

REMARKS ON FINSSEN'S PHOTOTHERAPY.

[WITH SPECIAL PLATE.]

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[In view of the interest excited at the Tuberculosis Congress held in Paris last year, and since then throughout the medical world, by the reports of the results obtained by Dr. Finsen of Copenhagen in lupus and some other affections by means of concentrated light, we invited Dr. Finsen to describe his methods and results in the BRITISH MEDICAL JOURNAL. Dr. Finsen asked his principal assistant, Dr. Bie, to undertake the task, and from him we have received the following paper. We are requested by Dr. Finsen to state that he has read the paper and fully approves of it.]

The readers of this JOURNAL know the name of Finsen from his red-light treatment of the exanthemata of the different eruptive diseases, especially small-pox (for instance, BRITISH MEDICAL JOURNAL, December 7th, 1895). More recently Dr. Finsen has devised another method, applying light for therapeutic purposes; the technique of this method is now so far perfected, and it has been tried in so many cases, that it deserves to be more extensively known.

Dr. Finsen's treatment of small-pox was, as is well known, founded on the following considerations:

As the "chemical" (blue, violet, and ultraviolet) rays of light are capable of causing an inflammation (erythema solare) of the healthy skin, it might be assumed that they would equally be capable of aggravating pre-existing inflammations. In other words, if the diseased skin be protected against the injurious action of the chemical rays of light, it will be possible to diminish the intensity of the inflammation, and thus prevent suppuration. The object is therefore to exclude the chemical rays of light which are injurious to the skin. In the new way of treatment devised by Finsen these rays are now used as curative agents. The method consists in treating local superficial bacterial skin diseases by the concentrated chemical rays of light.

The experimentally proved data on which the method is founded are the following:

1. The bactericidal property of the chemical rays of light.
2. The power of the chemical rays of light to produce an inflammation of the skin (erythema solare).
3. The power of the chemical rays of light to penetrate the skin.

1. THE BACTERICIDAL PROPERTY OF THE CHEMICAL RAYS OF LIGHT.

The bactericidal property of light, originally demonstrated by Downes and Blunt, has more recently been studied in detail by a great many investigators. The particular question which is of the greatest interest in this connection is the following: Whether the bactericidal property is essentially attached to a single part of the spectrum or whether it resides only in the whole uncoloured light. The most trustworthy examinations have given the result that it is especially due to the blue and violet rays. This view is supported by a series of researches which I have made with the improved physical apparatus of which "Finsen's medicinske Lysinstitut" disposes. At the same time I made this subject a matter of a quantitative examination. I pointed out that only a few per cent. of the effect of the light depend on the red, yellow, and green rays, and that the ultraviolet rays have a most powerful effect, a fact not previously determined. If it is desired to employ the bactericidal property of the light therapeutically, the greatest possible number of violet and ultraviolet rays must be procured. On the other hand, the red, yellow, and green are useless.

Another condition for the advantageous use of the bactericidal property of the light therapeutically is that the bacteria are quickly killed. In nearly all the first series of researches

several days, even months, elapsed before they were killed. This is, however, doubtless due to a defect in the way in which the experiments were carried out, for by using plate cultures with thin strata of nutritive media the light killed the bacteria in a few hours, and Finsen, for instance, found that on days of bright sunshine at noon in July and August in Copenhagen the sunlight killed the bacillus prodigiosus in plate cultures within one hour and a half of insolation. An electric arc lamp of 25 ampères killed a plate culture of the bacillus prodigiosus at a distance of 75 cm. from the carbon points after eight to nine hours' exposure.

Even the strongest sunlight in summer—which takes more than one hour to kill the bacteria in plate cultures, and probably still longer when they are growing in the skin—has then too slight a bactericidal property ever to be of any use for therapeutic purposes, otherwise all bacterial skin diseases would be cured spontaneously in the summer. In order to obtain a more energetic effect Finsen concentrates the light by means of apparatus, which will be described further on. It is only when the light is concentrated in such a way that it contains as many blue, violet, and ultraviolet rays as possible that its bactericidal property becomes so powerful that it can be used therapeutically with advantage. That concentrated electric light, which Finsen now uses for the treatment of patients, kills the bacteria till now examined in a few seconds when they are spread in a stratum of agar about $\frac{1}{2}$ mm. thick.

2. THE POWER OF THE CHEMICAL RAYS OF LIGHT TO PRODUCE AN INFLAMMATION OF THE SKIN.

The old name of erythema solare (erythema caloricum) proves that this disease was supposed to be due to a too intense heating of the skin consequent on the heat that always is inseparable from the light. Widmark (Stockholm) first experimentally showed the error of this view. He concentrated the electric light into parallel rays by means of a lens of quartz, and applied them to the skin, after they had passed either through a layer of distilled water, which absorbs the ultra-red rays (dark rays of heat) or through a glass plate, which absorbs a large part of the ultra-violet rays. It turned out to be immaterial whether the light contained the ultra-red rays or not; on the other hand, the absorption of the ultra-violet rays by the glass plate prevented completely the appearance of the inflammation. The experiments of Widmark prove, then, that the ultra-violet rays are of predominant importance in regard to producing light erythema. Later researches made by Finsen have confirmed this, and further he has proved that the blue and violet rays have also the power to produce the specific photo-chemical inflammation, but in a slighter degree than the ultra-violet rays. It is still impossible to decide finally of what importance this photo-chemical erythema is in regard to treating bacterial skin diseases with concentrated chemical rays of light; but that at any rate it is not quite insignificant for the treatment of lupus vulgaris may well be considered probable, in view of the trials made of other methods of treatment which tend to cause an inflammation of the skin.

3. THE POWER OF THE CHEMICAL RAYS OF LIGHT TO PENETRATE THE SKIN.

This point has been investigated by Godneff and Finsen. Godneff with a trocar placed small sealed glass tubes with muriate of silver under the skin of dogs and cats. Then he allowed some of these animals to remain in the dark, while he exposed the rest of them to the direct sunlight. After an hour he took out the tubes; and it was invariably found that the muriate of silver was blackened in those animals exposed to the sun, but not in those kept in the dark. The chemical rays of light can then penetrate the skin. Finsen thus proved that they penetrate far more easily in bloodless tissues than those filled with blood. He placed a piece of sensitised paper on one side of a man's ear, letting the blue and violet rays of one of his apparatus for concentration of sunlight fall on the other side of the ear. After five minutes this paper was not affected; on the other hand, the paper was distinctly blackened in twenty seconds if all the blood were pressed out of the ear between two glass plates. In agreement with this is the fact that by looking into a spectroscope through an ear filled with blood you will only

discover a red stripe; if the ear is made anæmic the spectrum will consist of all the colours. Accordingly the area of the skin that is going to be treated is made as anæmic as possible; later on I shall explain how this is done.

Based as it is on these three experimentally-proved facts this method of treatment is so rational that objections can scarcely be raised against it from a theoretical point of view. In the treatment of patients sunlight is used in the summer, when the sky is bright, otherwise the light of electric arc lamps of 50 to 80 ampères. As already explained, it is only by concentration that the light becomes so powerful that its bactericidal property can be used in treatment. In order to avoid burning the skin it is also necessary to cool the light. This double object—to make the light stronger and cooler—is attained in regard to the sunlight, by an apparatus such as is shown in

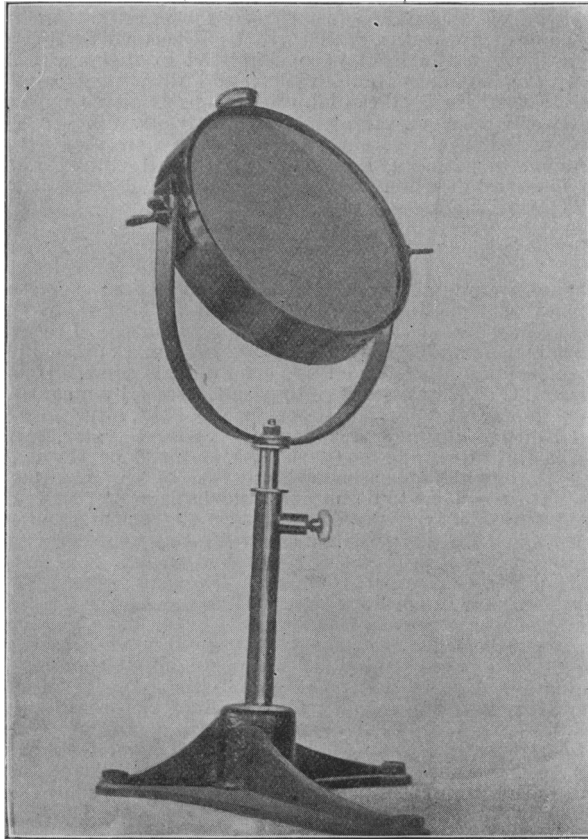


Fig. 1.—Apparatus for treatment by sunlight.

Fig. 1. It consists of a lens of about 20 to 40 cm. in diameter. The lens is composed of a plain glass and a curved one, which are framed in a brass ring, and between them there is a bright blue, weak, ammoniacal solution of copper sulphate. As one surface of the liquid is plain, the other one being curved, its optical function is that of an ordinary plain convex glass lens. By making the lens of a blue liquid instead of solid glass a considerable cooling of the light will be obtained, because water absorbs the ultra-red rays, and because the blue colour excludes a considerable amount of the red and yellow rays. These three kinds of rays have particularly strong heating effect, while their bactericidal power is insignificant. On the other hand, the blue, violet, and ultra-violet rays, which it is important to procure in as great a number as possible, are but very slightly impaired by passing through the blue liquid. The lens hangs on a foot, made in such a way that the lens can be raised and lowered as well as turned on a vertical and horizontal axis; therefore it is easy to place the lens perpendicularly on the sun rays, and at such a distance as to make the light strike the area of skin which it is intended to treat.

Fig. 2 shows a longitudinal section through an apparatus for concentrating the electric arc light. It consists of lenses of quartz (*a*, *b*, *g*, and *n*) framed in two brass tubes (*a-e* and *c-n*), which can be moved, the one into the other, like the two pieces of a telescope. Lenses of quartz are used because this material in a far higher degree than glass allows the ultra-violet rays of shortest wave length to pass through, and it is just the ultra-violet rays that have a considerable bactericidal effect. The apparatus for concentrating the sunlight may, on the other hand, be made of glass, because all the ultra-violet rays of the sunlight have so long a wave length that they can pass through glass; those of a shorter wave length are already absorbed by the atmosphere.

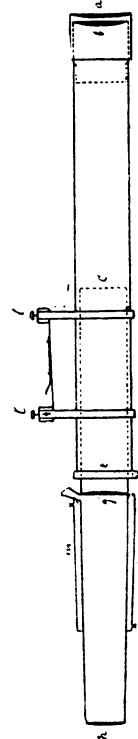


Fig. 2 Magnification 1:10.

In the part of the apparatus which faces the lamp, two lenses are placed (Fig. 2, *a* and *b*) that have together a focal distance of 12 cm.; when the apparatus is placed in such a way that the first lens (*a*) is exactly at this distance from the points of the carbons of the lamp, they consequently will concentrate the divergent rays coming from the lamp and make them parallel; these rays pass through the brass tubes, at the distal end of which they meet again with two lenses of quartz (*g* and *n*), which concentrate the parallel rays, making them convergent in such a way that they are united about 10 cm. outside *n*. Between these two lenses—*g* and *n*—there is distilled water, which cools the light by absorbing the intensely heating ultra-red rays, but does not impair the blue, violet, and ultra-violet ones. It is not possible, as in the apparatus for the sun, to make the water blue in order to cool the light further, because the extreme ultra-violet rays, which abound in the electric light, may well pass the quartz, but get absorbed by the blue colouring matters; the advantages of using the lenses of quartz would consequently be lost if the light got cold through a blue solution. Of course the distilled water between *g* and *n* gets heated by the absorption of the ultra-red rays. In order to avoid too much heating (boiling) cold ordinary water may be run through the mantle (*m m*) surrounding this end of the apparatus.

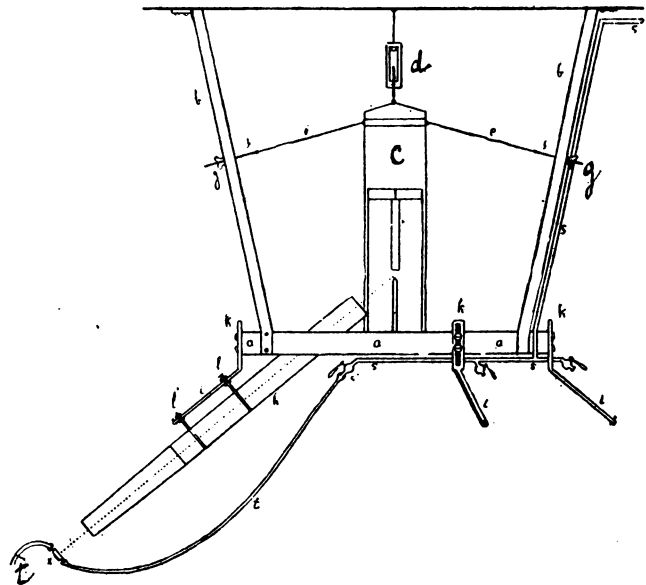


Fig. 3 (Magnification 1:20).

Four such apparatus for concentrating are fixed to an iron ring (Fig. 3, *a a*) round each lamp (*c*), this ring again being



Fig. 6.—Treatment by sunlight.

fixed to the ceiling by four iron supports (*b b*). The lamp is movable up and down by the mechanism *d*, and can be put exactly into the centre of the ring by the aid of four strings (*e e*), which are connected with screws (*f-g*) in the iron support. The apparatus for concentrating hangs on iron arms (*k-i*), fastened to the ring (*a a*), and hang from this at an angle of about 45° , because the lamp sends out the strongest light in this direction; the apparatus for concentrating can be put nearer to or further from the lamp by sliding on the iron arm. By this disposition the lamp and the apparatus for concentrating can be fixed so that the points of the carbons are exactly in the focus of the front lenses of all the four apparatus. The apparatus for concentrating can be revolved on a perpendicular axis and a horizontal one by three screws at *l'*; by this they can be so placed that the axis of the apparatus gets fused with the axis of the parallel rays, so that no light is striking the brass cylinders. The distant focus can be placed at the height which suits the patient by pushing the lowest cylinder (Fig. 2, *n-c*) into the uppermost one (Fig. 2 *a-e*) of the concentrating apparatus.

Through the two forms of apparatus for concentrating already described the concentration and cooling of the light are thus affected. But the light is still too warm to be applied to the skin without hurting it; the skin must therefore be cooled in order to avoid burning. This is effected by a little apparatus (*x* in Fig. 3) shown in Fig. 4. It consists of a plate of quartz and a plain convex lens of quartz, both framed in a conical brass ring, which carries two small tubes and four arms; to each arm is fastened an elastic band, by means of which the apparatus is pressed against the skin. By making cold water run (through *s-s* and *t-t* in Fig. 3) into one of the tubes and out of the other one, the skin would be cooled to such a degree that it can stand even the strongest light. By the pressure which the plano-convex quartz lens excites on the skin this is

made anæmic, so that the chemical rays penetrate it much better, as I have described already.

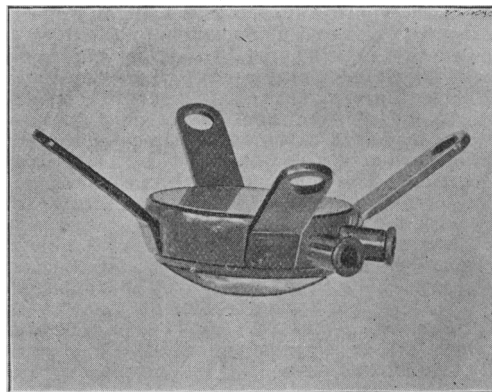


Fig. 4.

In this manner an area of skin of about $1\frac{1}{2}$ centimetre in diameter is treated for one hour every day. The treated skin reddens and swells, a bulla may appear, but necrosis has never been observed. Figs. 5, 6, and 7 show the arrangement of the treatment.

We have tried to treat different skin diseases known or supposed to be of microbic origin, but it is only of lupus vulgaris, lupus erythematosus, and alopecia areata, that we have treated a number of cases large enough to estimate the value of the method.

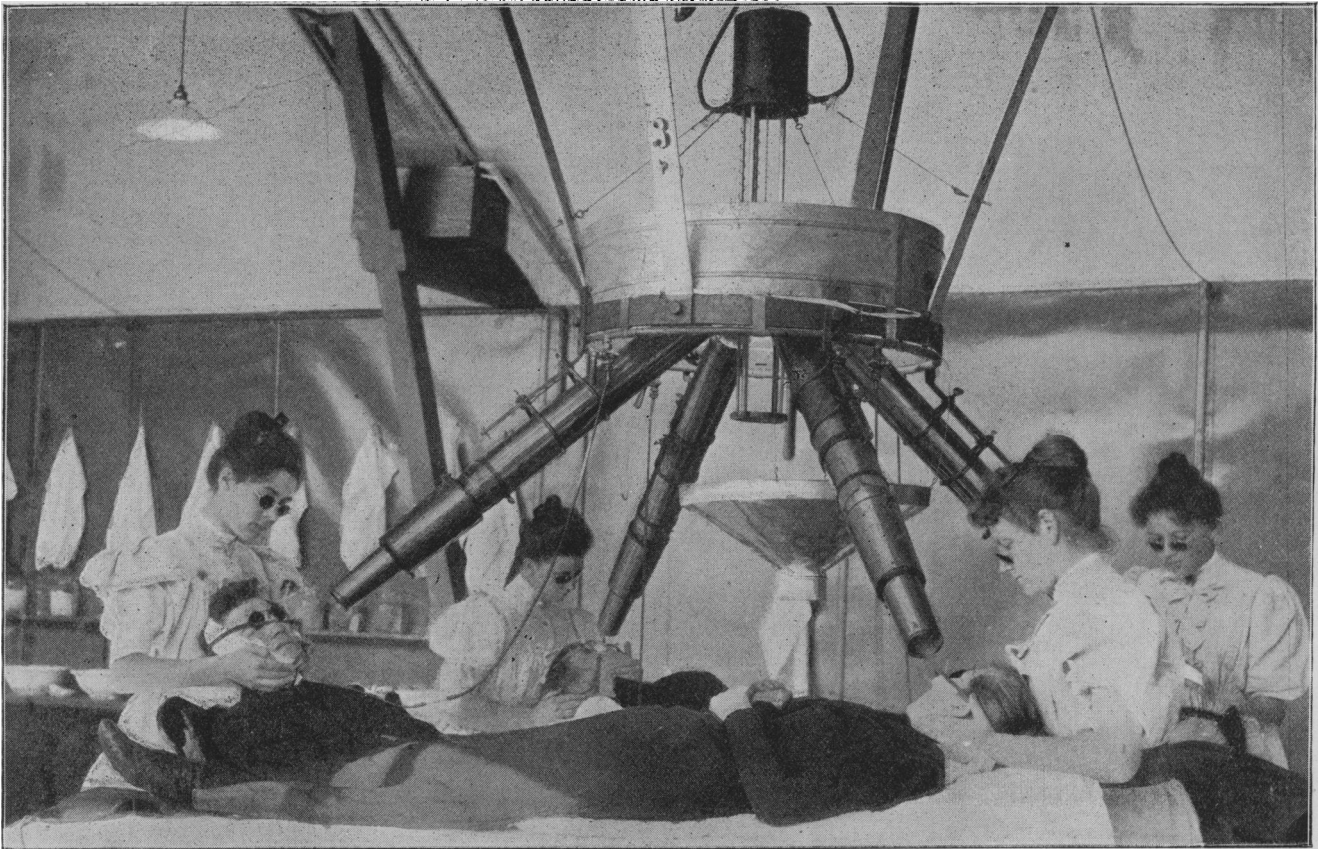


Fig. 7.—Treatment by electric light.

LUPUS VULGARIS.

Some 1350 cases of this disease altogether have been treated. The first patients were treated entirely by light; the same thing is done with all the slighter cases; on the other hand, in the more serious cases the treatment by light is assisted by treatment with pyrogallic acid ointment, in order to make the skin as smooth and easily penetrable by the light as possible. While one part is being treated by light, the pyrogallic acid ointment is put on another part; when the cauterisation is healed by a zinc ointment this area of skin is treated by light; this treatment with ointment is not necessary for obtaining a good result, but it saves much time for the patient. All ulcerations are kept free from crusts by a cataplasm of a boric acid solution. The mucous membranes are touched with a solution of iodine and iodide of potassium (1:2:2), or are treated with the galvano-cautery.

For the present, at least, only the skin, the hard palate, the front part of the septum nasi, tongue, and the mucous membrane of the cheek, can be cured by this method. In none of the cases has the treatment been quite without effect, but in about 5 cases the improvement was very slow, either because the disease was progressing so rapidly that it was extending in one place while the treatment went on in another, or because the lupus was so deep that the light could only with difficulty penetrate to it. In all the 350 other cases the result of the treatment has been satisfactory. Of course it takes some time—until all the diseased tissue is thoroughly treated and the formation of scar tissue has begun—before any improvement is visible; but from the moment it begins it is continued without interruption until the last nodule of the lupus patch has disappeared. In all these 350 cases this result has been so certain and so constant that there is even reason to doubt the accuracy of the diagnosis of lupus vulgaris when this method of treatment appears to be ineffective.

I do not propose to give any statistics of the results of the treatment. Statistics are always dangerous things, and

especially in this case it would be difficult not to give a wrong picture of the facts by mere numerical statement. Indeed, I think that one must not only know the number of the cases but also their nature in order to judge what excellent results this treatment of lupus yields. Among the patients that have been treated up to this time there are a disproportionally large number of severe cases, because the medical men of this country very soon gained confidence in the method, and

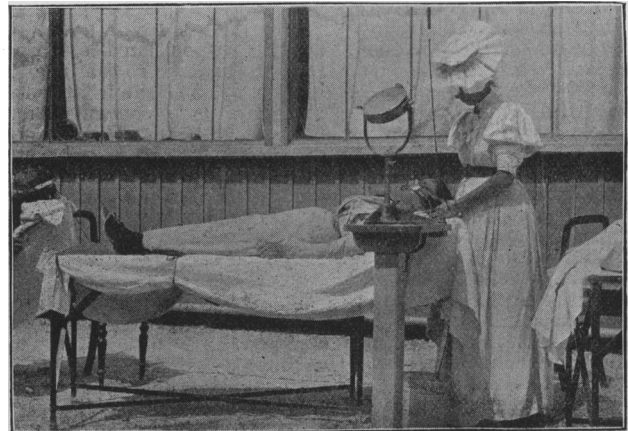


Fig. 5.—Treatment by sunlight.

therefore send to us a number of patients whom they had given up treating. The clinic of the institute has received all the patients who have applied except a few suffering from a very widespread lupus of the mucous membranes, and only from a localised lupus of the skin, which had nearly ceased, and had caused much destruction. Moreover, it would be



Fig. 8.—No. 192. Before the treatment.



Fig. 9.—No. 192. After the treatment.



Fig. 10.—No. 84. Before the treatment.



Fig. 11.—No. 84. After the treatment.

TO ILLUSTRATE DR. BIE'S PAPER.



Fig. 12.—No. 143¹ Before the treatment.



Fig. 13.—No. 143. After the treatment.



Fig. 14.—No. 177. Before the treatment

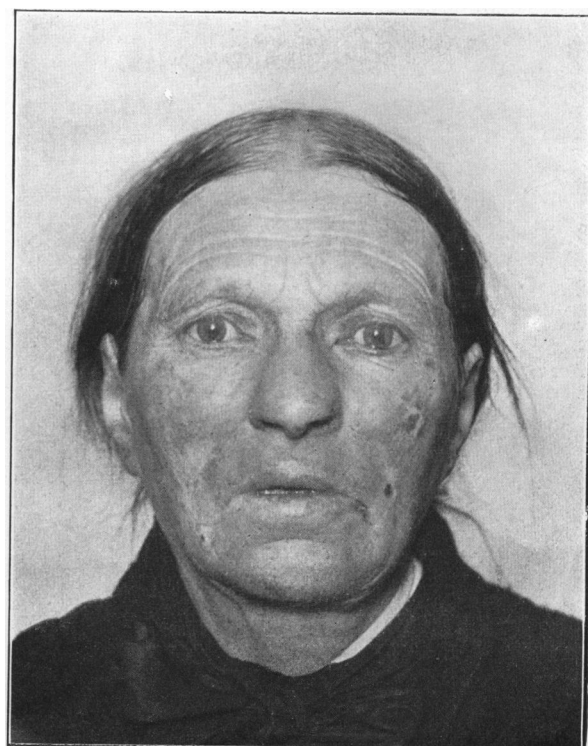


Fig. 15.—No. 177. After the treatment.

TO ILLUSTRATE DR. BIE'S PAPER.

very difficult to group the cases definitely in the categories "cured" and "not cured," if for no other reason because it is a matter of individual judgment how long a time of observation may be required. The intermedial groups: Better, much better, etc., depend too much on subjective opinion to lend themselves to mathematical computation. It must further be taken into account that until a year ago apparatus was used the bactericidal effect of which was quite insignificant compared with that of those now employed, because the lenses were of glass instead of quartz, but, of course, it would be quite unreasonable to make statistics only of the patients that have been treated during the last year.

I hope, however, that our readers will get an impression of the excellent results of the method of treatment through the following extracts of the histories, and from the illustrations.

No. 192 (Fig. 8), 30 years old. *Lupus vulgaris faciei et cavitatis nasi*. The patient has been suffering from *lupus vulgaris* fifteen years. Previous treatment: (1) cauterisation of the lupus; (2) homœopathic treatment; (3) scraping out and thermo cauterisation during three years. The disease was progressing very slowly just before the beginning of the treatment. The extent of the disease is seen in Fig. 8. The affected places were swollen and red. Everywhere numerous nodules, partly confluent with crusts and small ulcerations, no large ulcers. A number of disseminated nodules in the healthy skin. There was an extensive but almost quiescent *lupus cavitatis nasi*.

June 1st, 1898. Treatment by light with a quartz apparatus and a lamp of 50 ampères one hour a day. For the mucous membrane of the nose: Compresses saturated with a solution of perchloride of mercury and touching with a solution of iodine and iodide of potassium (1:2:2) once a week.

September 30th. Steady improvement. No ulcers at present. The skin of the nose seems to be healthy. Everywhere good scar tissue; hardly any nodules visible.

October 25th. No distinct nodules. Treatment discontinued.

November 15th. (Fig. 9) Everywhere the scar tissue is smooth and but little visible. No distinct nodules.

January 19th, 1899. Letter from the patient's doctor. No relapse.

No. 84 (Fig. 10), 23 years old. *Lupus vulgaris faciei, cavitatis nasi et manus dextræ, phthisis bulbi dextræ; spina ventosa digiti iii sinistri*. The patient has been suffering from *lupus* for seven years. Previous treatment: (1) ointment; (2) scraping, several times repeated; (3) touching with iodine. There was *lupus* on both sides of the face and of the right hand. The extent of the disease on the left part of the face was about the same as on the right half of the face, as shown in Fig. 10. The dorsum of the right hand was affected to the half of its extent, and still a part of the right fourth finger and the fifth one. The *lupus* consists of ulcers, covered with crusts, and of disseminated non-ulcerated nodules. The right *ala nasi* was almost quite destroyed.

October 18th, 1897. Light-treatment of the face, alternating every two days with lamps of 35 ampères and glass apparatus during two hours, and lamps of 50 ampères and quartz apparatus during one hour.

February 19th, 1898. Hardly any improvement.

March 8th. A slight improvement only.

April 13th. Good improvement. The apex *nasi* is not ulcerated. The ulcers of the cheeks are less numerous, small and superficial.

May 17th. The affection of the face is constantly improving, no ulcers, a few disseminated nodules.

June 15th. Light-treatment one hour every day with a lamp of 50 ampères and a quartz apparatus.

August 18th. The affection of the face apparently cured. No distinct nodules.

October 25th. A fine scar tissue everywhere in the face. Still a few doubtful patches. Treatment discontinued.

November 11th. The scars on the face are sound, only two small solitary nodules on both cheeks. Light-treatment a few times.

May 24th, 1899 (Fig. 11). Everywhere a smooth and pale scar tissue; the small scars are but very little marked. On the right cheek three small, fresh, and doubtful nodules; otherwise no nodules.

The right hand is treated by light (a lamp of 50 ampères and a quartz apparatus) from October 25th, 1898, till January 16th, 1899; in addition a pyrogallol acid ointment is applied five times, three days.

May 24th, 1899. The hands were covered with a smooth scar tissue still a little red, but without any nodules.

No. 143 (Fig. 12), aged 22. *Lupus vulgaris faciei et laryngis*. The patient has been suffering from *lupus* about six years. Previous treatment: (1) ointments; (2) cauterisation; (3) excision with transplantation three times; (4) scraping. The disease had been spreading quickly shortly before the treatment. The affected part was much infiltrated, of a deep livid colour. There were many irregular partly confluent ulcers, flat, with prominent granulations. The skin between the patches was thin, smooth, and shining. On the nose only a few nodules; they were somewhat more numerous on the margin on the cheeks and the lips. The greater part of the cartilaginous structure of the nose was destroyed. The upper lip was much infiltrated, the prolabium somewhat crusty, but it seemed to be free from *lupus*. The gums at the incisor teeth were swollen.

February 19th, 1898. Light-treatment, alternating every two days with a lamp of 50 ampères and a quartz apparatus during one hour, and a lamp of 35 ampères and a glass apparatus during two hours. Tampons with a solution of perchloride of mercury in the nose.

April 6th. Considerable improvement, less redness and infiltration, only a few ulcers. The upper lip not swollen any longer.

May 25th. Steady improvement, hardly any ulcers; the swelling and redness are disappearing; only a few nodules.

June 15th. Light-treatment every day during one hour by a lamp of 50 ampères and a quartz apparatus.

August 18th. No ulcers; only on the *ala nasi* a few brownish patches; no distinct nodules. Treatment discontinued.

Next time the patient was examined, on November 15th, 1898, the skin was smooth everywhere, the scar tissue fine. There was only one nodule on the right side of the nose and one on the right cheek; these were treated a few times. Since treatment was left off in August an ulcer had developed on the right side of the prolabium of the upper lip; it is seen on Fig. 13; the photograph was taken on November 15th, 1898. The whole right part of the upper lip was swollen. This ulceration was very obstinate; it was treated during a certain time by light in December, 1898; and since then by galvano-cauterisation twice; it was also scraped once. It has now diminished to about the size of a pea.

February 2nd, 1899. A little brown nodule was observed on the left *ala nasi*; it disappeared by galvano-cauterisation.

May 3rd. The scar tissue of the skin is fine; there are no nodules.

No. 177 (Fig. 14), aged 65. *Lupus vulgaris faciei et cavitatis nasi*. The patient had been suffering from *lupus* for ten years. Previous treatment: scraping three times during the first year of the disease; later at irregular intervals. There was a very considerable infiltration and hypertrophied granulations. Everywhere irregular, nodular ulcers were visible, forming large, confluent surfaces, between which nodules of the size of a pea. In the neighbourhood numerous nodules and small ulcers.

April 18th, 1898. Light-treatment, alternating every two days with a quartz apparatus, and a lamp of 50 ampères during one hour, and with a glass apparatus and a lamp of 35 ampères during two hours.

From June 15th. Light-treatment with a quartz apparatus and a lamp of 50 ampères every day during one hour. The treatment was continued till October 17th. In addition pyrogallol acid ointment was used in some of the periods, when the affected parts were not treated by light, altogether six times on the right cheek, four times on the left, and once on the nose. The treatment by ointment lasted every time about three to four days.

October 17th. Treatment discontinued. There was everywhere a smooth, soft scar tissue; no distinct nodules.

December 3rd. Letter from the patient's doctor: "On the margin of the left *ala nasi* a tiny ulceration, covered with crusts, with doubtful nodules. The remaining part of the affected area, the nose as well as the cheeks, is covered with a smooth scar tissue."

January 13th, 1899 (Fig. 15). Note made in the clinic of the Institute. There is a smooth, rather bright scar tissue everywhere; the left cheek is the best, with only a few nodules; on the right cheek also but a few nodules; but, besides, some suspicious spots of pigmentation. On the root of the nose a couple of superficial small nodules; the soft part of the nose is a little swollen and red; there are some deep spots of pigmentation; on the margin of the left nostril a few small ulcerations. In the interior of the nose *lupus* still exists. Light-treatment with a quartz apparatus, and a lamp of 70 ampères one hour every day.

February 17th. Treatment discontinued.

March 19th. Letter from the patient's doctor: "Quite well at present; no sign of relapse."

The principal advantages of the method are, besides its reliability, its excellent cosmetic results, the infrequency of relapses and their slight extent, and the fact that the treatment is painless.

The good cosmetic result is due to the fact that there is no destruction of tissue, healthy or diseased. It is for the same reason that the results in respect to relapse are so favourable. One may, without harm, treat both the diseased tissue and the apparently healthy surrounding skin until one is fairly sure of having destroyed all the disease germs. When the patient has been treated till there are no distinct nodules of *lupus* to be seen at the moment, the treatment is discontinued, till the swelling and redness of the skin have disappeared, so that it is easier to determine whether anything is left of the disease or not. If there is nothing visible, the patient is still kept under observation. Many have, however, to be submitted to a second course of treatment. Whether the nodules which develop are the result of recurrence, or whether they could not earlier be recognised as *lupus* nodules, is a matter of little consequence in itself. The principal thing is that there have always till now been a few scattered nodules, which disappear after a short further course of treatment.

If the treatment is carried on for some time after the last nodule of *lupus* seems to have disappeared, recurrence would be more surely guarded against. The fact that the treatment is discontinued as soon as we think it justifiable to do so is due solely to the desire to save the time and the money of the patients as far as possible. Inasmuch as the efficacy of the treatment is absolutely certain, and the patients, on account of its painlessness, are very willing to submit themselves to a second course, a recurrence is not nearly so serious a matter as it is after the older methods of treatment.

LUPUS ERYTHEMATOSUS.

The treatment of this disease has in many cases given excellent results—permanent recovery and firm scars. Nevertheless, the effect of the treatment is not nearly so sure as it is in the case of *lupus vulgaris*. A few cases have improved

very slowly and with a constant tendency to recurrence. What the cause of this great individual difference may be it is still impossible to determine, if for no other reason because we have not a sufficiently large material (altogether only 28 patients).

ALOPECIA AREATA.

As the indication for the treatment by concentrated chemical rays of light is that the disease must be superficial, local, and bacterial, and as it is at least possible that alopecia areata is due to an infection, we have tried to treat this disease. In January, 1899, when the first experiments were published in Danish, 7 cases altogether had been cured. The following are the notes of one of the cases:

No. 65, aged 15. In the beginning of June, 1897, the patient noticed a bald spot about 1 cm. in diameter, which was steadily increasing. When the treatment began on September 3rd, 1897, there was a large completely bald spot of 6 by 4 cm. After shaving the areas immediately surrounding, the patient was treated eight times for about half an hour from September 3rd till September 24th.

October 4th. Lanugo hair on the patch.

November 5th. A normal growth of hair.

January 12th, 1898. A bald spot of 2½ by 2 cm. is seen.

Treatment five times one hour from January 12th to 16th.

January 22nd. Fine small hairs.

March 29th. The growth of hair is as vigorous as on the rest of the scalp.

October 22nd. Unchanged.

On the whole the trials made till now look promising. Whether all the fresh cases will give results as satisfactory as in that described can be solved only by further experiments. To judge from the later experiments, even the old decalvans forms seems to be curable, though only after a long treatment. Besides the practical interest attached to these experiments, they have the theoretical interest that they decidedly support the theory of the infectious origin of alopecia areata.

SIXTY-SEVENTH ANNUAL MEETING

OF THE

BRITISH MEDICAL ASSOCIATION.

Held at PORTSMOUTH, August 1st, 2nd, 3rd, and 4th, 1899.

PROCEEDINGS OF SECTIONS.

SECTION OF ANATOMY AND PHYSIOLOGY.

Professor J. J. CHARLES, M.D., President.

THE INTERACTION BETWEEN THE OVARIES AND THE MAMMARY GLAND.

By STANLEY BOYD, M.B., F.R.C.S.,
Surgeon to Charing Cross Hospital.

THE title of this discussion is somewhat misleading; it really gives no idea of what I have to bring before you. I do not know that the breast influences the ovary in any way. Until lately I did not know that the ovary specially influenced the breast; but the cases which I am about to mention and others have shown me that the ovaries sometimes influence malignant growths starting from mammary epithelium.

In May, 1896, Dr. Beatson, of Glasgow, showed a very remarkable case, in which inoperable recurrent cancer of the breast had disappeared apparently as the result of removal of both ovaries and administration of thyroid extract. I was one of the earliest to try this treatment; but I employed the oöphorectomy alone, not giving any thyroid, at all events until the full effect of the oöphorectomy was apparent.

I will first illustrate by three cases the results of oöphorectomy in recurrent cancer mammae.

The first case was a woman of 45, with cancer of rather chronic type. In June, 1896, in a vain endeavour to rid her of a nodule fixed to the thorax, I excised the fourth and fifth left costal cartilages, exposing the pericardium and pleura. Finding an infected gland in the anterior mediastinum, I removed it, and, feeling that the case was hopeless, I gave up the idea with which I started, of removing her great pectoral, in which there was a large nodule, and clearing out the axilla.

Three months later the mass in the pectoral was larger, and the hollow left by the removal of costal cartilages had become so densely infiltrated with cancer that no cardiac impulse could be felt. Health and strength were good.

On December 22nd, 1896, both ovaries were removed, menstruation having been regular to date. Relief of pain, diminution of the general fullness of the pectoral region, and lessened vascularity of cutaneous nodules were evident after a week. In a month some skin lesions had gone, and much cancer had disappeared from the floor of the hollow over the heart, so that the cardiac impulse was again clear. The mass in the pectoral moved much more slowly, whilst some subcutaneous nodules were intermediate. In eight months all cancer seemed to have gone from the floor of the precordial depression; the last subcutaneous nodule had all but disappeared, but the pectoral nodule, reduced to the size of a filbert in its shell, seemed to be stationary. Again and again I wished I had removed the pectoral. For nearly a year it remained about the same in spite of various changes of air, excellent general health, and a short exhibition of thyroid, abandoned because it soon caused dyspnoea and palpitation. But about eighteen months after the oöphorectomy it made a fresh start and all but disappeared. In June last, twenty-eight months from the oöphorectomy, her general health and condition were perfect, and all that remained besides the scars to indicate where cancer nodules had been was a slight difference to sight and touch in the supraclavicular and infraclavicular fossae on the bad side.

I will next describe an instance of partial success; it was one of acute cancer in a woman of 37. I removed her ovaries in February, 1897. In a week diminution of vascularity was noted, and the hindermost of the three lowest nodules was the smallest, whereas it had been the largest. Disappearance of all lesions went on quickly. In a month the gland above the clavicle could no longer be seen, and the ridge below the clavicle had subsided, because the nodule which raised it was reduced to a mere plaque. Flesh was put on and strength gained. Six months after oöphorectomy there was nothing unhealthy in her appearance, and her chest wall seemed free from cancer. But careful inspection showed faint pink spots where nodules had been; they were slightly thickened, and reddened on handling. I could feel no enlarged gland, and only indefinite thickening at the site of a nodule in the pectoral. But while improvement was occurring in many parts, it was not so everywhere; a fresh nodule had appeared near the scar. For three months a growth in the left breast had diminished markedly, and a gland above it had disappeared; it had now trebled its size, and three glands could be felt above it. She continued to gain flesh (12 lbs. in all) and strength for another two months, although recurrence was taking place in old and some fresh sites. Thyroid was now given for a month, the only obvious result being the loss of 5 lbs. She died seventeen months after the oöphorectomy, with very numerous subcutaneous nodules and growths in liver and left clavicle.

Lastly, I will describe a failure.

Mrs. B., 46, three years' growth; whole breast involved and very large, affecting the skin widely, fungating and sloughing freely, and adherent to the pectoral; the axilla blocked by a hard mass, not quite fixed to the chest wall; great weakness and cachexia; no evidence of visceral growth. I performed oöphorectomy, and removal of breast and pectoral, and clearing out of axilla. Unfortunately the wound suppurated. Recurrence took place before it healed, and although considerable improvement in health resulted at first she died ten months after the operation.

Dr. Beatson has recorded a case of complete disappearance, and Dr. Herman two cases, and marked improvement occurred in a case of Beatson's and in one of Watson Cheyne's—7 cases out of a total of 17, which includes all the cases of the surgeons mentioned as well as my own. So this atrophy seems to occur not very rarely, but the numbers are too few for any accurate estimate.

Now, in all these cases, other than my own, thyroid extract was given after the oöphorectomy, so it is necessary to consider whether it is an important factor in producing the result. It cannot be essential, because as great success can be obtained without it as with it, as I have just shown. Dr. Beatson added thyroid to the oöphorectomy as a "power-