the mucous membranes of the lips and corners of the mouth some improvement followed the continued application of the Finsen light, but permanent healing resulted from a few exposures to the x rays. In another case a small superficial ulcer of the skin of the neck proved refractory to the light treatment but the application of the x rays produced rapid healing. In this instance, however, the healing was not permanent, and the ulcer had eventually to be excised.

Rapid absorption of oedema under the influence of the x rays has been observed in several of our cases. In one in which there was marked oedema and protrusion of the upper lip with ulceration of its under surface and of the gums, the lip regained its normal shape and consistence, and the ulceration healed. This case was treated over a year ago and no recurrence has taken place. In the case with ulceration of the angles of the mouth referred to above, the upper lip was also tense and protruding owing to oedema, and the result of treatment with x rays was equally satisfactory. Improvement is also taking place in two cases of extensive oedema of both sides of the face, in one of which there is also oedema of the lobes of the ears.

When the disease is extensive the x rays may be used as a preliminary to the light treatment. The advantage of this plan is that a large area may be treated at a time. In dealing with extensive surfaces care must be taken not to cause severe dermatitis. We think it doubtful, however, whether permanent

results can be obtained without the production of some degree of inflammation.

When mucous membranes (lips, gums, nostrils, etc.) are the seat of lupus, the *x* rays are, in our experience, more effectual than the Finsen light. When the inside of the nostrils is involved there is no choice, as the region is inaccessible to the light rays; in all such cases, therefore, we have used the *x* rays. The immediate results have been very encouraging, obstruction being quickly relieved, discharge ceasing, and ulcers healing after a few applications. It is only after a long course of treatment, however, that results of any degree of permanency can be obtained, and the tendency to relapse is very marked. We have treated only one case in which the palate was affected; it was extensively scarred from frequent scraping operations, and the *x* rays produced no beneficial effect.

Another point on which we wish to lay stress is the palliative use of the *x* rays. Patients who, either owing to advanced age, ill-health, exigencies of occupation, residence at a distance, or other causes are unable or unwilling to give up much time to treatment may get considerable relief from a short course of *x* rays. More than once we have succeeded by this means in checking the spread of the disease. It may be added that this statement also holds good in regard to cases of malignant ulceration.

Although the immediate effects of *x* ray treatment, especially in cases in which there is extensive ulceration are so good, our experience so far has been that the initial rapidity of improvement is unfortunately not maintained. Secondary conditions (ulceration, discharge and oedema) are relieved almost at once; but in respect of eradication of the disease, progress is disappointingly slow, and failure is not infrequent. Opinions differ as to the possibility of entirely destroying the granulomatous tissue. Many cases have been reported in which nodules have remained after long-continued treatment. In non-ulcerative lupus the results seem to be less satisfactory as regards complete destruction of the foci of disease. Observers also differ as to the advisability of producing a reaction in the part. It seems probable that unless a certain amount of inflammatory change be set up there is little chance of permanent destruction of the granuloma and that a somewhat severe reaction is more likely to bring this about than a slight superficial inflammation. An intense reaction is, however, very painful, and if this be aimed at only a small area can be exposed at a time. The scar also suffers if supuration ensues. In some of our cases marked improvement in the disease has followed severe reaction, but even when this has been repeatedly produced relapse has occurred again and again. In the case of an ulcerated surface there seems to be less risk of dermatitis. It is the epidermic cells, more especially in hair follicles, which react so readily to strong stimulation, not the underlying connective tissue. It may be mentioned that very inflammatory cases of lupus react more quickly and severely, the stimulation of the rays adding to the inflammation already present. Milder applications and longer intervals between them are therefore required in such cases. By microscopic examination of fifteen foci at various intervals after exposure to the rays Scholtz found that they caused a great alteration in the character of the lupus nodule; the cells were swollen and there were large numbers of leucocytes, especially polynuclear, between the plasma cells, with a number of exceptionally large giant cells.

RODENT ULCER.

Much of what has just been said concerning lupus may be applied to rodent ulcer. Even in apparently hopeless cases the *x* rays may be productive of marked benefit. They sometimes cure, and scarcely ever fail to relieve. It may indeed be said that there is no case beyond reach of the palliative action of the rays. Relatively better results are obtained in extensive ulcers. Unless underlying bone or periosteum is involved the base of the ulcer is generally fairly healthy, the active disease being to a large extent limited to the spreading edge; healthy granulating tissue is rapidly formed and heals with a sound scar. Sometimes where destruction has been rapid the spreading edge itself seems to have been ulcerated away and large cavities left after healing present no trace of the disease. In several of our cases deep cavities in the cheeks and other parts of the face have healed and have since remained sound. In the majority of ulcers, however, some of the infiltrating growth remains at the edge, and requires prolonged and strong applications of the rays before it yields; sometimes it

proves absolutely refractory. In one or two cases, after large areas of ulceration have completely healed, small foci have remained on which no effect has been produced by the *x* rays. Invasion of bone also makes the case much less favourable for treatment by the rays. When the ulcer is small it heals, as a rule, before the hard edge disappears; in such circumstances we have found a few applications of the Finsen light sufficient to destroy the edge. We have treated a considerable number of small non-ulcerative rodent ulcers with Finsen light alone with excellent immediate results. As, however, relapse has taken place in several of these cases, it is now our practice to use the light first to break down the growth and cause exfoliation, following up this result with the use of the *x* rays.

As in the case of lupus, we think that a certain degree of reaction is beneficial, and leads to more rapid absorption of the growth. In general terms, it may be said that rodent ulcers require stronger applications than lupus, and as the extent of the disease is generally smaller than in lupus such applications are better borne. In a very extensive case involving the eyelids and nose² marked improvement followed prolonged treatment. Recurrence, however, soon took place and the treatment was pushed until a rather severe dermatitis was set up, since when there has been no recurrence. The cases of rodent ulcer we have treated have been in all stages. We have found that the small non-ulcerative varieties of rodent ulcer are more effectually treated by Finsen's method followed, if necessary, by *x* rays, and the large ulcers by *x* rays followed, if necessary, by the light treatment. In other words, if there is no ulcer the tissues should first be broken down by application of light; if there is an ulcer it should be treated with the *x* rays, any remaining growth being treated by the chemical rays. Relapse has occurred in the majority of our cases after a longer or shorter interval of time, but some have remained free from recurrence for varying periods up to the present time. In a few cases we have been able to do no more than hold the disease in check, relapse occurring as soon as treatment is discontinued.

CARCINOMA.

The *x* rays are, as far as present experience goes, applicable to the treatment of carcinoma only with strict limitations. The progress of rodent ulcer is so slow, and metastasis so rare, that there is no risk in the employment of measures which take some time to produce their effect. On the other hand, in the case of carcinoma, every hour is of importance, and in all cases where the disease is still completely within reach of the surgeon's knife, immediate operation is imperative. But in cases that are past all surgery a hope, not indeed of cure, but considerable palliation, is opened up by the use of the *x* rays. The drying and healing effect of the rays on ulcerating surface in lupus has already been pointed out. The same holds good, though to a less extent, with regard to the ulcerations of malignant disease. The most marked effect of the rays, however, in cases of cancer, is the relief of pain. In this way life has been made fairly comfortable in many cases where previously it was little better than a prolonged agony. But though the palliative effect is considerable, up to the present nothing in the nature of a cure has been reported.

Another direction in which the rays find a useful application is in the prevention of recurrence after the disease has been removed by the knife. Superficial nodules can be destroyed as soon as they appear. In the treatment of carcinoma by the rays our experience has been that inflammatory reaction is harmful; this should therefore be carefully avoided. We are inclined to think that weak exposures should be given, especially in acutely inflammatory conditions. The chronic indolent cases appear to do best, while any pre-existent inflammation is likely to be aggravated by the stimulant or irritant effect of the rays. With regard to the histological changes resulting from the action of the *x* rays on cancerous growths there is not much to be said. According to W. F. Brook the epithelial elements of the cancer disappear, but the fibrous tissue remains unchanged, the loosening of the adhesions being due rather to general relaxation from diminution in bulk than to any dissolution of cicatricial tissue. In a case under his care in which the "lump" after 50 exposures, gradually increased to three-quarters of an hour, was reduced to half its original size, excision was performed, and an examination of the tumour was made by Mr. Shattock, who reported to the Pathological Society of London³ that no degeneration of any kind or cell lysis had been induced in the carcinomatous epithelium, no phagocytic invasion of the epithelium was in

progress, and on every side the growth was in an extending condition. There was nothing in the amount of lymphocytic infiltration in the mast cells and Unna's plasma cells which might not be met with in cases where no treatment had been carried out. The clinical diminution in size of the mass and the loosening of its deep connexions were difficult to explain; possibly they were due to the disappearance of a sub-inflammatory oedema. Mr. Shattock expressed "profound disappointment" at such a negative finding. One of the most recent writers on the subject, E. A. Codman, of Boston,⁷ thinks the effects of the x rays in cancer are due to stimulation of the nutrition of the part rather than to destruction of the malignant tissue.

OTHER DISEASES.

In regard to the effects of the x rays in other diseases we can only give a rapid summary of cases reported by various workers; our own experience does not yet justify us in expressing a definite opinion on the value of the results. Some mention of them is necessary in order to show the range of therapeutic possibilities offered by the rays.

Keloid.—We have treated a few cases of keloid with the x rays, in some of which there has been decided diminution in the growth. The effect of the treatment in easing pain has, however, been very marked.

Lupus Erythematosus.—This intractable disease yields much less readily to the therapeutic influence of light than lupus vulgaris, and the results of x-ray treatment are still less favourable. All our cases save one have improved considerably under the light treatment, although the improvement in some of them has been slow. In most there has been a tendency to relapse soon after discontinuance of the treatment. We have not treated any cases with the x rays, but good results have been obtained by Schiff, Jutassy, and others.

Acne and Rosacea.—Hyde, Montgomery, and Ormsby report that in two extensive and very severe cases of acne, which had resisted for months all efforts at treatment, the eruptive symptoms disappeared completely under the influence of the x rays. Jutassy, Scholtz, Schiff, and Hahn also observed favourable results in rosacea.

Eczema.—Good results have been reported by Hahn and Albers-Schönberg, Hyde, Montgomery, and Ormsby, and others. Childs treated a case of eczema of the perineum and thigh in which the itching and then the eczema disappeared after six exposures.

Psoriasis.—We have seen good results in chronic patches of psoriasis. Hyde, Montgomery, and Ormsby treated thirty-two cases, causing in each a temporary disappearance of the lesions. From four to ten treatments in a given group of lesions were usually sufficient to cause these to disappear entirely. Codman⁸ says that in his own experience the effects of the x ray in causing the disappearance of psoriasis and chronic eczema is "little short of the miraculous."

Hypertrophicosis.—Schiff holds that radiotherapy is the only radical treatment for hypertrophicosis, even when compared with electrolysis. In May, 1898, he reported with Freund, a series of seven cases of epilation. Jutassy also had good results. In nine cases treated by Hyde, Montgomery, and Ormsby, the hairs were removed in from sixteen to twenty treatments on a given area. In five there was a return at the end of six weeks or two months of a considerable portion of the hairs. After another period of two months a few hairs are again returning.

Sycosis.—In Schiff's experience, after the shedding of the hair no new pustules appeared, and secretion and scab-formation ceased; but even before the shedding of the hair there was a noticeable diminution of the inflammatory processes, and the more striking inflammatory infiltration in the surrounding tissue disappeared. After seven to eleven sittings the hair became loose and fell out spontaneously or with slight traction. The redness and all other appearances of the disease disappeared in the course of the next ten or twelve days. The affection returned in certain cases after from two to four months, but in a number of cases the hair grew again as before without any relapse.

Ringworm.—Whitfield showed a case of ringworm which he had treated by means of x rays at the Dermatological Society of London.⁹ Exposures of ten minutes to a moderately high tube at a distance of 4 in. were given. After fourteen exposures a slight blush was present and the hair seemed to be loosening. Treatment was then stopped, and in the following week a rapid shedding of the hair took place, the sound hairs coming away before the stumps. The patch became completely bald and was apparently cured. At the time the case was shown the hair on the patch first treated was just beginning to show itself again in the shape of fine and healthy down. Hyde, Montgomery, and Ormsby report "no success whatever," but they feared to use the rays freely for fear of producing permanent alopecia.

Favus.—Schiff treated favus by exposing the whole hairy scalp to the rays, and continuing the treatment till complete epilation was produced. All his cases have remained permanently cured. It may be doubtful, however, whether this result is due exclusively to the x rays, as carbolic ointment was applied after epilation.

Mycosis Fungoides.—This terrible disease on which no treatment previously tried had any effect, has to a certain extent yielded to the x rays. Allan Jamieson¹⁰ has recorded a case in which "not only did the tumours melt wholly away, but the thickened patches likewise disappeared under the influence of the rays." Jamieson thinks that "what has been accomplished in the way of cure of the fully established disease warrants the hope that attacked betimes still better results will be obtained." A striking illustration of the beneficial effects of the rays in mycosis

fungoides was displayed at a meeting of the British Society of Dermatology on May 13th by E. Stainer. The patient appeared to be completely cured—for the time at least. The x rays have also been employed by various practitioners with more or less advantage in alopecia areata, naevus, xanthoma, varicose ulcers, actinomycosis, Paget's disease, elephantiasis, Hodgkin's disease, and leprosy.

CONCLUSIONS.

Our experience of the x-ray treatment may be summed up in the general statement that, while it has a well-defined sphere of usefulness, it is in the case of lupus vulgaris much inferior in curative efficacy to Finnsen's light treatment. The use of the rays, however, supplies certain shortcomings of the light treatment, as they can be applied to cavities inaccessible to the latter. In dealing with lupus of mucous membranes the x rays are more effective. For the healing of ulcerated surfaces and for the relief of pain they are especially indicated. The combination of the two methods, reinforced, if need be, by the use of pyrogallol, salicylic, or carbolic acid, or other caustic applications, may be trusted to give good results in cases of lupus, in which the disease is not too extensive to be overtaken in its development by the therapeutic agencies. As to the permanency of these results it would be rash at present to speak too confidently. But there is good reason to believe that the disease may be kept under control if the case is watched and treatment applied as there is any appearance of recurrence.

In regard to rodent ulcer, practically the same thing may be said with certain limitations. Here in our experience relapse after a varying period of time is the rule, and in some cases the most that can be done is to keep in check the extension of the disease.

Our experience of the x-ray treatment in other skin affections is too limited to form the basis of a definite conclusion.

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FURTHER OBSERVATIONS UPON THE TREATMENT OF RODENT ULCER BY THE X RAYS.

By JAMES H. SEQUEIRA, M.D. Lond., Etc.,

Assistant Physician to the Skin Department of the London Hospital.

In February, 1901, I published in the BRITISH MEDICAL JOURNAL a preliminary paper upon the treatment of rodent ulcer by the x rays. My observations were based upon 12 cases treated at the London Hospital between June, 1900, and January, 1901. The immediate value of the treatment was demonstrated in a striking manner, but, of course, nothing could be said as to the permanence of the results. Since the date of the publication of that paper I have had nearly 100 cases of rodent ulcer under my care at the London Hospital and privately, and the satisfactory results of the x-ray treatment then reported have been fully maintained, and a large number of successes have been published by other workers. I propose to put on record here the impressions which my further experience has given me, and shall especially refer to the changes produced in the growth, the question of recurrence and also to the selection of cases, and the conditions which favour success.

THE CHANGES PRODUCED IN THE GROWTH.

That rodent ulcer is a form of cancer is generally recognized, but there is still doubt as to the exact elements of the skin in which the growth starts. It begins obviously in the derma, and originates in some of the glandular elements, but whether the actual starting point is the hair follicle, the sebaceous gland, or the sweat gland is still debatable. In some of my sections the character of the cells of the neoplasm and the effect of staining reagents lead me to the belief that in many cases the starting point is the hair follicle. In several instances the point of origin has been a mole. On the other hand, there appears to be evidence that the growth may start in the sebaceous glands. The point of origin is of interest therapeutically, because we know that the x rays have a marked effect upon the hair bulbs, causing a rapid shedding of hair. Changes are observable in the nuclei and in the