

three other cases in being greatest in the upward movement. Of especial importance is the absence of the ability to converge the eyes in spite of the fair action of the internal recti on lateral movements. It is difficult to understand this symptom except on the assumption of a central affection. It may be compared with the fact that in Case I the left eye at one time only moved outwards when tested separately, not with the right eye, and also with the fact that in Case II the eyelids, which could not be raised voluntarily, were sometimes over elevated under the influence of interested attention.

Lastly, the development of epilepsy in a subject of myasthenia is very unusual. I have not met with any recorded instance. It is the more remarkable on account of the absence of any inherited tendency. Its rarity deprives it of much significance, since such cases of epilepsy developing *de novo* at this time of life are not unusual. Few diseases are mutually exclusive, and the attacks in this case may perhaps be associated with the extreme nervous sensitiveness rather than with the condition of myasthenia.

It is customary to include among collected cases of myasthenia a case described by Wilks in the *Guy's Hospital Reports* for 1877 (vol. xxii, third series, p. 54). There seems to me no justification for its inclusion. The patient died from bulbar symptoms, and apparently paralysis of the respiratory muscles or larynx—"quite unable to cough"—of three days' duration, after slight symptoms of general and bulbar character lasting a month. Their feature was slowness, as if due to "lethargy from want of will." There was slight strabismus, but no mention is made of ptosis. No morbid change was found. The case seems to resemble diphtherial paralysis more than myasthenia. There is no evidence that preceding sore throat was inquired for.

FURTHER REMARKS ON FINSEN'S LIGHT AND X-RAY TREATMENT IN LUPUS AND RODENT ULCER.

BY

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IN the BRITISH MEDICAL JOURNAL of February 9th, 1901, p. 326, we gave an account of our experience of Finsen's method up to that date. It may be useful if we now give a further record of our experience—now extending over two years—of its utility and its limitations. Such a report is likely to be more valuable owing to the fact that there has of late been a tendency to exaggerate the possibilities of the light treatment, and to employ it to the exclusion of all other older and well-tried methods. It is only by a plain statement of facts that we can enable those who have no personal experience of the treatment to estimate it at its true value, and assign to it its proper place in the therapeutics of the diseases in question.

We may, therefore, say at once that although in our opinion the results we have obtained have fully justified the employment of the treatment, and in some cases no other treatment could have produced such good results, we do not regard it as the only method to be used in all cases, nor advocate it indiscriminately to the exclusion of other methods. But when used judiciously, and combined, if necessary, with other means, we may perhaps claim for it the first place in the treatment of the majority of cases of lupus vulgaris. In regard to cosmetic effects it certainly stands first, while in reliability it yields to none, practically all the cases we have had under treatment have made a steady improvement. In regard to permanency of results, however, we are inclined to reserve our opinion as to its superiority over other forms of treatment. That relapses have been common in our experience when the disease has not been entirely eradicated is only too true. The patient must be kept under constant supervision, and the recurrent nodules treated without delay as they make their appearance. These relapses are due largely to the fact that it is difficult to be certain when the part has had sufficient treatment for the disease to be completely extirpated.

If it were not for this constant supervision and repetition of the treatment, the disease would soon regain its hold, and a still more extended experience is necessary before we can say that phototherapy is more permanent in its results than other measures. On the other hand the fact that applications of the light rays can be made over and over again without injuring the tissues and with improvement rather than deterioration of the scar is in itself a strong argument in favour of this form of treatment both for lupus and rodent ulcer, and as long as the patient is kept under observation and recurrent disease dealt with immediately on its appearance, the intervals between the recurrences become longer and longer, so that eventually a time may be reached when the disease is entirely eradicated.

Another point of importance is the fact that this treatment makes evident disease which was hitherto unsuspected, enabling the disease to be more thoroughly treated than by other methods. This may also account in part for the great length of treatment required.

Disadvantages of the Light Treatment.

The disadvantages of Finsen's method are now well known, the chief being the tediousness and length of time, the small area that can be treated at a time, the elaborate and expensive apparatus, and the large staff of attendants required. The French lamp of Lortet and Genoud, in which the rays are not concentrated but in which the patient is brought close to the source of light before it diverges, does away with most of these disadvantages. The rays, however, do not penetrate in the same way as when they are brought to a focus, and their action is too superficial. For this reason this lamp and the Danish lamp with water-cooled iron electrodes have been discarded in Copenhagen. We have found the French lamp of service in cases in which the lupus is superficial, and in extensive cases as a preliminary to treatment with the Finsen lamp, but not as a substitute for the latter. In the new Finsen lamp the principle is the same as in the old one, but it is modified in such a way as to make it applicable to one patient at a time, and the cost is thereby much reduced.

THE X RAYS.

Although we have found the *x* rays very useful as an adjunct to the light rays, we do not, except in certain cases, regard them as an adequate substitute. We have treated many cases with the *x* rays alone, and have formed the conclusion that in the majority of cases Finsen's method is more reliable, and apparently gives more permanent results. The effects can more easily be controlled, and the scar is better, for although a very good scar may result from the *x*-ray treatment, it seems to have more tendency to contract, perhaps varying with the severity and depth of the reaction.

This was well shown in one of our cases in which both methods were applied to different parts of the skin. The scar resulting from the *x*-ray treatment was more discoloured, denser, less supple, and more tense than the other, which was so fine and smooth as almost to resemble normal skin.

There also appeared to be a greater tendency to relapse in the scar, although the total number of applications was certainly less than that of the light. Although a larger area may be treated with *x* rays than by Finsen's method, it is not advisable to expose too large an area at once on account of the severity of the reaction; and for permanent or at all events rapid results, a reaction seems to be necessary. Pressure is of course not required in the treatment with *x* rays. The *x* rays seem to have a slight selective action on diseased tissues, but the healthy skin is also affected. Like the violet rays, they cause pigmentation and softening of scar tissue. They differ from the latter in their physical properties, in the fact that they cause loss instead of growth of hair, are not bactericidal, and in many other ways.

Advantages of X Rays.

In ulcerating cases the *x* rays are effective in so far that the ulcerations heal rapidly. In one of our cases a small ulcerating surface, which resisted treatment by Finsen's light, rapidly healed after a few exposures of *x* rays. For mucous membranes inaccessible to the light the *x* rays are very useful, and may be combined with Finsen's treatment in other parts. Notwithstanding the much greater penetrating power of the

x rays, they seem to have a special affinity in their action for the cutaneous or mucous surfaces. Where the mucous membranes could be exposed directly to the action of the rays, we have had better results than when it was attempted to treat them through the skin. Thus in treating the nasal mucous membranes, it is better to use a speculum and to direct the rays into the cavity, than to trust to penetration through the external skin or cartilage. If the latter course be adopted, there is not only little effect on the mucous membrane, but there is danger of setting up too severe a reaction in the overlying skin.

Disadvantages of the X Rays.

When the *x* rays were first used as a therapeutic agent great stress was rightly laid on the danger of causing acute dermatitis and necrosing ulcerations, of which several instances occurred from giving long exposures with low tubes. Now, however, by giving short exposures and by avoiding the use of very low tubes, this danger has been, to a large extent, eliminated. Although owing to the large number of factors to be taken into consideration it is still much more difficult to estimate the dosage of *x* rays than it is in the case of the violet rays, we have found that by observation when similar conditions can as nearly as possible be arranged, the effects we endeavour to produce can be obtained.

DIFFERENCES IN THE TWO REACTIONS.

In our first paper¹ we emphasized the importance of striving to obtain a reaction after every application of Finsen's rays, and we are still of the opinion that good reactions are productive of better results; when there is no reaction there is comparatively little benefit. In most of our cases the severity of the reaction has remained the same with continued treatment, but in some the reactions have become more severe, in others less so.

With regard to the *x* rays, there has been much difference of opinion as to the necessity of producing an inflammatory reaction. Our own view is that the therapeutic effect, as in the case of the violet rays, is much greater when a reaction occurs. In ulcerating cases reaction as a rule does not occur so readily as in the unbroken skin, and may not come on until healing has taken place and new epidermis formed. It may be mentioned that a part previously treated with *x* rays seems to give more severe reactions with Finsen's treatment, but the converse does not hold good.

The reaction produced by the light rays is fairly uniform in its time of onset, intensity, and duration, depending upon certain conditions which were dealt with in a previous paper.² It comes on a short time after exposure to the light, causes a more or less circumscribed and comparatively superficial inflammation with the formation of blebs and serous crusts.

On the other hand, owing to the difficulty of accurately estimating the dosage, the reaction from the *x* rays is much more variable. There may be no inflammatory phenomena with ordinary short exposures, or the reaction may vary from a slight transient erythema to a deep-seated suppurative inflammation of long duration; the necrosis of tissues which has occurred in a few cases has already been referred to.

The time of onset and severity of reaction vary within wide limits. With daily exposures of ten minutes, with the anticathode at a distance of about 5 in. from the patient's skin, some reaction is generally manifested after eight or nine applications, but varies from two or three to fifteen and more, its onset being more or less gradual, and usually indicated by some redness or soreness of the part. It often comes on two or three days after the cessation of treatment, but may be delayed for a considerable time, and make its appearance with but little warning. Many factors are concerned in its production, such as the duration of the exposure and the interval between them, the distance of the tube from the patient, the kind of tube employed, and the degree of exhaustion of its vacuum, the strength of the current, the nature of the coil and interrupter used, the peculiarities of the patient's skin, etc., so that results apply only to a given set of apparatus worked under similar conditions for each application. By keeping a daily record of the above data it is not difficult to estimate the effect that will be produced. We have obtained our results with an electric supply from 200-volt circuit, a 12-in. coil, and a mercury jet interrupter. The conditions

have been varied considerably in many cases, but as a rule have been as follows: Time of exposure, ten minutes daily; distance of anticathode from patient, about 5 in.; tube giving a spark gap (point + plate -) of about 7 in.; volume, about $3\frac{1}{2}$ ampères.

The conditions which hinder reaction from the ultra-violet rays also seem to apply, although to a less degree, to the reaction from the *x* rays, for, in spite of the greater penetration of the latter, they seem to have a special action on the cutaneous tissues. Contrary to expectation, several very hyperaemic cases have reacted strongly to the ultra-violet rays, and these cases also seem to react more quickly and severely to *x* rays.

The reaction from the *x* rays is as a rule more severe than that caused by the ultra-violet rays; it is deeper, more painful, and usually suppurative. Its onset is delayed; the effect of the rays being cumulative, it lasts longer than the Finsen reaction—a fortnight or three weeks—and the action goes on for some time after cessation of the treatment.

Treatment of Rodent Ulcer.

Even very extensive ulcerations of the rodent type rapidly heal by granulation under treatment by *x* rays and are replaced by a healthy scar tissue, and in such cases, especially if inoperable, there can be no doubt as to the advantage of employing this method of treatment. The characteristic rolled, indurated edge of a rodent is not so easily dealt with, and it may be necessary to push the treatment until a moderate reaction is set up before this will disappear. Another way of attaining the same object is to treat this resistant edge by Finsen's method or by the cautery or surgical procedures before employing the *x* rays. In small non-ulcerating rodents Finsen's treatment seems to give more rapid results than the *x* rays, partly, perhaps, by causing a mechanical removal of the growth. In larger rodents, whether ulcerating or not, Finsen's treatment is not applicable, as it is impossible, on account of the small area treated at a time, to keep pace with the spreading margin.

With regard to recurrences, the same applies in this case as in the treatment of lupus; undoubtedly they do occur, but are easily dealt with. It is most important to continue the treatment until every particle of the disease as far as can be seen and felt is eradicated, or, if possible, to continue the applications for a short time after apparent cure. It may be mentioned that in rodent as in lupus Finsen's treatment reveals the whole extent of the disease, which is often greater than was apparent before treatment, and thus enables the growth to be more thoroughly dealt with.

CASES.

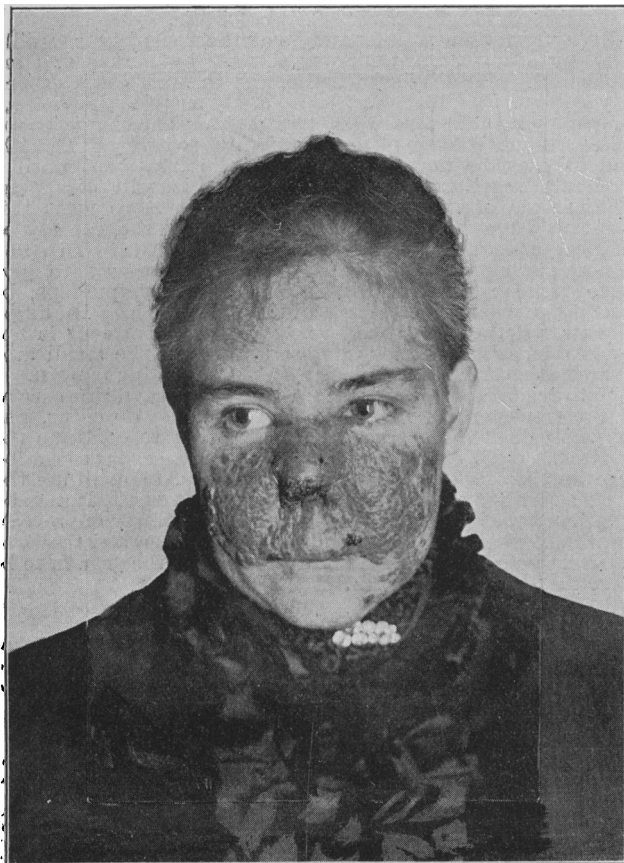
The following are notes of the further course of cases related in the report published in the BRITISH MEDICAL JOURNAL of February 9th, 1901. The numbers correspond to those used to denote the cases in that paper:

Lupus Vulgaris.

CASE I.—A woman, aged 33. This patient has now been under treatment for nearly two years, and has had nearly 500 applications of light and 174 of Roentgen rays. A few nodules still crop up if treatment is discontinued for long, but this is scarcely to be wondered at when the duration, extent, and aggressive character of the lupus in the first place is considered. The improvement she has made is very great. She had previously had almost every other form of treatment, and although she has never before been under constant treatment for such a long period it may fairly be said that nothing else could have produced such a result. The right cheek is now apparently quite free of disease, and the skin is so pale and smooth that without close inspection it might easily be supposed that it had never been affected. The left side of the face is not quite so good, and has a somewhat mottled look produced by white scar and patches of pigmentation. On examination with the diascopie a few brownish infiltrations can be detected here and there, but the skin is, except for the pigmentation, on the whole pale, smooth, and supple, quite unlike ordinary cicatricial tissue. On the upper lip and a small area on the left cheek, where *x* rays have been used, the scar is stiffer and redder and coarser than on the parts treated with the light rays; the disease has also relapsed somewhat in these parts, but this may be because the number of applications of *x* rays have been less than that of Finsen. The mucous membrane of the nose, also treated with *x* rays, has remained sound. It may be mentioned that the growth of hair on the parts of the cheeks not diseased has been somewhat accelerated, and they are now covered with a very fine downy growth.

CASE II.—Man, aged 49. When this case was reported before, the improvement was very marked; on account, however, of the great extent and aggressiveness of the disease it was found difficult to keep pace with the rapidly-recurring nodules with only one hour's treatment daily, and the patient was unable to give more. At the end of May, 1901, when he

had had 223 applications, he was unable to continue the treatment owing to pressure of work. At this time the skin of the cheeks presented a fine smooth pigmented scar tissue with no active disease in the central parts. At the margin of the patch, however, on the cheeks, under the chin, and on the neck, the nodules reappeared as fast as they were treated, and the disease was only just kept in check by the single daily applications. The left ear, which from being enormously oedematous and swollen had become somewhat smaller from treatment, was again increasing in size. At the beginning of November the disease had gone back considerably, although the benefit he had derived was still very evident. The disease was active at the edges of the diseased area, and there were a few apparently fresh, rather prominent, and infiltrated nodules near the nose, at the inner margin of the patch. In other parts, also, the lupus showed signs of becoming more active. He was given urea, grs. xxx. t. d. s., and was advised to have 2 rays, as this would take less time, and enable a larger area to be treated. After he had three or four exposures he stopped in order to have an operation on his ear, which was now of great size. On January 6th he came back, having had the lower swollen part of his ear excised. Unfortunately the lupus of the face had gone back very much during the interval, and again became thick and infiltrated. At the peripheral parts especially the nodules were large and prominent, and the disease had encroached on the healthy skin of the cheek on either side of the nose. He began daily applications of Pinsen again, at the same time going on with the urea, which he thought had done him good.



Case III: Before treatment.

CASE III.—Man aged 22, was one in which the whole of the central part of the face was affected—the lower parts of the nose had been previously destroyed by the disease; both cheeks were studded with large, deep-seated nodules. The worst feature of the case, however, was the extensive and intractable ulceration of the mucous membranes of both lips and the inside of the mouth. The upper lip was infiltrated with lupus, being greatly thickened and oedematous, and the whole lip protruded. Under treatment with light the disease on the cheeks was very much benefited; the ulcers also, instead of being foul and covered with crusts, became clean and less ragged. After 164 exposures there were still a few scattered pale nodules embedded in the scar, especially at the edges of the patch on the cheeks, but they were very small and superficial, and although they disappeared for a time after treatment, they soon cropped up again. The ulcerations about the mouth were smaller and shallower, but failed to heal up completely, and soon became worse if treatment was discontinued. On May 7th, the light treatment was stopped and x rays resorted to. Eight exposures to each corner of the mouth were sufficient to set up reaction, and when the inflammation subsided the ulcerations very rapidly healed. When he had had twenty applications all the ulcers were healed and the swelling of the upper lip much reduced. The ulcers have shown no tendency to break down since. At the present time they are quite sound. On the cheeks, however, which have had no

treatment for eight months, there is some relapse. The nodules in the scar at the periphery of the patch, which were never entirely eradicated, have become large and prominent again, and a few fresh ones have formed.

CASE IV.—An unmarried lady, aged 24 years.

Family History good; she has four brothers and sisters, all of them in good health; no history of consumption.

Personal History.—Her general health has always been very good.

History of Present Condition.—Her disease began when she was 3 years of age; it followed an injury which caused a slight wound on the chin that did not heal. The patch was about the size of a sixpenny piece at first, and has since continued to spread very gradually.

Present Condition.—There is a more or less circular patch of a brownish-red colour, situated on the extremity of the chin a little to the left of the middle line. It measures about $\frac{1}{2}$ in. either way. There is a uniform, diffuse, dark brown infiltration of the skin, slightly raised above the surface, with a well-defined but somewhat irregular outline. The surrounding skin is quite healthy, and there are no outlying nodules. She is a tall, healthy-looking girl with a soft skin of fair complexion and a bright colour. Light treatment for one hour daily was commenced on January 2nd. January 7th. The patch has now been treated all over, and is blistered and sore, so that treatment had to be discontinued for a time. The reactions have been good. January 14th. The diseased area is now sufficiently healed to begin treatment again; it looks paler, but this is partly



Case V: After treatment.

due to partially detached epidermis. January 30th. The affected part is now very sore, and the granulomatous infiltration is obscured by blebs and crusts. A rest was given to allow healing to take place. February 4th. The inflammation has subsided and the part has healed up. It has a pale pink colour instead of being of a dark brownish red. Scarcely any lupus can be seen, but it is partly hidden by loose macerated epidermis. February 10th. No nodules can be seen on pressure in the upper part of the diseased surface, but one or two are still visible at the lower part. February 26th. The upper half of the patch presents a pale red, healthy surface. There are still some distinct nodules in the lower part, especially round the edge. March 15th. Only one distinct lupus nodule is now visible. March 23rd. No disease can be seen, but it is difficult to be certain that there is none left on account of the soft opaque epidermis overlying the diseased part. March 30th. Treatment discontinued. April 23rd. She has had no treatment since March 30th. There is still a little thickening and redness of the skin over the patch, but no granulomatous tissue can be seen on pressure with a glass. February 11th, 1902. The originally diseased area is covered with smooth white skin, which without very close inspection could not be distinguished from the normal. There is no disease left and no disfigurement.

CASE V.—Boy, aged 12 years.

Family History.—Father and mother and a sister in good health.

Personal History.—Has always been in the best of health.

History of Present Condition.—The disease began five years ago from a "small shiny red spot" on the face; this did not heal, and was followed by a small shiny red spot. It was not treated until three years ago, when it was cauterized once or twice a week for two or three months. After this he had it excised five times in all, but it recurred very soon after each operation. The last operation was performed about five weeks ago, and almost directly after the wound had healed two small brown spots appeared.

Present Condition.—There is a small linear scar, about $\frac{1}{4}$ in. long, situated on the left cheek between the angle of the jaw and the corner of the mouth (about $\frac{1}{4}$ in. from the latter). At the upper end of this there are two small lupus nodules embedded in the scar tissue; they are in close proximity, and each is about 3 mm. in diameter. As far as can be seen the remainder of the scar is healthy. October 26th, 1900. Treated with light for fifty minutes. October 27th. Two small blebs with some surrounding hyperaemia have appeared at the site of the spot treated yesterday. The place is also slightly tender. October 29th. The two small blisters have coalesced to form one large one, the lupoid nodules cannot be distinguished on account of the blister. November 3rd. The area is covered with a layer of loose skin on removal of which the nodules can be seen. To-day is the fifth of treatment.



Case VII: Before treatment.

November 6th. The spot is not very sore, on removal of the scab a pit is seen in the position of one of the nodules, the other cannot be seen. November 8th. The spot is too sore for treatment to be continued. November 10th. The soreness has abated, but the crust is still too adherent to be removed. November 13th. The crust was able to be taken off with forceps and treatment continued. November 15th. To-day is the eighth day of treatment. The crust was removed with difficulty. The spot was too inflamed and swollen to be able to distinguish any lupoid tissue. Treatment postponed. December 12th. The scar is softer and more even. The nodules are apparently more superficial, and another one which was not visible before can now be seen to the inner side of the other two. The two deep-seated nodules that were so obvious at the commencement of treatment have joined to form one pale superficial one with indefinite outlines. January 9th, 1901. With ordinary observation no disease is visible, but with firm pressure with a glass too indistinct faintly discoloured spots can just be made out. Treated again to-day for an hour. January 11th. Has had three more consecutive applications. The part is now inflamed and covered by a scab. He has had eleven applications altogether. Treatment discontinued. May 7th, 1902. No recurrence.

CASE VI.—Female, aged 19.

Family History.—Father and mother living and healthy, also three brothers and three sisters. One brother died of rheumatic fever. No skin disease or consumption in the family.

Personal History.—She has always been healthy, and has only been laid up for an attack of scarlet fever and of influenza.

History of Present Condition.—When she was 7 years of age, just after she had had influenza, a small red spot the size of a pin's head formed on the left cheek, near the nose. This gradually increased in size, and became slightly raised above the surface. When she was 10 years of age, and the spot was about as large as a threepenny piece, she went to Guy's Hospital, where it was operated upon with the cautery. The disease was destroyed, leaving a slight scar. This remained healthy for two years, but when she was 10 the disease came back again. For the last three years she has used an ointment, and the disease has been alternately better and worse. The patch is now considerably larger than it was two years ago.

Present Condition.—There is a small, nearly circular patch of lupus vulgaris on the left side of the face near the ala of the nose. It is about the size of a sixpenny-piece ($\frac{1}{2}$ in. by $\frac{1}{2}$ in.). It is raised and thick, and consists of infiltrated lupoid tissue, giving a brown colour on pressure. The edge is even and well defined, and there is no disease elsewhere. March 15th. Treated by light for one hour. The whole lesion can just be covered by the compressing glass at one sitting. March 22nd. Has now had seven consecutive applications (with the exception of Sunday). There has been



Case VII: After treatment.

practically no reaction, and the part is not sore. The absence of reaction is unusual, and may be accounted for by the depth and dark colour of the infiltration. March 26th. To day is the ninth application. The area is less elevated. The surface is red, except where it is covered with a whitish film of softened epidermis, which is removed with difficulty. There is still very little reaction. April 3rd. The area is now red and discharging, and is somewhat sore and tender. April 23rd. Very little lupus can now be seen. At one end a brownish nodule is visible. April 27th. Has only had a few applications during the last three weeks. She has now had twenty-four altogether. May 8th. It was found necessary to give a few more applications, the disease not yet having been entirely eradicated. May 15th. There was a little haemorrhage into the spot at the last sitting. The area is sore, and the surface is covered with crusts. Treatment discontinued. May 24th. The crusts have now come off, so that the part can be examined. There is a small, faint, apple-jelly nodule at the outer and upper edge of the patch, otherwise no disease can be made out. She has had twenty-nine applications altogether. June 1st. Patient was seen by Mr. Morris, who pronounced her free of disease. In August a small pustule appeared in the centre of original site of disease. This was touched with pure carbolic acid. There is practically no scar, but a slight reddening.

CASE VII.—Married woman, aged 32.

Family History.—Her father and mother are dead; the former died of

asthma. She has one brother and he is quite healthy. There is no consumption or other disease in the family.

Personal History.—She has always enjoyed very good health, and has never been laid up by a serious illness.

History of Present Condition.—The disease began on the left cheek when she was 16 years of age. She remembers it first as a small red patch which gradually increased in size. Ten years ago it was scraped, and two years ago it was again scraped and cauterized. In spite of the operations the disease has never been completely eradicated, and since the last scraping it has been a good deal worse.

Present Condition.—There is a triangular-shaped patch of lupus on the left cheek, the base of the triangle being uppermost, and represented by a line drawn from the lobe of the ear to the lowest point of the ala of the nose. From this base line the patch gradually tapers almost to a point, terminating at the lower edge of the jaw. Transversely the diseased area measures about $\frac{1}{2}$ in. and the same vertically. The patch presents a dark-brown, scaly, slightly-projecting surface. It is infiltrated with the disease, which is confluent except at the upper edge, where there are some discrete nodules. There is no visible scarring, but the characters of the disease are partly obscured by large scales. There are no satellite nodules and no disease elsewhere. March 22nd, 1901. Began light treatment, one hour daily. March 26th. Severe reactions have occurred and the part is sore and covered with large blisters. April 23rd. There is less thickening of the affected skin, and it is paler in colour. May 9th. The whole area is inflamed and discharging so that the granular tissue is hidden. June 15th. She is making a steady improvement. Most of the infiltration has disappeared. July 31st. Has had a fortnight's rest. The patch is rather red, and very little "apple-jelly" can be seen. August 13th. Treatment postponed for summer vacation. September 10th. Still further improvement, but one or two small superficial nodules remain. She has had eighty-eight applications altogether. October 15th. She is now only coming for treatment occasionally having three or four consecutive applications and then an interval of a fortnight or so. December 21st. One or two nodules still crop up occasionally after treatment has been stopped for any considerable period. They appear in the scar, which takes the form of a vertical ridge with lines radiating from it. This scar, which is rather dense, was not apparent at the commencement of treatment, being hidden by the lupoid infiltration. January 14th, 1902. There is now a smooth shiny scar with a small doubtful nodule in one part of it. This was treated to-day. There is also a small scaly spot, brown in colour but leaving no stain on deep pressure in the healthy skin just below the main patch. As this has been present for some time it was thought advisable to give it an application of the light.

Rodent Ulcer.

CASE I.—Man, aged 45. In this case the small rodent situated on the right cheek, which disappeared after seven applications of the light, the last being on July 6th, 1900, relapsed after an interval of about a year. He returned on September 11th, 1901. At the upper and inner margin of the scar there was a small raised growth the size of a pea, the top was flat and slightly depressed in the centre, while the edge was rounded and hard. This was the site of the original trouble, and the only part that had any suspicion of induration when the light treatment was stopped. The remainder of the scar was quite healthy. He had noticed the occurrence for some months, and it was gradually getting larger; it was very slight at first, and he cannot remember when he first noticed it. It was decided to treat the lesion with 2 rays, and he began with this treatment on September 11th. The face was covered in the usual way with a lead mask, a small hole having been cut out corresponding to the position of the growth. The primary current was one of 4 or $\frac{1}{2}$ ampères. The tube gave a spark of 8 in. and was placed at a distance of 4 in. (= 6 in. from anticathode) from the patient. Daily exposures of twelve minutes were given. After the third application (September 13th) there was some diminution in the irritation and the growth seemed to be slightly softer. After the fourth (September 16th) the lesion was flatter and less indurated, but there was no redness of the skin. After the fifth a small crust formed on the summit of the wart-like growth. The flattening and softening were more noticeable. After the sixth there was practically no induration, the scab came off easily leaving a glazed slightly red surface. After the seventh (September 20th) another small crust had formed, and remained until treatment was discontinued on September 23rd after it had had ten applications. On September 27th the crust was easily detached and revealed a smooth red surface, with no elevation or depression of the epidermis and no underlying or surrounding induration.

CASE II.—Mrs. B., aged 36. This patient was under treatment from June 1st to June 16th, 1900, for a small rodent of the right cheek in the malar region. When she had had nine applications of the light the infiltration had broken down to form a circular ulcer which healed leaving a healthy scar. On December 10th, 1901, she returned for treatment. There were two points of recurrence, one was a raised, warty-looking growth, the size of a pea, at the upper and outer edge of the scar, and a linear, slightly raised, shiny, translucent infiltration corresponding with the inner border of the scar, the rest of which was to all appearances sound. She says the spots formed very gradually, but she cannot give the exact time of recurrence. Light treatment was resumed on January 13th. The area treated broke down as before to form a punched-out ulcer. She is still under treatment.

Lupus Erythematosus.

Married woman, aged 44. This patient, who had very extensive lupus erythematosus affecting the upper and lower lips, chin, and skin of the infraorbital regions, derived great benefit from the treatment, the diseased portions being replaced by a very fine white scar, resembling the normal skin. Unfortunately, however, she was only able to have treatment intermittently, so that the disease was never entirely eradicated; and in some parts—namely, on the skin of the lips and chin—the disease began to spread again soon after the cessation of treatment. She stopped having treatment after having had about one hundred applications of light, the condition having very much improved.

REFERENCES.

¹ Loc. cit. ² Loc. cit.

THE THERAPEUTIC EMPLOYMENT OF X RAYS.

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THE physical treatment of certain skin diseases being a subject which is now arousing much interest, I purpose shortly summarizing here the results I have obtained during the past twelve months with the *x*-ray tube.

There are many physical phenomena associated with a Crookes's tube in action, but the deeply interesting question as to which of these phenomena is the curative factor will not be discussed in this paper. Be this as it may, the evidence collected up to the present time, both from this country and abroad, may be said to have fairly established the *x*-ray apparatus as a curative instrument of the first importance in the treatment of certain diseases. The list of these diseases has been as yet by no means determined, but would appear to be extending.

The successful employment of the *x*-ray apparatus for curative purposes calls for considerable experience in its management. The treatment is not to be indiscriminately resorted to for all cases, or in all stages of disease; moreover, as in most other "treatments," the method of application is half the battle. Passing by the question of the supposed directly bactericidal effects of the *x*-ray tube—a now fairly disproved hypothesis—can any broad theory be advanced which shall explain the lines on which the cure of disease by this method proceeds? It would appear reasonable to conclude, in the present state of our knowledge, that the good effects of the "raying" are due to the mechanical stimulation of normal cell activity, whereby morbid tissue is either thrown off or absorbed by the healthy. In other words the process partakes of the nature of an inflammation. It is the control of this inflammatory reaction, as far as possible, which calls for the nicest judgement.

Hitherto one of the chief bugbears of *x*-ray work has been what is known as *x*-ray dermatitis, meaning by this an intense and long-persisting aggravation of the normal reaction. The avoidance of this calamity in itself demands no little foresight and experience, and even despite the greatest precautions the trouble will occasionally occur. The difficulty is sometimes increased by the long incubation period, so to speak, of the dermatitis, which may develop its full intensity even so late as a fortnight after the last exposure.

In certain individuals there would appear to be some idiosyncrasy which renders them prone to excessive reactions of this type; on the other hand, with others it is remarkable how long they may be exposed to the tube without appreciable reaction. The occurrence of *x*-ray dermatitis may probably be best avoided by keeping the tube at a fair distance (8 or 9 in.) from the skin, and by ensuring short exposures (ten to fifteen minutes) and periodic rests from treatment. The moment the reaction appears to be too severe (which may be suspected if the redness of the unbroken skin becomes too vivid, or if increasing discomfort be complained of) the treatment should be at once suspended. I have found simple dressings of linimentum calcis relieve the pain in this condition as well as anything.

After the dermatitis has once healed there would appear to be some immunity against further outbreaks of excessive reaction, an immunity not to be explained by the increased precautions one would naturally take to avoid a recurrence. The apparatus I employed was modelled on the plan recommended by Schiff and Freund, whose methods I had the advantage of studying in Vienna in the autumn of 1900. Briefly, this apparatus consisted of a resistance board so arranged as to bring the main supply (at 100 volts) down to 12 volts; a mercury break, which could be regulated so as to give a wide range of alternations. As a rule, the apparatus was worked at the rate of 600 interruptions to the minute; about 4 or 5 ampères were used. The coil was capable of giving a 12" spark in air.

Next as regards the tube. Personally, I prefer this to be fairly "soft," and one giving plenty of green fluorescence.