

A YEAR'S EXPERIMENT IN THE TREATMENT OF TUBERCULOSIS
BY
THE CARBON ARC LAMP
AT
HAIRMYRES COLONY, EAST KILBRIDE.

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Within recent years an additional weapon in the fight against the scourge of Tuberculosis has been added to our armamentarium in the form of the scientific application of sunlight, first of all, and later, sunlight artificially produced by various types of lamps and administered in a variety of ways. The value of sunlight as a therapeutic

ARTHUR ANDERSON, M.A., M.B., Ch.B.,

Hairmyres Colony,

EAST KILBRIDE.

carrying his experiment further, he reached the conclusion that the ultra-violet rays of the spectrum had the strongest effects, that the light of the Carbon Arc Lamp was much richer in these special rays than the sun, the rays of which were, to some extent, absorbed by the atmosphere in their passage to earth - consequently he brought into use the Carbon Arc Lamp alone. In Switzerland, on the other hand, in a clear dry atmosphere with abundance of sunlight, we find Rollier at Leysin securing undoubtedly astonishing results in the treatment of a variety of tuberculous lesions by direct Heliotherapy. In our Islands, Sir Henry Gauvain at Alton has brought to the aid of Surgery the healing qualities of sunlight with excellent results.

In Scotland, where the atmosphere is decidedly moist, and where weather conditions are so markedly uncertain, that a prescribed period of good sunshine can never be expected/

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Within recent years an additional weapon in the fight against the scourge of Tuberculosis has been added to our armamentarium in the form of the scientific application of sunlight, first of all, and later, sunlight artificially produced by various types of lamps and administered in a variety of ways. The value of sunlight as a therapeutic agent in Tuberculosis has been appreciated for centuries. A great debt is due to the late Professor Finsen, who was the creator of and pioneer in this form of treatment. The work, of which he laid the foundations, has been carried on conscientiously and energetically by his disciples in Denmark and by Bernhard and Rollier in Switzerland - amongst many workers in this field of medicine we owe much to Rollier of Leysin, who has worked out the problem of Heliotherapy in large practice and brought to us, by practical example, a full appreciation of the medicinal and curative properties of sunlight in the treatment of Tuberculosis. Finsen first of all used the sun as a source of light, but realising that in all countries a sufficiency of pure sunlight was an impossibility, he proceeded to derive an equivalent light from artificial sources. As his source of artificial sunlight he chose the Carbon Arc Lamp. In carrying his experiment further, he reached the conclusion that the ultra-violet rays of the spectrum had the strongest effects, that the light of the Carbon Arc Lamp was much richer in these special rays than the sun, the rays of which were, to some extent, absorbed by the atmosphere in their passage to earth - consequently he brought into use the Carbon Arc Lamp alone. In Switzerland, on the other hand, in a clear dry atmosphere with abundance of sunlight, we find Rollier at Leysin securing undoubtedly astonishing results in the treatment of a variety of tuberculous lesions by direct Heliotherapy. In our Islands, Sir Henry Gauvain at Alton has brought to the aid of Surgery the healing qualities of sunlight with excellent results.

In Scotland, where the atmosphere is decidedly moist, and where weather conditions are so markedly uncertain, that a prescribed period of good sunshine can never be expected/

expected, the scientific application of sunlight as sun's rays in the treatment of Tuberculosis is a very difficult and disheartening problem. In this Institution, Heliotherapy has been rigorously attempted during the summer months - our children being gradually exposed to the rays of the sun, by a system of carefully graduated exposure of five minutes gradually increased to one and a half hours daily - when complete bodily exposure is reached; each child lying on a stretcher wearing only a loin cloth and a sun bonnet. The results have not been at all decided, since on occasions, several weeks have had to elapse between exposures, owing to inclement weather conditions. In fact, during the year 1923, only twenty-five days were suitable for this direct form of Heliotherapy. In view of the fact then that no expectation could be held of sustained Heliotherapy, such as is maintained by Rollier at Leysin, an attempt was made, in March 1923, to put into application the treatment of various forms of Tuberculosis as met with under Colony conditions here, by means of the Carbon Arc Lamp, and I propose to consider the results obtained in the different types of cases treated from March 1923 to March 1924.

The treatment has been carried out in a room 20' x 20' x 10', with walls white enamelled, in fact, with, as far as possible, a complete white interior, in order to prevent absorption of light by any dark object, and to allow the patients exposed to the lamps the full value of the ultra-violet rays available. The rays are supplied by four Crompton Open Arc Lamps of 10 amperes each, arranged in series with a line resistance and a voltage of 200. In order to strike the arc and to vary its length, the lamps depend on the joint action of shunt and series solenoids. The carbon holders with positive carbons of 18 millimetres in diameter, and negative carbons of 12 millimetres in diameter, float normally under the control of the shunt and series coils. When the adjustment thus obtained is no longer sufficient, a clutch permits the carbons to slip together by their own weight, after which the regulating coils again take up the fine adjustment. In order to steady the arc, the positive carbon is cored with a soft pure grade of carbon. These lamps are suspended in line from a metal beam which can be raised or lowered as desired by means of weight and pulley.

Eight patients are treated at one sitting, arranged on chairs placed in two rows, each four parallel to the lamps, which of course are central. The patients are seated one metre distant from the carbons. On the first day of treatment the/

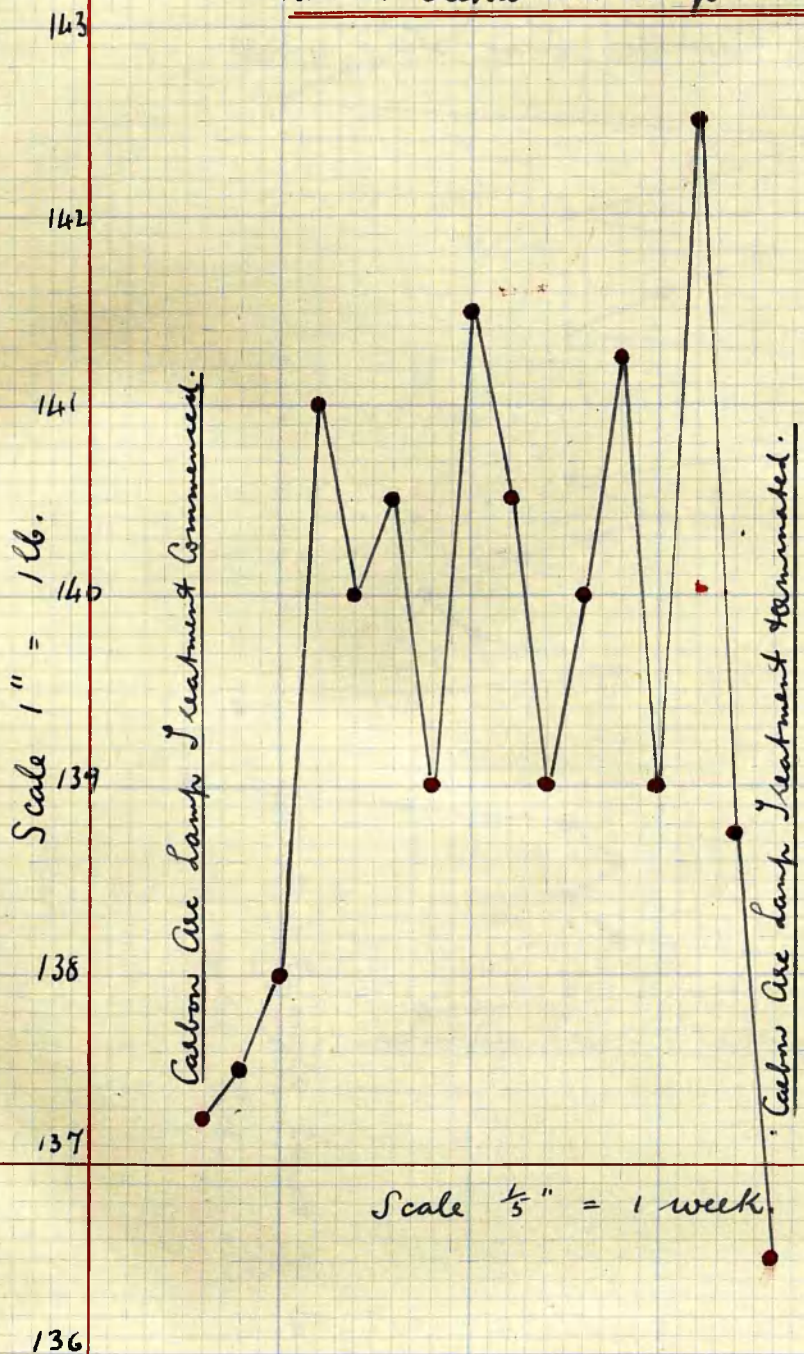
the lower limbs and abdomen are exposed to the rays, and on the second day complete bodily exposure is the rule - each patient being clad only in a pair of white cotton pants serving the role of loin cloth, and wearing dark glasses for protection to the eyes, which become painfully inflamed if exposed directly to the light. The initial exposure is 30 minutes and is increased daily by 30 minutes until a daily exposure of two and a half hours is reached. This is maintained for the desired period, all other things being equal. Since the object aimed at is not irradiation of affected parts only, but of the body as a whole, the treatment being general and not solely local, the patients turn through a quadrant of a circle every fifteen minutes, so that all parts possible are reached by the rays. Temperature and pulse readings are carefully taken on each occasion in the lamp room before the lights are set in action, and again at the termination of the day's exposure, immediately the current is switched off. A third reading is made two hours later. This, in my opinion, affords one gauge of the reaction of the individual to this form of treatment. In the case of sores to which have been applied preparations of an emollient nature, care is taken to remove all trace of such before exposure, in order to allow more thorough ultra-violet ray penetration. Discharging sinuses are freely exposed to the light, and, so far, no detrimental results have followed this method. A temperature of 99° - 100°F. at commencement of exposure is regarded a contra indication - 99°F. being regarded under Colony conditions here as of clinical significance - the usual daily variation in our patients being 97°F. to 98°F. or 98.4°F. Elevation of temperature to 100°F. at termination of exposure is regarded as an indication for caution, either towards temporary cessation or a shorter daily exposure. On occasions, treatment and also results which boded well have been brought to an ignominious close by the departure of a patient from the Colony, either at his or her own request, or as a punishment for breach of regulations, so necessary in a working Colony for the maintenance of discipline. Cases of Tuberculosis, other than Pulmonary, have, in the majority of cases, fully appreciated the benefits derived from this form of treatment, and have courageously borne the monotony of two and a half hours daily exposure - Pulmonary cases have been more difficult to deal with, becoming early discontented and grudgingly sacrificing two and a half hours for their daily exposure. In an Institution of this kind in Lanarkshire, the majority of our patients come from Industrial areas, and with such patients, and I speak especially of adult males, great difficulty is experienced, from time to time, in convincing them of the value/

value of this or of any other form of treatment. Married men especially constitute a problem - many of them considering, in spite of advice to the contrary, that three months sojourn in a Colony, even with leave each Saturday afternoon and overnight and week-end leave alternate months, is a sufficiently long period. That is one great obstacle experienced in pursuing what may be a prolonged period of treatment. In the case of children, on the other hand, an over solicitous or ignorant parent may interrupt what promises to be an excellent result.

During the year 1923 - 1924 patients selected for irradiation by the ultra-violet rays of the Crompton Open Arc Lamp included cases of Pulmonary Tuberculosis, of Glandular Tuberculosis, with or without abscess formation or discharging sinuses, of Osseous Tuberculosis with discharging sinuses, of Cutaneous Tuberculosis, and one case of Laryngeal Tuberculosis associated with definite Pulmonary involvement.

To inaugurate the experiment, eight adult males were chosen. Each was afebrile and was performing some manner of graduated labour from two to three hours daily in the forenoon - treatment being carried out in the afternoon from 2 p.m. until 4.30 p.m. A period of approximately four months exposure was applied in seven cases, the remaining case having approximately six months treatment. Of these eight patients, three were purely cases of Pulmonary Tuberculosis with sputum containing Tubercle Bacilli; two were cases of Glandular Tuberculosis, one of whom had two firm discrete and freely movable glands posterior to left Sterno-mastoid, the other presented enlargement of cervical, axillary and inguinal glands with several discharging sinuses in association: one showed Pulmonary involvement (Sputum T.B.+) complicated by Ischio-rectal abscess following a Gunshot Wound: one presented an active Pulmonary lesion (Sputum T.B.+) complicated by oedema and ulceration of Epiglottis with recurring pain and hoarseness which necessitated the use of an analgesic spray: one in addition to an active Pulmonary lesion with Sputum T.B.+ presented a patch of Lupus Vulgaris right side of face. Before commencement of treatment, each patient's dental condition was investigated and any deficiencies attended to - in each case blood was subjected to the Wassermann test to exclude a latent Syphilitic condition - and a thorough clinical examination made of each individual, before being subjected to the Light Bath, and at termination of their respective periods /

Weight Chart of Case I white
under Carbon Arc Lamp Treatment.



Scale 1" = 1 lb.

121

122

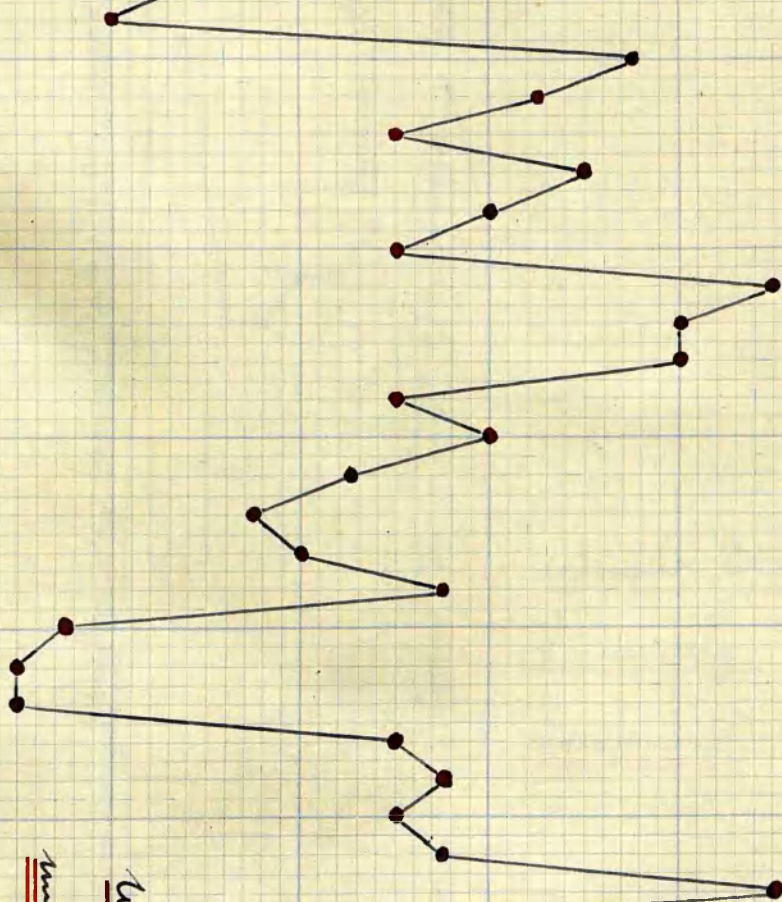
123

124

125

126

Carbon Arc Lamp Treatment commenced.



Carbon Arc Lamp Treatment terminated.

Scale $\frac{1}{5}$ " = 1 week.

Weight Chart of Case 2. while
under Carbon Arc Lamp Treatment

periods of treatment. For convenience of reference, each case discussed in this work bears a number. Also, in the first fifteen cases recorded, dates given indicate

- (a) date of commencement of exposures;
- (b) date of termination of treatment.

The following is illustrative of the condition clinically of each of these eight patients, before and after exposure to the Crompton Open Arc Lamps.

CASE 1. A.M. aet. 29 years.

- (a) 14.3.23 Weight 9 st. 11 $\frac{1}{4}$ lbs. Involvement of left apex and of apex of left lower lobe with fine moist rales. Sputum 1 oz. T.B.+.
- (b) 6.7.23 Weight 9 st. 10 lbs. Pulmonary condition in statu quo. Sputum 1 oz. T.B.+ . Skin very slightly pigmented. General condition unimproved. Patient expressed a desire to have treatment terminated - stating that he had not now the physical energy he had before 14.3.23, and was easily fatigued.

CASE 2. W.D. aet. 33 years.

- (a) 14.3.23 Weight 8 st. 10 $\frac{1}{2}$ lbs. Consolidation left apex and apex left lower lobe with moist rales of medium size. Sputum 1 oz. T.B.+ . Ischio-rectal abscess following gunshot wound causing intermittent pain and discharging intermittently.
- (b) 4.9.23 Weight 8 st. 10 $\frac{3}{4}$ lbs. Pulmonary lesion in statu quo. Sputum 1 oz. T.B.+ Ischio-rectal abscess as at commencement of exposures. General condition somewhat improved. Very slight cutaneous pigmentation.

CASE 3. D.S. aet. 58 years.

- (a) 14.3.23 Weight 9 st. 7 $\frac{1}{4}$ lbs. Several enlarged glands about size of a large marble in left axilla with one associated sinus discharging; also in left groin with two discharging sinuses; also in right groin with three discharging sinuses; small shotty glands both sides of neck with several healed cicatrices. General condition poor.
- (b) 6.7.23 Weight 9 st. 11 $\frac{1}{4}$ lbs. Glands still palpable but reduced to size of small marble. Sinuses all healed with good cicatrices. General condition greatly improved. Very slight pigmentation of skin.

CASE 4./

Scale $\frac{1}{2}'' = 1 \text{ lb.}$

129 lbs.

132 lbs.

133 lbs.

134 lbs.

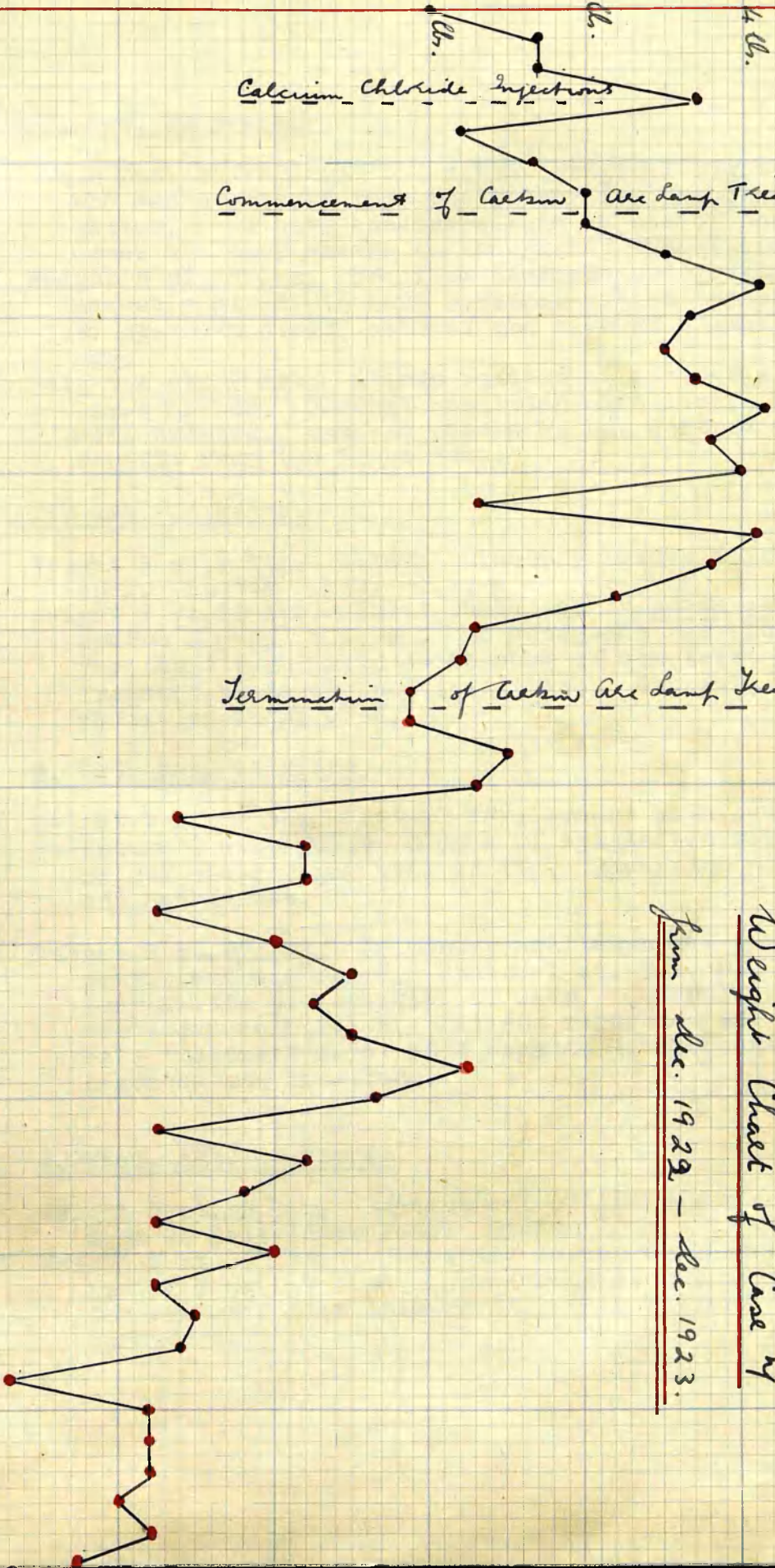
Calcium Chloride Injections

Commencement of Calcium Arc Lamp Treatment.

Termination of Calcium Arc Lamp Treatment.

Scale $\frac{1}{5}'' = 1 \text{ week.}$

Weight Chart of Case 4
from Dec. 1922 - Dec. 1923.



CASE 4. J.Y. aet. 22 years.

This patient replaced one of the original eight who was dismissed from the Colony for Insubordination. I have considered him as one of the cases who were chosen to inaugurate the experiment.

- (a) 31.3.23 Weight 8 st. 9 lbs. Two firm discrete and freely moveable glands in left cervical region posterior to Sterno-mastoid, each of the size of a small hen egg.
- (b) 6.7.23 Weight 8 st. 9 lbs. Glands reduced to size of a large marble. General condition excellent. Skin well bronzed. Patient states he has derived great benefit from the Light Bath.

CASE 5. A.W. aet. 33 years.

- (a) 14.3.23 Weight 9 st. $\frac{3}{4}$ lbs. Active pulmonary lesion at right apex. Sputum 2 ozs. T.B. + .
- (b) 21.6.23 Weight 9 st. $2\frac{1}{4}$ lbs. Chest condition in statu quo. Sputum 3 ozs. T.B. + . No cutaneous reaction. Treatment terminated on account of complaint of frequent headaches and lassitude. General condition unimproved.

CASE 6. C. McG. aet. 37 years.

- (a) 14.3.23 Weight 9 st. $2\frac{1}{4}$ lbs. Apical involvement both lungs. Sputum 1 oz. T.B. + . Oedema of epiglottis with ragged ulcer right side of tip. Recurring pain and hoarseness.
- (b) 6.7.23 Weight 9 st. $6\frac{3}{4}$ lbs. Pulmonary and Laryngeal conditions unchanged. Sputum 1 oz. T.B. + . Very little pigmentation of skin. General condition unimproved. Patient requested to have treatment terminated because of frequent headache and lassitude.

CASE 7. J. MacG. aet. 18 years.

- (a) 14.3.23 Weight 9 st. 8 lbs. Involvement of left apex and apex of left lower lobe. Sputum 1 oz. T.B. + .
- (b) 6.7.23 Weight 9 st. 7 lbs. Pulmonary lesion unchanged. Sputum 1 oz. T.B. + . Marked cutaneous bronzing. General condition unimproved. This patient considered/

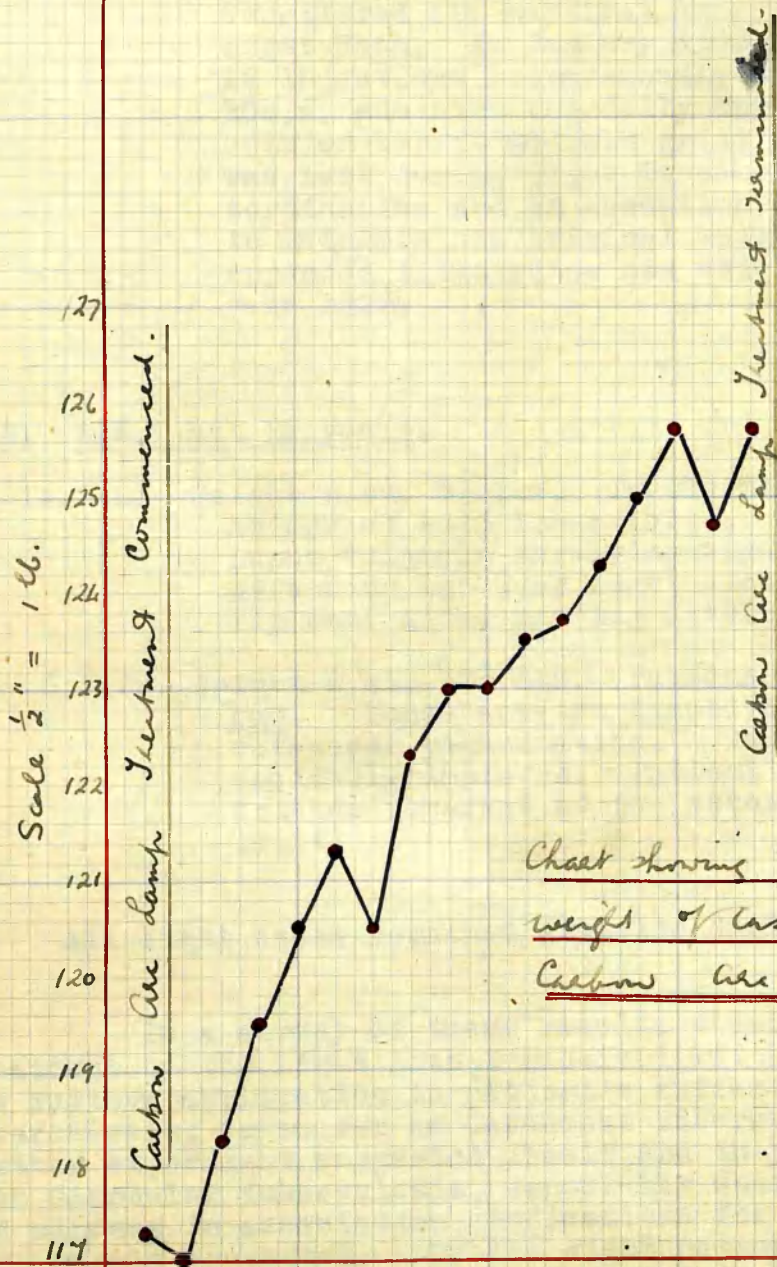


Chart showing progressive increase in weight of Case 8 while under Carbon Arc Lamp Treatment.

Scale $\frac{1}{5}$ " = 1 week.

considered his physical improvement retarded by the Light Bath. In January 1923 he received a course of 12 injections intravenously of 10% Calcium Chloride, 10c.c. administered daily for 12 days, which in his opinion benefited him greatly. This improvement was lost during Light Treatment. Certainly, towards termination and on cessation of treatment, he failed to maintain his original weight. Weight chart appended illustrates his weight variations for the year 1923.

CASE 8. B.W. aet 21 years.

- (a) 14.3.23 Weight 8 st. 5 $\frac{1}{4}$ lbs. Involvement both apices and apices of both lower lobes. Sputum 1 oz. T.B.+ . Lupus Vulgaris involving right side of nose and extending 1 $\frac{1}{2}$ " over right cheek and down to upper lip same side, showing little evidence of activity.
- (b) 6.7.23 Weight 8 st. 13 $\frac{3}{4}$ lbs. Pulmonary condition in statu quo. Lupus appears inactive. Very little cutaneous pigmentation. General condition decidedly improved. Patient's family doctor and friends remarked on the astonishing facial improvement.

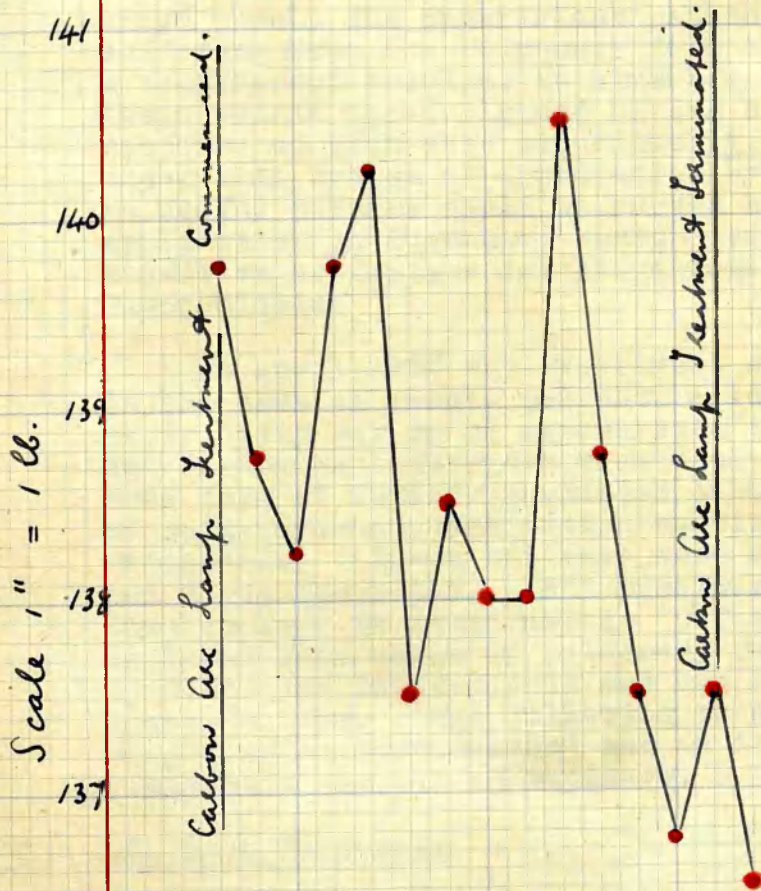
All eight cases remained afebrile during treatment.

In a survey of these results obtained by this method of treatment by the Light Bath, I received little encouragement for its further application in patient's suffering from Pulmonary Tuberculosis; in so far as Cutaneous Tuberculosis was concerned, further experiment suggested itself, and in patients suffering from Glandular Tuberculosis, especially where a glandular lesion had sinuses in association, indications for continued investigation were surely presented. Of the eight patients treated, physical improvement of varying degree was noted in four - the remaining four, all Pulmonary cases, one of whom had a Laryngeal involvement, being unimproved. Improvement in the healing of the Tuberculous lesion/

lesion occurred in three - in the Cutaneous Tuberculosis of Cases 8, while his chest condition remained stationary, and in Cases 3 and 4, both suffering from Glandular Tuberculosis. Of special interest ~~was~~ the fact, that in Case 3 during the first three weeks of daily exposure, a freer and more abundant discharge poured from the open sinuses, as though the process of caseation had been stimulated by the Light Bath - associated with this there was initiated a very gradual diminution in the size of associated glands. Progressive closure of sinuses occurred, and at termination of treatment period, clean level cicatrices, devoid of the merest suggestion of keloid, replaced old standing sinuses. During exposure, one gland in left axilla enlarged, softened, and finally broke down - contents were discharged en masse through a circular opening which closed up in little over a week's time. A less definite result was obtained in Case 4. - but one which ~~was~~ encouraging. Both patients made excellent progress physically during treatment, and voluntarily expressed their full appreciation of the experiment, as did also Case 8, whose progress has already been remarked upon. No appreciation of the method was evinced by the other five patients. Two, as noted, complained of lassitude and frequent headaches which might be regarded as indications for caution toward complete cessation ~~or~~ temporary or permanent reduction of daily exposure provided one could fully eliminate the question of a purely psychological factor being involved. No indications for cessation of exposures were adduced from Temperature and Pulse Records.

Pigmentation of the skin afforded no indication of improvement either in the physical condition of the patients exposed or in the ~~diseased~~ foci. It might be a useful observation, but could by no means be regarded as interpretative. Of this series of eight patients, well marked bronzing was noted in two only, one of whom benefited greatly from the irradiation, the other very disappointingly, whilst in Case 3, whose result was most satisfactory of all, the skin showed very little reaction. In one case only was no trace of pigmentation observed - Case 5, who derived no benefit at all from his period of exposure.

In so far as the cases of Pulmonary involvement ~~were~~ concerned, the question arose as to whether the lesions were/



Weight Chart of Case 9 while
under Light Treatment.

Scale $\frac{1}{5}$ " = 1 week.

were too well defined for favourable results to be expected, or the system of exposure defective, or the influence of temperamental peculiarities unconsidered, since surely the Tuberculous patient, especially one suffering from the Pulmonary form of the disease, has a temperament peculiar to himself. Having reviewed these points carefully, and having studied closely the response of each case individually, I concluded that under this system of irradiation by the Open Arc Lamp, no useful purpose could be served by its further application in Pulmonary cases - but resolved to direct attention to further investigations in other forms of Tuberculosis.

In April 1923 the experiment was put into application in the case of female patients - adults and young girls. Their daily period of exposure to the Arc Lamp was carried out during each forenoon, when adult males were engaged on some form of outdoor graduated labour, with the exception of Saturday, when Institution routine made treatment impossible. Seven patients were chosen - four adults and three juveniles. All procedure was identical to that applied to adult males. These seven patients included four cases of Pulmonary Tuberculosis, two cases of Glandular Tuberculosis and one case of well marked Lupus Exudans. The following is a record of their condition at commencement and at termination of their respective periods of exposure.

CASE 9. I.K. aet. 22 years.

- (a) 3.4.23 Weight 9 st. 13 $\frac{3}{4}$ lbs. Involvement both lobes of left lung and right apex. Sputum 3 ozs. T.B. + many.
(b) 7.7.23 Weight 9 st. 11 $\frac{1}{2}$ lbs. Pulmonary condition in statu quo Sputum 3 ozs. T.B. + many. Marked cutaneous bronzing. Very slight general improvement.

CASE 10. J.G. aet 28 years.

- (a) 3.4.23 Weight 8 st. 6 lbs. Activity both lobes left lung with slight right apical lesion. Sputum 1 oz. T.B. + many.
(b) 19.5.23 Weight 7 st. 12 lbs. Pulmonary condition in statu quo Sputum 1 oz. T.B. + many. Very slight cutaneous pigmentation. General condition unimproved. She requested/

Scale 1" = 1 lb.

Carbon Arc Lamp Treatment Commenced.

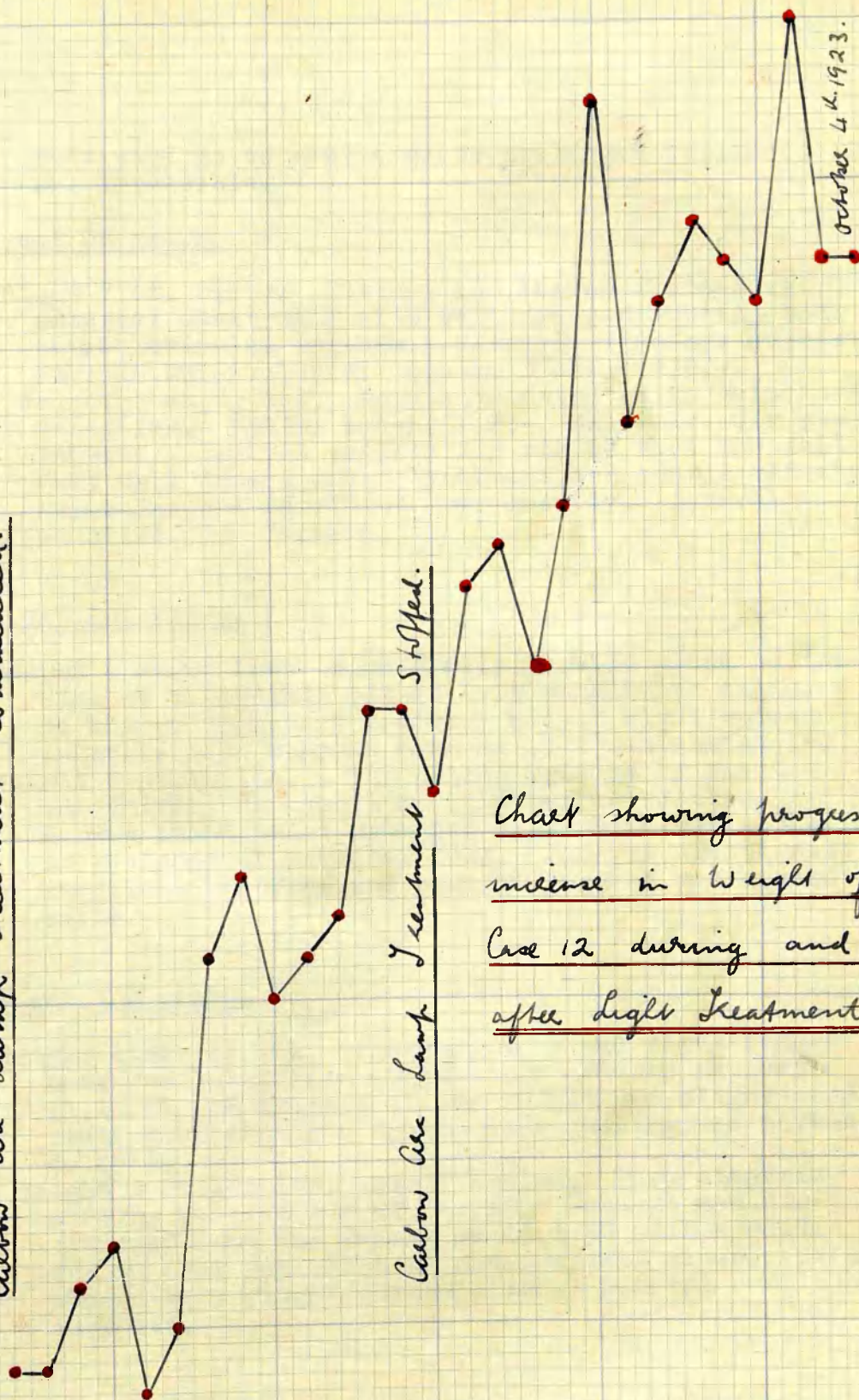


Chart showing progressive increase in weight of Case 12 during and after Light Treatment.

Scale $\frac{1}{5}$ " = 1 week.

requested to be sent home, so prolonged treatment was impossible.

CASE 11. B.A. aet 38 years.

- (a) 3.4.23 Weight 7 st. 5 $\frac{1}{4}$ lbs. Patient had marked flattening anterior chest wall with well defined cupping both supraclavicular regions. Clinical findings suggested Fibroid Tuberculosis. Sputum 3 ozs. T.B.-.
- (b) 13.12.23 Weight 7 st. 4 $\frac{1}{4}$ lbs. No change detected in Pulmonary condition. Sputum 3 ozs. T.B.- Skin markedly pigmented. Patient voluntarily stated that she felt very well indeed under treatment and considered the exposures had benefited her greatly. General condition did improve.

CASE 12. A.C. aet. 13 $\frac{1}{2}$ years.

- (a) 3.4.23 Weight 6 st. 8 $\frac{3}{4}$ lbs. Firm freely movable gland of the size of a pigeon's egg at left mandibular angle. No active pulmonary lesion - slight right apical dulness, also empyema scar at left scapular angle.
- (b) 7.7.23 Weight 6 st. 12 lbs. 4 oz. Gland reduced by about one-third. No change in Pulmonary condition. Marked bronzing of hammered type which was still in evidence in November 1923. General health made excellent progress and benefit derived was unquestionable.

CASE 13. E.B. aet. 10 $\frac{1}{2}$ years.

- (a) 3.4.23 Weight 4 st. 11 lbs. Discharging sinus right side of neck resulting from a glandular abscess aspirated 11.11.22 and again 1.12.22. Sinus had slight persistent discharge and spontaneous healing was markedly delayed.
- (b) 27.4.23 Weight 4 st. 13 $\frac{1}{4}$ lbs. Sinus healed. Firm cicatrix showing no evidence of keloid. Patient was discharged from the Colony on 16.6.23 with a well formed scar replacing an old standing sinus. Skin showed very slight pigmentation. General condition improved.

CASE 14. M.A. aet. 31 years

CASE 14. M.A. aet. 31 years.

- (a) 3.4.23 Weight 8 st. $3\frac{1}{2}$ lbs. Well marked activity both lobes of right lung and of left apex. Sputum 1 oz. T.B. + .
- (b) 11.4.23 Weight 8 st. $5\frac{3}{4}$ lbs. No pigmentation noted. Treatment was terminated on account of evening elevation of temperature which persisted until her transfer home on 7.7.23. She was a progressive case of Pulmonary Tuberculosis and died a short period after discharge. She is mentioned here solely because she was one of the seven females chosen for the experiment.

CASE 15. E.F. aet. 12 years.

- (a) 3.4.23 Weight 4 st. $1\frac{3}{4}$ lbs. Lupus Exudans of several years duration with active margin both sides of face, extending from malar bones over cheeks and round mouth and encircling neck also several patches left forearm. She had undergone several methods of treatment including a course of injections of Tuberculin. No benefit had accrued. Improvement in the cutaneous lesion was noted from the commencement of Light Bath Treatment. In July 1923 the only definitely active part of the Lupus was at junction of mucous membrane and skin at left side of upper lip. In November 1923 no activity could be detected and white cicatricial tissue was replacing the original active lesion. On 14.3.23 there is still no evidence of activity, all redness has disappeared, and cicatrization is progressing steadily. Patient is still having $2\frac{1}{2}$ hours exposure daily with the object of still further improving skin condition. Her general condition has decidedly improved. Skin shows very slight degree of pigmentation.

The results obtained in this series of seven females are comparable with those obtained in the first eight patients, adult males, who were subjected to the irradiation of the Open Arc Lamps. It is to be noted that no progress toward recovery was made in any of the Pulmonary/

Pulmonary lesions, that decided results were secured in the two patients suffering from Glandular Tuberculosis, and marked healing occurred in a case of Lupus Exudans who had been disfigured for several years by an ever-active cutaneous lesion. Undoubtedly Case 14 was under this form of treatment for too brief a period for the true evaluation of results, and one might also make a similar suggestion of Case 10 who nevertheless underwent almost seven weeks' exposure. Leaving Case 14 out of consideration, three Pulmonary cases lost weight in greater or less degree during treatment, the two Glandular cases gained weight steadily as did also Case 15 representing the section of Cutaneous Tuberculosis. In so far as physical improvement was concerned, most marked effects were shown by cases other than those with active Pulmonary lesions. Pigmentation of the skin, reviewed in the light of results obtained in this series of cases, could not be regarded as interpretative of lesion healing. Of special interest is the effect of the artificial light on the cervical sinus of Case 13. After preliminary increase in discharge for about four days, gradual approximation of sinus walls occurred, and healing, so long delayed, progressed very satisfactorily, so that in less than one month's time, a good cicatrix formed, which on her discharge from the Institution at a later date already noted, remained firm and was gradually blending with the appearance and texture of adjacent healthy skin.

I may remark here that, with the exception of Case 14, all of this group of patients showed no febrile reaction during treatment, other than an elevation of $1^{\circ}\text{F.} - 1.5^{\circ}\text{F.}$ after a single exposure. The evening elevation of temperature in Case 14 I could not recognise as being in any way caused by the Arc Lamp Treatment, in the light of the very well defined activity of her Pulmonary lesion.

In view of the encouraging results secured by this method of treatment in cases of Glandular Tuberculosis, especially when associated with discharging sinuses, and in Cutaneous Tuberculosis, and of the unsatisfactory findings in cases of Pulmonary involvement, my attention was directed to a further application of the method to conditions of Glandular involvement with sinus formation, to Skin Tuberculosis, and to other forms, such as Osseous Tuberculosis/

Tuberculosis with persistently discharging sinuses.

Before proceeding further, I may remark on a female patient suffering from a moderately active left apical lesion, who, immediately on her admission to the Colony, **was subjected** to Carbon Arc Lamp Treatment in order to occupy a vacant chair, and **for** further investigation of the effect of the Light Bath on this form of the disease. Dates indicate, as before (a) date of commencement, and (b) date of termination of exposures.

CASE 16. A.B. aet. 24 years.

- (a) 27.5.23 Weight 8 st. 3 $\frac{1}{2}$ lbs. Fine moist rales audible left apex. Sputum $\frac{1}{2}$ ozs. T.B. + few. General condition poor.
- (b) 7.9.23 Weight 8 st. 13 $\frac{3}{4}$ lbs. Pulmonary lesion in statu quo Sputum $\frac{1}{2}$ ozs. T.B. + few. Skin deeply pigmented. Physical condition greatly improved.

In this case of Pulmonary Tuberculosis also, no improvement could be recorded in the affected lobe of the left lung although no deteriorating effects were noted. She remained afebrile throughout her period of treatment and her physical condition made excellent headway. She, alone of all Pulmonary cases exposed to the Arc Lamp, made rapid progress physically. Appended chart shows steady increase in weight during treatment.

I now propose to consider in separate groups results obtained under exposure to the Crompton Open Arc Lamp in Glandular Tuberculosis, Cutaneous Tuberculosis, Osseous Tuberculosis - no further attempt having been made to pursue further the experiment in so far as patients with Pulmonary lesions were concerned.

GLANDULAR TUBERCULOSIS.

This group includes cases whose period of treatment has been completed and cases who are still under treatment at date of completion of the year's experiment, namely, 14th March, 1924.

CASE 17./

CASE 17. M.H. aet. 6 years.

- (a) 29.4.23 First exposure. Weight 3 st. 9 $\frac{1}{4}$ lbs. Five discharging sinuses, two in right submaxillary region, two in left preauricular region and one in left submaxillary region, with subjacent glandular nodules of small size. Numerous small cicatrices in cervical region resulting from previous small glandular abscesses.
- (b) 13.7.23 Termination of treatment. Weight 3 st. 12 $\frac{3}{4}$ lbs. All sinuses healed with clean cicatrices and a mere trace of associated glandular thickening. General condition improved. Skin showed very slight degree of pigmentation. Scars on her discharge from the Colony on 27/10/23 retained their soundness and, free from keloid, blended well with adjacent skin.

CASE 18. W.P. aet 9 years.

This boy is illustrative of the effect of irradiation by the Carbon Arc Lamp in an inoperable glandular mass with sinus in association. He presented a large glandular mass, occupying area between mastoid process and ramus of mandible right side causing undue prominence of lobe of ear, with a sinus, $\frac{3}{4}$ " in length, resulting from an incision made three months before commencement of treatment over a fluctuant area. Sinus had slight daily discharge and no visible reduction in mass had been noted. Arc Lamp Treatment was commenced on 16/5/23. In one month's time, after a more copious daily discharge, there was definite reduction in size of glandular mass. On 1/9/23 a very small swelling remained subjacent to a sinus almost healed and presenting daily the merest crusting. By 18/9/23 sinus was completely healed and a small indurated nodule of apparently fibrous tissue of small marble size was palpable under the scar. Treatment period was extended until 23/10/23, almost complete reduction of inoperable mass having been attained, with a cicatrix of good quality, free from the slightest trace of puckering. His general condition improved considerably and cutaneous pigmentation was a marked feature. He gained 3 $\frac{1}{4}$ lbs. in weight during treatment.

CASE 19./

CASE 19. J.W. aet 39. years.

This patient is illustrative of the effect of Light Bath Treatment on isolated glands of the discrete firm Hodgkin's type. Admitted to the Colony on 24/3/23, he presented numerous glands varying in size from a small pea to a large marble both sides of neck, both anterior and posterior to Sterno mastoids, also at each mandibular angle, a firm glandular mass as large as a small hen's egg. From date of admission until 12.5.23 he was confined to bed owing to daily range of temperature $97^{\circ}\text{F.} - 100.4^{\circ}\text{F.}$ First exposure was given on 10/7/23, when his weight was 11 st. $10\frac{3}{4}$ lbs. and on this date I made a complete blood examination which was as follows:-

Red Cells	...	5,570,000.
White Cells	...	7190
Haemoglobin		90% (Tallquist Scale)
Colour Index	...	.81
Differential Count:-		
	Polymorphonuclears	54%
	Eosinophils	8%
	Basophils	0%
	Small Lymphocytes	34%
	Large "	4%

By 30/9/23, a noticeable reduction in size of glandular masses at angles of jaw had occurred. On this date he complained of a gnawing pain at sternal end of third right interspace. On 22/10/23, a small tender swelling was palpable with very faint sensation of fluctuation and he still complained of constant gnawing pain. Early in November, pain was less severe and a little more fluctuation could be elicited. During November, pain gradually diminished, and swelling, losing fluctuency, began to convey a firmer sensation to palpating fingers. On 15/2/23, palpation revealed a small firm nodule about the size of a large marble, neither tender nor painful. The lighting up of activity in an intercostal gland with softening and ultimate fibrotic healing was postulated. On cessation of exposures on 31/1/24. No palpable reduction in small isolated glands was noted, but the two masses at mandibular angles were reduced by $\frac{1}{2}$. His weight was 12 st. 5 lbs. His general condition had made good headway. Skin showed very slight pigmentation. He was afebrile throughout treatment. He voluntarily expressed appreciation of benefit derived. A complete blood examination made on date of cessation of treatment was as follows:- /

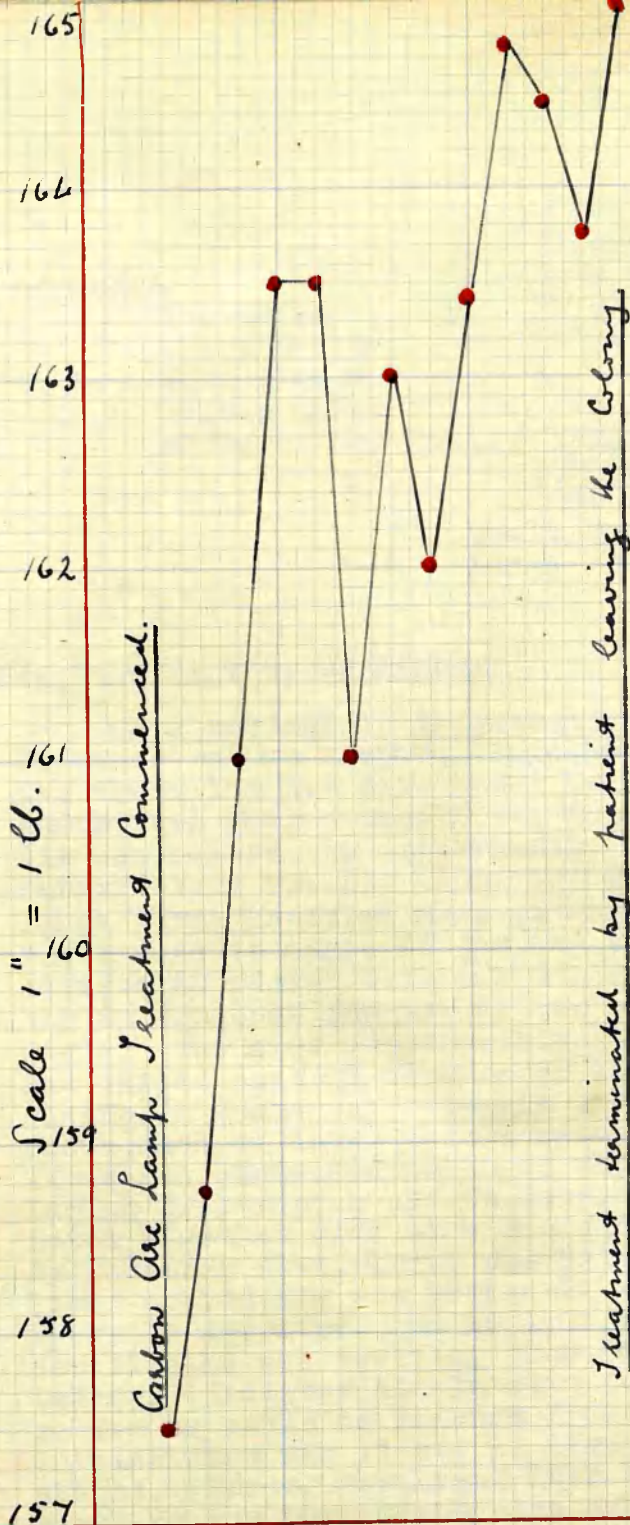


Chart showing progressive
increase in weight of
Case 20 while under
Light Treatment.

Scale $\frac{1}{5}$ " = 1 week.

follows:-

Red Cells	5,080,000.
White Cells	7500.
Haemoglobin	95% (Tallquist Scale)
Colour Index	.95
Differential Count:-	
Polymorphonuclears	56%
Eosinophils	4%
Basophils	0%
Small Lymphocytes	30%
Large "	10%

CASE 20. T. McQ. aet. 23 years.

This patient is illustrative of improvement under treatment of an inoperable glandular mass and of one of the obstacles met with under Colony conditions in an Industrial area - namely the departure of the patient of his own accord, so interrupting what promised to be a very satisfactory result. Admitted 23/10/23, he presented a large firm glandular mass extending from level of zygoma right side to angle of jaw and round lobe of ear to post-auricular region with two discharging sinuses, one immediately in front of Tragus of ear, and one at level of mandibular angle. The mass considerably distorted his facial appearance and caused partial closure of lower eyelid. Two enlarged glands in submental triangle and three in right supraclavicular fossa, each of large marble size, completed the picture. Exposures commenced 28/10/23 when he weighed 11 st. 3½ lbs. During treatment a slight increase in daily discharge was noted, together with slow but progressive reduction in mass. By December 31st, almost one half reduction had been attained - lower eyelid now was perfectly normal and facial contour markedly improved. On 19/1/24, while acknowledging the benefits he was deriving from the Light Bath, he left the Colony. Isolated glands were reduced in size by one-third, so far as could be learned from mere palpation. Weight on discharge was 11 st. 11 lbs. Skin pigmentation was very slight. During the Light Bath treatment, he sustained a mild first degree burn right side of neck and right shoulder, through failure to turn a quadrant of a circle every 15 minutes and exposing his affected side for too prolonged a period to the Open Arc.

Case 21. R.C. aet 4½ years.

On admission 25/6/23, he presented a discharging sinus 1" long, immediately posterior to right mandibular ramus, resulting from a previous glandular operation. Small firm discrete/

discrete glands of shotty character were palpable both sides of neck in line of Sterno mastoids. Lamp treatment was commenced on 9/7/23. His weight then was 2 st. 6½ lbs. Healing of sinus was complete by the end of September - a healthy cicatrix resulting. No alteration was noted in isolated shotty glands. On cessation of treatment on 13/10/23, an improvement was perceptible in his physical condition, although no cutaneous pigmentation occurred: and he had gained 3 lbs. in weight.

CASE 22. J.B. aet 15 years

In this patient, a glandular sinus overlying a small glandular mass of the size of a large marble and with slight discharge daily - situated immediately underneath right lower mandibular margin - healed well, with subsidence of associated gland, under a period of exposures, extending from 26/7/23 until 27/10/23. While under the Light Bath, he gained 12¾ lbs. in weight. His general condition showed decided improvement. No cutaneous pigmentation was noted.

CASE 23. J. MacV. aet 4 years.

On admission to the Colony on 31/5/23, small firm discrete shotty glands, varying in size from a pea to a marble were palpable both sides of neck, whilst a sinus 1" long, overlying a broken down gland, was present immediately posterior to right mandibular ramus. Treatment commenced on 9/7/23 was terminated on 17/8/23, sinus now being apparently healed, although a little glandular thickening was still palpable under the scar - and accommodation in the Light Room being required for another patient. During this period he gained only ½ lb. in weight and skin was unpigmented. On 13/9/23, slight fluctuation was detected at site of cicatrix and Arc Lamp Treatment was recommenced. Two days later, the scar gave way, and a slight daily discharge persisted until 9/10/23, when sinus gaped widely and yielded a copious discharge. Free evacuation occurred for a period of two weeks, followed by a gradual lessening of discharge and approximation of sinus margins. At the end of November, ⅝" of raw surface remained and a further period of two week's exposures completed healing. Now no glandular induration could be detected in association with cicatrix. He gained 1½ lbs. in weight during this second period, his physical condition improved; his skin still remained unpigmented. No febrile disturbance/

disturbance occurred during period of exposure. On discharge on 5/1/24, a clean healthy cicatrix presented itself, free from the slightest trace of subjacent glandular enlargement.

CASE 24. A.M. aet. 10 years.

This boy was admitted in August 1923 in a poorly nourished condition with a history of having had Tuberculous Glands removed left side of neck four years before, and a return of glandular swelling under old scar of several months duration. This swelling, firm to the feel, was of the size of a large marble. During the last week of September, fluctuation was detected and treatment was commenced on 2nd October. His weight then was 4 st. 4 lbs. After five days' exposure, the gland ruptured spontaneously, leaving a sinus $\frac{1}{2}$ " in length. A preliminary free discharge of purulent material occurred, followed by progressive healing, and by 19th November, cicatrization was complete - no evidence of remaining glandular tissue in association with scar being detected. Exposures were continued until 19th December, with a view to still further strengthening existing cicatrix. He gained $4\frac{1}{2}$ lbs. in weight, his general condition made excellent progress and his skin became deeply bronzed.

CASE 25. A.S. aet. 11 years.

In this case, an attempt was made by a short period of exposure, to strengthen already healed cicatrices. From date of admission in October 1921 he had had recurring glandular abscesses of small size in cervical region, which, on breaking down, left small sinuses healing slowly. Treatment commenced 9/7/23 and terminating 31/7/23 appeared to strengthen existing scars, to give them a purer outline and greater suppleness, and to make them blend more harmoniously with adjacent healthy skin. He gained $\frac{1}{2}$ lb. in weight during treatment and no pigmentation was noted. On discharge from the Colony on 5th October 1923 cicatrices were still intact.

CASE 26. P. McA. aet 7 years.

A strumous child, he presented numerous small discrete and firm glands both sides of neck along anterior and posterior borders of Sterno mastoids, also at each mandibular angle a firm/

firm gland of the size of a large marble. His period of treatment extended from 2/9/23 until 24/11/23, during which time he gained $3\frac{1}{4}$ lbs. in weight and his general condition improved. No alteration, however, was noted in glandular affection and no cutaneous pigmentation occurred.

CASE 27. A.O'N. aet. 7 years.

In this case, Carbon Arc Lamp Treatment was terminated abruptly by reason of elevation of temperature, which was attributed to undue lighting up of glandular activity. He suffered from occasional Bronchitic attacks: and glandular affection was present in the form of shotty cervical glands both sides of neck, with a gland of the size of a pigeon's egg in right submental region - also one of similar size in left submaxillary region. Arc Lamp exposures were commenced on 17/9/23, when gland in right submental region was showing slight evidence of fluctuation. On 7/10/23, owing to palpable glandular softening, aspiration was unsuccessfully attempted - 1.5cc only of thick pus being evacuated. On 13/10/23 gland ruptured spontaneously, leaving a small circular sinus above a firm slowly caseating core. On 22/10/23 very faint evidence of fluctuation was elicited over gland in left submaxillary region. This became more marked during the following fortnight, but subsequent observation under exposure was prevented, owing to cessation of treatment on 8/11/23, on account of elevation of temperature to 101°F . at commencement of the day's exposure. Persistent evening elevation to 99° - 102°F . has occurred from that date until the present period i.e. 14/3/24. Since cervical glandular condition appeared insufficient to account for this, and careful chest examination suggested Bronchitis, the question was postulated of a lighting up of activity in Hilus glands since X-Ray examination revealed well marked Hilus thickening. During treatment he lost 2 lbs. in weight - skin showed no reaction - and general condition remained in statu quo.

CASE 28. J.S. aet 9 years.

This patient was admitted to the Institution on 1/10/23. with two sinuses in cervical region, each about $1\frac{1}{2}$ " long, one immediately posterior to right mandibular ramus, and one in right submaxillary region, resulting from incision of glandular abscesses in August 1923. Both sinuses exuded a/
a/

a free offensive discharge, and in association with the anterior one, was a glandular thickening of the size of a large marble. ARC LAMP TREATMENT was commenced on 13/10/23. By 9/11/23, the posterior sinus had closed, and the anterior, while reduced in size, still had slight daily discharge - more of a serous nature and no longer purulent and offensive. This condition persisted until 7/2/24, when he complained of pain in the region of the anterior sinus - the gland in association appeared somewhat increased in size - evening temperature was 99.8°F, pulse 116. On 8/2/24, a free discharge of purulent material was liberated through this sinus - temperature being elevated all day 99.20 F - 100°F. On 9/2/24 temperature reached normal and remained so. A temporary cessation of exposures for seven days was indicated, during which time a gradual reduction in daily discharge was noted. Treatment was resumed 15.2.24 and is still continued 14/3/24. The anterior sinus is almost closed - a mere bead of discharge appearing daily - the cicatrix forming is a little rugged - the glandular enlargement in association has been reduced to the size of a pea. A perfectly level scar, now blending with the texture of adjacent parts, replaces the original posterior sinus. So far, he has gained 3 lbs 10 ozs in weight - his general condition has made good progress - no cutaneous pigmentation has been noted. A complete blood examination was made on two occasions during treatment. The results are as follows:-

	<u>7. 12. 23</u>	<u>4. 3. 24</u>
Red Cells:	5,170,000	5,140,000
White Cells:	7,800	8,740
Haemoglobin: - Tallquist Scale -	85%	90%
Colour Index: ... ..	.83	.88
Differential Count:		
- Polymorphonuclears -	53%	56%
Eosinophils	5%	4%
Basophils	0%	0%
Small Lymphocytes.	33%	28%
Large do.	9%	12%

CASE 29. W.McH. aet. 5 years.

On commencement of ARC LAMP Treatment on 17.11.23, he presented a chain of five discrete firm enlarged glands, varying in size from that of a large marble to that of a pigeon's egg, behind left Sternomastoid and extending from level of angle of jaw to just above clavicle. Under the system of daily exposures, he has remained afebrile, has so/

CONDITION

so far gained $2\frac{3}{4}$ lbs in weight, and his general has improved. No cutaneous pigmentation has occurred, and no palpable alteration in size or consistence of enlarged glands. Treatment is still continued 14/3/24. Two complete blood examinations have been done in this patient - they are as follows:-

	21. 12. 23	4. 3. 24
Red Cells:	3,888,000	5,060,000
White Cells:	8,420	8,740
Haemoglobin: - Tallquist Scale -	86%	90%
Colour Index:	1.1	.9
Differential Count:		
-Polymorphonuclears -	54%	45%
Eosinophils	6%	6%
Basophils	0%	0%
Small Lymphocytes.	26%	41%
Large do	14%	8%

The results in this type of case with glandular enlargements of the Hodgkin's type have not been striking, in so far as the diminution in size of the glandular nodules is concerned.

CASE 30. J.L. aet. 7 years.

This child was subjected to the Light Bath, with a view to healing of a raw surface, resulting from traumatic rupture of a glandular abscess. A glandular abscess of the size of a small hen egg was aspirated on two occasions, first on 29.12.23, when 15 c.c. of purulent material were evacuated, and again on 6.1.24, when 8 c.c. of similar necrotic glandular matter were removed. The abscess reappeared, and before further aspiration was attempted, traumatic rupture took place, leaving, after evacuation of contents, an irregular raw surface $1" \times 1\frac{1}{2}"$ with ragged margins. Arc Lamp exposures were commenced on 5.2.24 - patient weighing $3\frac{3}{4}$ lbs. Improvement was progressive from the first exposure - the margins of the raw surface gradually lost their torn appearance, and healing, as indicated by approximation of edges and appearance of pink granulations over exposed surface, continued. On 14.3.24, while exposures are continued, a small superficial wound, $\frac{3}{4}" \times \frac{3}{4}"$ is presented. Rapid final healing is expected. He has gained only 6 ozs in weight so far, his skin shows no pigmentation, his physical condition shows a little improvement.

CASE 31. M.S. aet. 14 years.

This/

this patient is illustrative of the action of irradiation by the Carbon Arc Lamp in the treatment of inoperable glandular masses with associated sinuses. She was admitted on 14.1.24, presenting in the region between the left angle of jaw and mastoid process, a moderately firm glandular mass as large as a hen's egg, with one sinus, the result of an incision six weeks before admission. Treatment was commenced on 18.1.24 - patient weighing 5 stone 4 $\frac{3}{4}$ lbs. Slight crusting has occurred daily over sinus with progressive reduction in glandular mass. At date of termination of this work, she is still under treatment - the glandular mass has been reduced by at least one half - her general condition has made excellent progress, and she now weighs 5 stone 11 $\frac{3}{4}$ lbs. Her skin shows very slight pigmentation. Two complete blood examinations made, are as follows:-

	15. 1. 24.	7. 3. 24.
Red Cells:	4,180,000	5,010,000
White Cells:	11,540	13,120
Haemoglobin: - Tallquist Scale -	90%	90%
Colour Index: ... ..	.98	.81
Differential Count:		
- Polymorphonuclears -	62%	61%
Eosinophils.	1%	3%
Basophils.	0%	0%
Small Lymphocytes.	31%	32%
Large do.	6%	4%

CASE 32. A.P. aet. 12 years.

A case of Glandular Tuberculosis, she was admitted on 31.5.23, three weeks after a glandular operation left side of neck behind Sternomastoid, where a sinus 1" long was present, with glandular thickening of the size of a large marble subjacent. Inferior to the sinus, and parallel with the posterior border of Sternomastoid, was a healed cicatrix also 1" in length, with very slight glandular enlargement in association. First exposure was made on 29.7.23, when patient weighed 5 stone 4 ozs. By 17.12.23, the superior sinus had closed with slight reduction in the size of the associated gland. The gland in association with the inferior cicatrix showed fluctuation early in October, and broke down eventually, healing being complete by 7.12.23 with complete disappearance of associated glandular thickening. On 5.1.24, the superior cicatrix broke down, free daily discharge occurring for about three weeks, followed by mere daily crusting over a progressively healing sinus, and almost complete reduction of the associated gland. On 14.3.24 the inferior cicatrix presents a firm supple appearance, whilst the superior sinus measures now about $\frac{1}{4}$ " in/

in length, and shows only occasionally a mere bead of discharge. Lamp treatment is still continued. Her general condition has made excellent progress and she has gained $7\frac{1}{4}$ lbs in weight. Her skin has reacted well and shows marked bronzing. This case is illustrative of the lighting up of activity of Tuberculous glands - the stimulation of preliminary break down and the subsequent healing under the rays of the Open Arc .

CASE 33. K.W. aet. 10 years.

This child, who was suffering from both glandular and pulmonary Tuberculosis, was subjected to the Light Bath with a view principally to the reduction of glandular enlargement in cervical region. Both lobes of her left lung were involved, with vomica at the left apex - she had no cough or spit. A well marked chain of glands of the size of small marbles was palpable along the anterior border of right Sternomastoid, with two or three glands of large marble size in submental region. A glandular abscess in the latter region had been aspirated on 30.4.22, and again on 10.6.22 with good results. Arc Lamp treatment was commenced on 8.7.23 when the patient weighed 4 stone 12 lbs. A gradual subsidence in the submental glandular enlargement was noted, so that on 14.3.24 it was no longer palpable, whilst the gland chain on the right side of the neck showed a very little reduction in size. Her pulmonary condition remained unchanged. While still under treatment, she has gained $13\frac{1}{4}$ lbs in weight, her general condition has made decided progress and her skin is deeply bronzed.

CUTANEOUS TUBERCULOSIS.

CASE 34. J.C. aet. 12 years.

He was admitted on 10.10.23, presenting on the right cheek, a circular patch of **Lupus Non-exudans** 2" in diameter, a patch of the size of a five shilling piece on the anterior aspect of the left thigh, also a linear patch 3" long by 1" broad in the right gluteal region at the site of a healed cicatrix. The Lupus was of eight years duration. Light Bath Treatment was commenced on 24.10.23 when he weighed 3 stone 4 lbs. On 14.3.24 while exposures are still continued, an improvement is noted in the facial lesion, in that it is reduced in size by almost one third and presents a less active appearance - whilst the other two affected areas remain in statu quo. So far, he has shown no cutaneous pigmentation. Physically, he has made good headway, and has gained/

gained $9\frac{1}{4}$ lbs in weight. In this case, two complete blood examinations were carried out, viz:-

	<u>28. 11. 23.</u>	<u>1. 3. 24.</u>
Red Cells:	3,290,000	5,060,000
White Cells:	9,680	9,680
Haemoglobin: - Tallquist Scale -	86%	90%
Colour Index:	1.3	.9
Differential Count:		
-Polymorphonuclears -	55%	52%
Eosinophils.	6%	1%
Basophils.	0%	0%
Small Lymphocytes.	30%	44%
Large do	9%	3%

CASE 35. J.L. aet. 12 years.

Admitted on 23.11.23 suffering from Lupus Erythematosus extending from middle of forehead over face to chin and also involving the nasal vestibules, this boy was given his first exposure on 19.12.23. He weighed 4 stone $5\frac{1}{2}$ lbs. He remained afebrile until January 6th 1924, when his temperature, at the termination of $2\frac{1}{2}$ hours exposure, was 100.6°F , pulse 96. He complained of pain in the affected areas. His daily exposure was reduced to one hour for seven days, then gradually increased daily by 30 minutes until he was undergoing once more the usual daily $2\frac{1}{2}$ hours exposure. Since then no further reaction has occurred. At the date of termination of this work, no visible progress has been made toward lesion healing. His facial condition remains in statu quo. No cutaneous pigmentation has occurred. He has gained $2\frac{1}{2}$ lbs in weight, and his physical condition makes satisfactory progress. Complete blood examination on two occasions gave the following results:-

	<u>8. 12. 23.</u>	<u>8. 3. 24.</u>
Red Cells:	3,750,000	4,890,000
White Cells:	6,560	9,680
Haemoglobin: - Tallquist Scale -	80%	90%
Colour Index:	1	.9
Differential Count:		
-Polymorphonuclears -	54%	51%
Eosinophils.	2%	5%
Basophils.	0%	0%
Small Lymphocytes	33%	29%
Large do	11%	15%

CASE 36. J.S. aet. 11 years.

This patient presented a wide area of Lupus Exudans, of eight years duration, involving left side of face, including the external surface of the nose of the same side: also the right half of the chest wall from just above the clavicle to the nipple level anteriorly, and from the nape of the neck to the scapular angle posteriorly, and encircling the upper third of the right brachium. There was marked crusting on the cheek and an active spreading margin at the borders of the affected areas. Centrally, scattered areas of cicatricial tissue were present. First exposure was given on 13.1.24, patient then weighing 5 stone 5 lbs. Arc Lamp Treatment is being continued - the progress made toward healing in the affected parts being very gradual. At present the margins of the lesion anteriorly have lost their fiery appearance, and seem quiescent. There is very little crusting on the affected cheek and the spreading margin posteriorly presents a lower degree of activity, whilst cicatricial areas centrally have increased in size. So far, he has gained $2\frac{1}{4}$ lbs in weight, and his physical condition shows decided improvement. No cutaneous reaction has been noted. While a prolonged period of exposure to the Light Bath may be expected, a very favourable result is awaited. Two complete blood examinations, with an interval of two months between each, point to an improvement in this system. They are as follows:-

	<u>8. 1. 24.</u>	<u>5. 3. 24</u>
Red Cells:	4,650,000	5,030,000
White Cells:	11,240	12,500
Haemoglobin: - Tallquist Scale -	90%	90%
Colour Index: ... ..	.97	.9
Differential Count:		
-Polymorphonuclears -	60%	41%
Eosinophils.	4%	9%
Basophils.	0%	0%
Small Lymphocytes.	25%	44%
Large do.	11%	6%

CASE 37. M.B. aet. 12 years.

In this patient, the cutaneous lesion took the form of a large patch of Lupus Exudans, measuring 10" by 8", and/

and of five years duration, involving the left buttock and the posterior aspect of the left thigh. An active spreading margin was present with patches of cicatricial tissue centrally. Before admission to the Colony, she had been treated on six previous occasions with local applications of Carbon Dioxide Snow. A strumous child, and poorly nourished, she weighed 5 stone 2 lbs when treatment was commenced on 28.10.23. So far, progress has **been** encouraging, the redness of activity having **gradually subsided** from the margins, except at the inferior extremity of the affected area, which is now the only really active part of the lesion. Centrally, the areas of cicatricial tissue have extended and now almost completely represent the full extent of the previously active Lupus. The child voluntarily has remarked on the wonderful change which has resulted in the affected area from her exposures to the rays of the Open Arc Lamp. On 14.3.24, she had gained 12½ lbs in weight, showed no cutaneous reaction, and was making good progress physically. Treatment is being continued in the hope that a result may be secured comparable with that attained in Case 15. Complete blood examination carried out on two occasions gave the following results:-

	<u>3. 12. 23.</u>	<u>22. 2. 24</u>
Red Cells:	4,320,000	5,030,000
White Cells:	6,560	10,600
Haemoglobin: - Tallquist Scale -	85%	88%
Colour Index: ... ..	.98	.8
Differential Count:		
- Polymorphonuclears -	58%	60%
Eosinophils.	8%	7%
Basophils.	0%	0%
Small Lymphocytes.	27%	27%
Large do.	7%	6%

CASE.38. J.R. aet. 8 years.

On admission on 15.11.23, a cutaneous lesion was present in the form of patches of Lupus Exudans - one on the volar aspect of each wrist, each patch about 2" square and showing well marked crusting. Arc Lamp Treatment was commenced on 25.11.23. A great reduction in surface exudation has been noted and little or no crusting now occurs. On 14.3.24 the two patches presented a pink coloration, with here and there minute points of exudation. Exposures are still maintained, and present progress points to a satisfactory end result. Her skin so far has shown no/

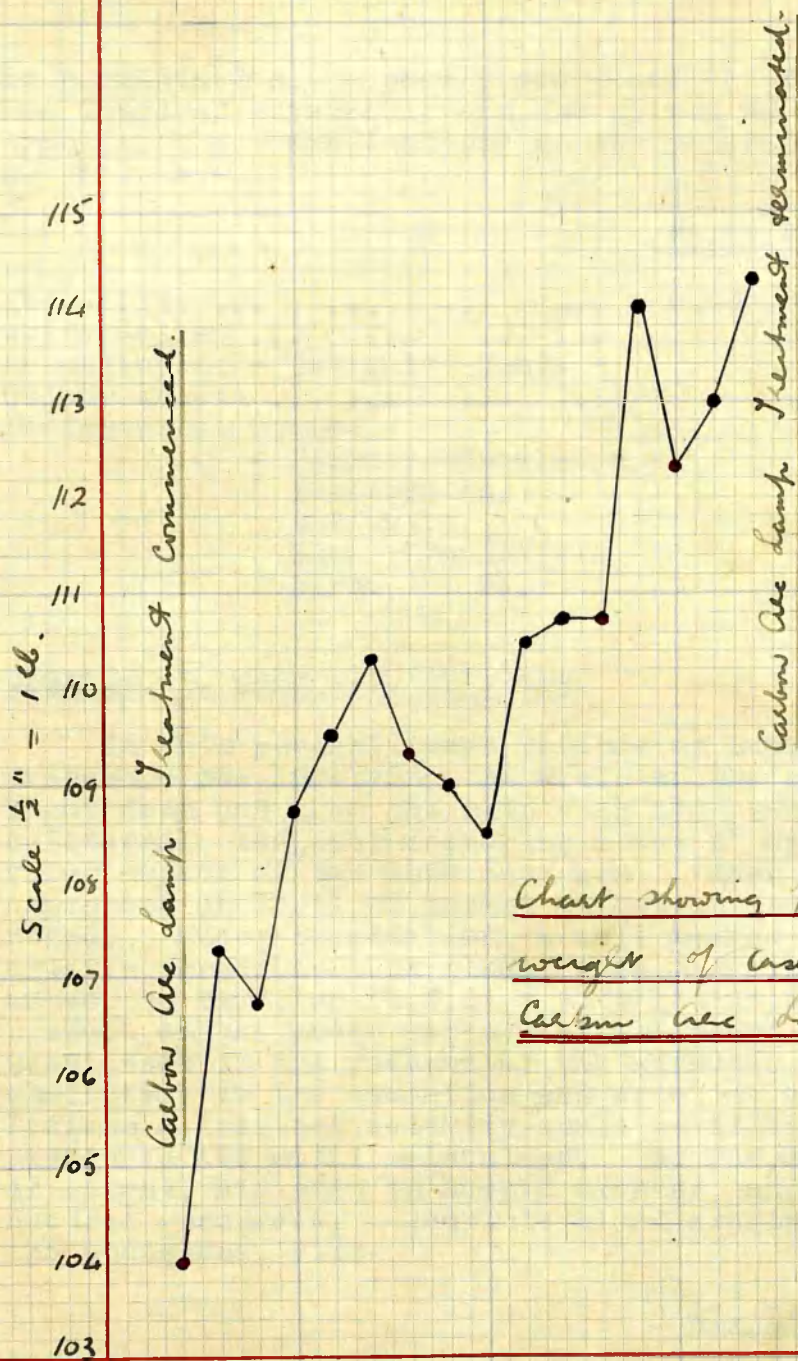


Chart showing progressive increase in weight of Case 39 while under Carbon Arc Lamp Treatment.

Scale $\frac{1}{5}$ " = 1 week.

no pigmentation. A poorly nourished child on admission, she has improved physically and has gained $4\frac{1}{2}$ lbs in weight. Two complete blood examinations on two separate occasions are as follows:-

	<u>25.11.23.</u>	<u>7. 3. 24.</u>
Red Cells:	5,080,000	5,210,000
White Cells:	7,500	7,800
Haemoglobin: - Tallquist Scale -	85%	90%
Colour Index: ... ..	.76	.86
Differential Count:		
- Polymorphonuclears -	67%	72%
Eosinophils.	8%	8%
Basophils.	0%	0%
Small Lymphocytes.	23%	16%
Large do.	2%	4%

CASE 39. D. McG. aet. 26 years.

In this patient, three patches of Lupus Exudans were present - one involving the whole of the great toe of the right foot and also the skin over the head of the first metatarsal, two, each measuring about 2" by $2\frac{1}{2}$ " on the volar aspect of the left fore arm. When treatment was commenced on 25.11.23, marked exudation and crusting were noted. Under irradiation, a well marked disappearance of crusting gradually took place, with a drying up of the affected areas, so that, on 14.3.24, a very little crusting was present on the under surface of the great toe only. From a subsidence in the redness of the affected parts and a decided diminution in the exudation and crusting of the cutaneous lesions a lessened activity could be adduced. Arc Lamp exposures are still maintained. So far, he has gained $10\frac{1}{4}$ lbs in weight, his skin is deeply bronzed, and physically he shows decided progress. Complete blood examination was made on two occasions, viz:-

	<u>27. 11. 23.</u>	<u>20. 2. 24.</u>
Red Cells:	5,140,000	5,350,000
White Cells:	7,500	9,680
Haemoglobin: - Tallquist Scale -	85%	90%
Colour Index: ... ..	.83	.84
Differential Count:		
- Polymorphonuclears -	51%	44%
Eosinophils.	3%	3%
Basophils.	0%	0%
Small Lymphocytes.	41%	49%
Large do.	5%	14%

126 lbs.

Scale $\frac{3}{10}$ " = 1 lb.

102 lbs.

Commencement of Carbon Are Lamp Treatment.

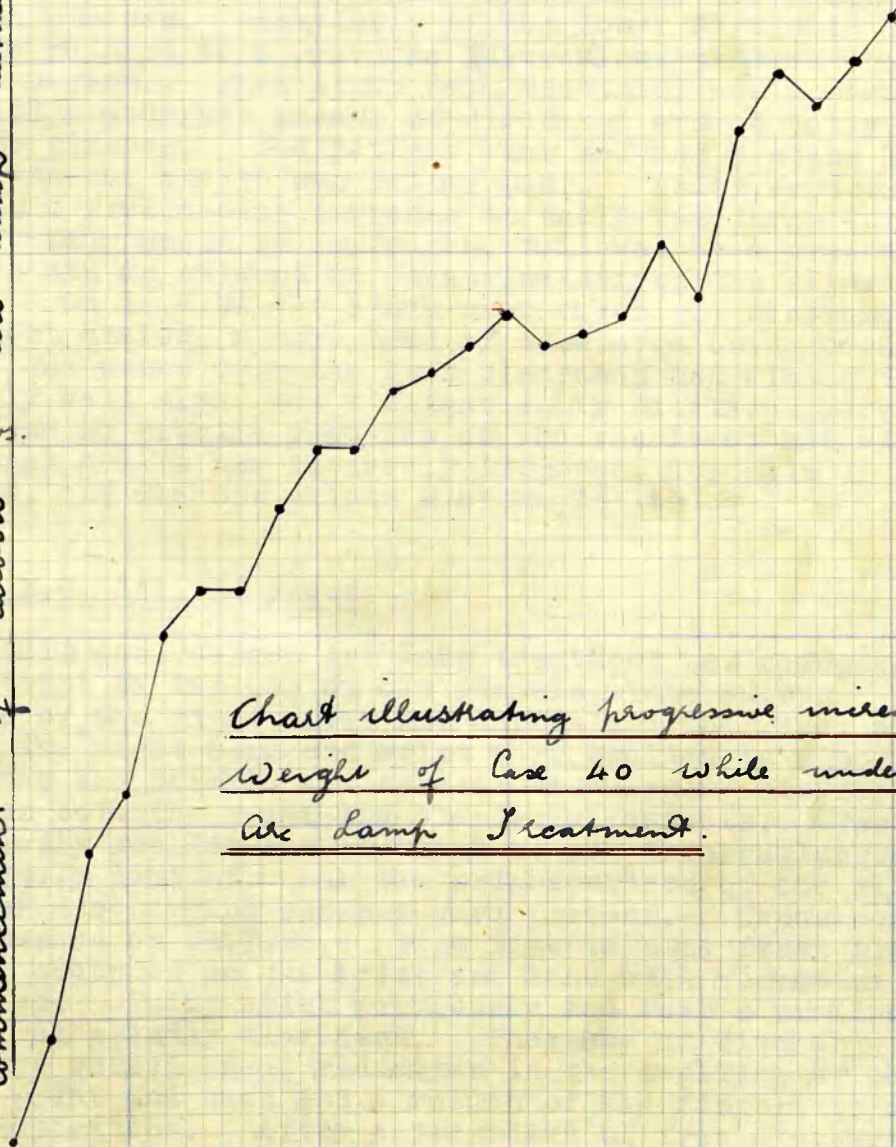
98 lbs.

Scale $\frac{1}{5}$ " = 1 week.

Chart illustrating progressive increase in weight of Case 40 while under Carbon Are Lamp Treatment.

Termination of Carbon Are Lamp Treatment from point of

view of present work.



OSSEOUS TUBERCULOSIS

CASE 40. M.M. aet. 21 years.

This patient was admitted to the Colony on 22.9.23 suffering from old standing Tuberculous disease of both elbows, with a discharging sinus immediately over each olecranon process. Ankylosis of the lower cervical vertebrae pointed to a previous Tuberculous process in that region. When Light Bath treatment was commenced on 27.9.23, a moderate amount of discharge exuded daily from both sinuses. The patient then weighed 7 stone $1\frac{1}{4}$ lbs and her general health was rather poor. Under exposures, there was a preliminary increase in daily discharge during the first four weeks of exposures, followed by a gradual reduction and an attempt at cicatrization of the separate sinuses. On 14.3.24 the sinus over the right olecranon had almost healed, a mere bead of discharge being occasionally noted. The sinus over the left olecranon had closed in remarkably well also, but a slight daily discharge persisted. She has had no febrile reaction as the result of her exposure, her general health has decidedly improved, her skin is deeply pigmented, and she now weighs 8 stone $5\frac{3}{4}$ lbs.

CASE 41. M.C. aet. 45 years.

In this case, Carbon Arc Lamp treatment was commenced in an attempt to improve an old standing Tuberculous affection of the right wrist and carpus and the right elbow joint. The right hand and wrist were swollen to almost three times the normal, and several discharging sinuses were present on both the volar and the dorsal aspects. The fingers were markedly swollen and movement at the interphalangeal joints was extremely limited. In the neighbourhood of the elbow joint, four discharging sinuses were present. Exposures were commenced on 24.7.23. From time to time fresh tissue breakdown occurred in the wrist and hand with formation of new sinuses. Pain, which previously had been a prominent feature, was greatly alleviated. Increase in discharge from the sinuses caused great reduction in the swelling of the affected wrist and hand and a return of the fingers to more normal proportions. After a few weeks of free discharge, the sinuses in the region of the elbow joint gradually closed, with the exception of one, which continued to present a persistent daily leak. On 14.2.24 the swelling of the wrist and hand had been reduced by one half, the fingers could be freely moved, and in shape and size they were approximately normal. One sinus only, in the region of the right elbow joint, continued to/

to present a slight daily crusting. The patient has voluntarily expressed extreme satisfaction at the progress she has already made, and most of all at the alleviation of pain, which, previous to commencement of Light Bath Treatment, was frequently considerable. Her skin shows very little pigmentation so far, and her weight remains stationary. A prolonged period of exposures is expected, and, in spite of the improvement recorded in the Tuberculous lesions, the possibility of ultimate healing is a very questionable matter.

GENERAL OBSERVATIONS ON PATIENTS TREATED BY
THE CROMPTON OPEN ARC LAMP.

(A) Cutaneous Reaction:

In this series of forty one cases of Tuberculosis exposed to the rays of the Open Arc Lamp, no definite indication of progress physically, or in so far as the individual lesions were concerned, or the slightest estimate of prognosis, could be adduced from the cutaneous reaction. During the first few days only of exposure, a cutaneous Hyperaemia, with increased sweat gland activity, was noted: and in one case only, case 20, did a burn of the first degree occur - this being due solely to the patients own neglect of instructions, in exposing the affected side of his face and the corresponding shoulder to the rays of the Open Arc for too prolonged a period, instead of rotating through a quadrant of a circle every fifteen minutes, by which procedure such a result is obviated. The idea underlying this system of irradiation is to secure general and not merely local treatment. In so far as cutaneous pigmentation was concerned, various degrees of it were met with, from a very mild erythema to a well defined bronzing. In sixteen cases no pigmentation was noted - on the termination of exposures in completed cases or in the course of treatment in patients still undergoing exposures. In one patient, Case 14, included in this group, treatment was too brief for reaction to be expected. Of these sixteen cases four proved good end results - Nos. 21, 22, 23, and 25: six improved and are still undergoing a daily exposure of $2\frac{1}{2}$ hours - Nos. 28, 30, 34, 36, 37 and 38: six remained in statu quo - Nos. 5, 14, 26, 27, 29 and 35. In thirteen cases slight degree of pigmentation was observed. Of these, a good end result was secured in six - Nos. 3, 8, 13, 15, 17 and 19: improvement was noted in three - Nos. 20, 31 and 41, the latter two being still under treatment: whilst four remained in statu quo - Nos. 1, 2, 6, and 10. Well marked bronzing occurred in twelve patients/

patients. Of this group a good end result was obtained in four - Nos. 4, 12, 18 and 24: improvement was observed in four - Nos. 32, 33, 39 and 40, all of whom are still undergoing the usual daily exposure: four remained in statu quo - Nos. 7, 9, 11 and 16. In so far as this section is concerned, improvement or otherwise refers solely to the Tuberculous lesions already referred to in the course of this work. In the group of forty one cases discussed, no general rule could be formulated regarding the dependance of skin sensitiveness on the pigment content, since cutaneous reaction to the rays of the Open Arc Lamp was revealed in such a contradictory manner both by blondes and brunettes. Under this system of graduated exposures, no complaints were made of burning or itching of the skin, except in Case 20, where as already noted, a burn of the first degree occurred due solely to the patient's own neglect.

(B) Weight of Patients.

In considering the maintenance of original weight or the gain of further weight in this series of forty one patients, it was noted that six actually lost weight during irradiation. Of these, five were suffering from Tuberculosis in its pulmonary manifestations and one from a glandular condition. Loss of weight varied from $\frac{3}{4}$ lb in case 1, to 8 lbs in Case 10. In two patients, the weight remained stationary - Case 4, who presented enlarged firm and discrete cervical glands, and Case 41, in whom the disease took the form of a well defined osseous lesion. Increase in weight occurred therefore in thirty three patients - the amount varying from 6 ozs in a child, Case 30, after little over a month's exposure, to one stone $4\frac{1}{2}$ lbs in an adult female, Case 40, suffering from osseous Tuberculosis. In estimating the intrinsic value of increase in body weight in so far as the actual effect of the Light Bath is concerned, a difficulty presents itself - many of the cases recorded were in very poor physical condition when exposures were initiated, and might well have progressed equally as satisfactorily in the building up of body tissues, when suitably nourished under the hygienic conditions of an institution such as this. It is however, noteworthy, that loss of weight was in five cases associated with active pulmonary disease, and occurred in one case only of glandular Tuberculosis, Case 27, whose exposures were terminated at an unduly early date, by what was recognised as a lighting up of glandular activity. Whilst gain in weight progressively must be regarded as a very encouraging sequel, it could not be evaluated as of prognostic significance or correlated in any way with progress toward healing of the various lesions. Weight charts are appended throughout this work in order to add interest to the study of individual cases, and to indicate their progress in so far as gain in body weight is concerned while under irradiation by the Crompton Open Arc Lamp.

(C). Improvement in general health of patients.

When an attempt is made to review the effects of irradiation by the Open Arc Lamp on the general health of patients exposed, due regard must be paid to the temperamental peculiarities of individual patients. The psychological factor plays a part - this, in my experience, being especially so in cases suffering from the pulmonary form of Tuberculosis. All things considered, improvement physically was noted in all forty one cases with the exception of Cases Nos. 1,5,6, 7,10 and 27, all of whom with the exception of Case 27 came under the pulmonary group. Case 14 need not be considered owing to her short period of exposure. With these exceptions, muscle tone was well maintained, general health improved, and the patients expressed a feeling of well-being which was indeed encouraging. Especially so was this remarked in patients suffering from glandular Tuberculosis, who, of all types treated, appeared to make most satisfactory progress in the artificial sun bath. In the pulmonary cases above quoted, who presented no physical improvement on termination of their respective periods of exposure, psychological factors probably played a part, since, after an earnest appreciation of beneficial sensations experienced soon after commencement of treatment, several of them appeared to lose faith, and, although they completed their respective periods of irradiation, frankly stated that they felt they had derived no real benefit. In none of the pulmonary cases was an indication for cessation of exposures offered in the way of a lighting up of lesion activity as indicated by temperature elevation or increase in pulse rate or by clinical findings in the lungs. Lassitude and headache might well be due to the monotonous period of daily exposure of two and a half hours: although such a complaint was always regarded as an indication for a thorough clinical examination of the patient. In Case 27, in whom the disease assumed a glandular form, physical progress was impeded by the more powerful influence of an activated process. Whilst improvement in general health did occur in thirty four patients, it could not be regarded as solely due to the irradiation of the Open Arc Lamp, in view of the ideal conditions for a healthy life existent here. It could only be taken as evidence of the absence of noxious effects from the Light Bath, provided all psychological factors and temperamental peculiarities of individual patients were duly recognised and given full consideration.

(D). Blood examination.

In ten cases, all of whom with one exception, Case 19, are/

are still under treatment at the date of closure of this work, two complete blood examinations were performed at intervals varying from two to three months. An increase in the Red Cell Count was noted in all except one, Case 19; an increase in the White Cell Count was noted in all, with one exception, Case 34, where an equal result obtained on both occasions; whilst the Haemoglobin percentage, as estimated by the Tallquist Scale, had increased in all except in Cases 31 and 36, where it remained stationary. No useful information was gained from the Differential Counts toward the gauging of results or the estimation of progress of individual lesions under this system of graduated exposures to the Open Arc Lamp. Whilst specimens mentioned are too few to allow of rigid conclusions, it is noteworthy, that, under the influence of the rays of the Open Arc, an improvement did occur in the condition of the blood: it being fully understood, that all patients subjected to this form of treatment were living under the most suitable conditions for physical improvement, quite apart from the additional factor of artificial sunlight as supplied by the Open Arc. The finding of blood improvement indicated general progress and therefore negated the possibility of a deteriorating influence of the Light Bath in the cases concerned. It could not be regarded as solely due to this special form of treatment.

(E). Temperature and Pulse Records.

As already noted, these readings were made on each occasion immediately before exposure, immediately after exposure, and again two hours later. An elevation of 1°F - 1.5°F on a termination of an exposure was generally noted, with subsidence to normal on the third reading: also an increase of 10 - 15 beats per minute in the pulse rate, subsiding as the temperature.

(F). Indications for reduction or temporary or permanent cessation of exposures.

On account of the temperamental peculiarities of individual patients, it is a difficult matter to weigh fairly objective sensations. Complaints of headache and lassitude are indications for caution and thorough clinical examination of the patient. Psychological factors must in this connection be given due consideration. Temperature records, I consider, the most accurate means of gauging the reaction of the individual to the Light Bath - an elevation of 2°F or more at the termination of an exposure being regarded as an indication for reduction of exposure, or cessation, temporary or permanent, such procedure depending on the features presented by each case individually. This is well illustrated in Case 35. In this connection also, a/

a temperature of 99°F or over, immediately before commencement of exposure, is a contra indication to persuance of treatment, temporarily or permanently, as illustrated in Case 27. Variations in pulse rate, I have not been able to recognise as of equal value. As already observed, on no occasion has clinical examination of the chest in patients presenting pulmonary lesions, indicated the necessity for caution from the occurrence of increased **lesion** activity.

SUMMARY OF RESULTS OBTAINED IN THE
DIFFERENT TYPES OF TUBERCULOUS LESIONS.

(1) Pulmonary Tuberculosis.

Twelve cases presenting Pulmonary involvement were subjected to irradiation by the Crompton Open Arc Lamp during the year, March 14th 1923 - March 14th 1924. Of these, one, Case 33, was put under treatment with a view principally to reduction of glandular enlargement in cervical region: one, Case 8, presented facial Lupus which improved under exposures: and one, Case 6, in addition to his pulmonary lesion, suffered from a troublesome Laryngeal affection as already noted. Irrespective of the duration of their respective periods of exposures, in no case could improvement in the lung lesions be detected - on the other hand, no evidence was presented, from clinical examination of the cases individually, of any deteriorating influence exerted by the Light Bath on the respective lesions. Omitting case 14, whose period of treatment was too brief for proper evaluation of results, five of the patients presented no evidence of progress physically on termination of their exposures to the Open Arc, whilst six showed progress of varying degree - the most decided headway physically being made by Case 16, whose treatment was commenced immediately after her admission to the Colony when her general condition was rather poor.

(2). Laryngeal Tuberculosis.

One patient only, case 6, who, in addition to a well defined pulmonary lesion, presented an oedematous epiglottis with a ragged ulcer at the tip, is included in this group. He suffered from recurring hoarseness and pain for which an analgesic spray was required. On termination of a period of exposures/

exposures extending from 14.3.23 to 6.7.23, his general condition showed no improvement - his pulmonary condition remained in statu quo - hoarseness and pain were in no way alleviated by the Light Bath nor was the slightest indication of healing of his Laryngeal lesion discovered on laryngoscopic examination.

(3) Cutaneous Tuberculosis.

During the year, exposures were applied to eight patients suffering from Tuberculous skin affections. Of these, five presented areas of Lupus Exudans, and in three, the lesion took the form of Lupus Non-Exudans. From the progress of individual cases noted earlier in this work, more satisfactory results have been obtained in the former variety of Lupus. Case 15 is an admirable exponent of the effect of the Light Bath on an affection of this kind. Undoubtedly, a prolonged period of exposures has been required, but the result already secured is decidedly encouraging and an admirable sequel to the experimental application of the rays of the Open Arc Lamp in the treatment of Cutaneous Tuberculosis. Marked reduction of crusting and subsidence of marginal activity has been remarked upon, whilst central cicatrization appeared to be stimulated by the irradiation. In cases 36, 37, 38 and 39 rapid improvement has occurred, and all four are still undergoing a daily exposure with a view to securing a healing comparable with that attained in Case 15. From results so far observed, such may be confidently expected after a prolonged period of treatment. Equally encouraging results were not secured from the irradiation of patients suffering from areas of Lupus Non-Exudans. In Case 8, the low activity of the lesions in all probability accounted for the rapid arrest. In Case 34, whilst slight diminution in size of facial patch has been observed, no change in the other affected areas has occurred. Case 34 remains in statu quo, although daily exposures have been continued since 24.10.23. The latter two are still under treatment. One noteworthy feature is, that in all eight cases physical improvement has taken place, and in no way has the light bath exercised a deteriorating influence on the general condition of these patients or on their respective lesions. Observations made during the year point to a prolonged period of exposure being required in this variety of Tuberculous affection.

(4) Glandular Tuberculosis.

Twenty one patients are included in this group. Twelve presented discharging sinuses at commencement of exposures, in two, sinuses formed during treatment owing the breaking down/

down of glandular tissue and overlying skin, six presented firm discrete glands of varying size, whilst in one case, irradiation was given a trial with a view to improving existing glandular cicatrices in the light of previous results. It was noted that, when discharging sinuses were freely exposed to the rays of the Open Arc Lamp, an increase in daily discharge occurred during the first few weeks, followed by a gradual reduction, diminution in size of associated glandular thickenings, and finally closure of sinuses. The cicatrix formed, presented a healthy pink appearance - absence of keloid was a marked feature - and a supple scar, on a level with adjacent skin, gradually blended more and more with the colour and texture of surrounding healthy tissues. The breaking down process was apparently stimulated to increased activity, as was also the subsequent process of repair. An example of the beneficial effect of this mode of treatment in glandular Tuberculosis, where sinuses are present, is afforded by Case 3, whose sinuses, in just under four months of daily exposures, were favourably healed. He was discharged from the Colony on 6.7.23, firm cicatrices replacing old standing sinuses. On 23.2.24 he was readmitted, complaining of lassitude, loss of weight, and general weakness, presumably due to insufficient food and unhygienic home conditions. The scars still maintained their soundness, and no recurrence of glandular activity had taken place since the date of his discharge. Case 13 also illustrates the rapid healing of an old standing sinus under the Light Bath. Other cases, quoted, point to the value of this line of treatment in the production of firm supple cicatrices to replace recent or old standing sinuses. The reduction or complete disappearance of associated gland masses was noteworthy in the light of the application of irradiation by the Open Arc Lamp to inoperable glandular enlargements, with spontaneously or surgically produced sinuses. Cases 18, 20 and 31 afford an indication for the further application of this method in such cases - Case 18 especially - since his treatment period was fully completed and an admirable result obtained. The progress made by Case 20 before his departure from the Colony, and the improvement in his facial contour, also the gradual subsidence of a large glandular mass in Case 31, who is still undergoing a daily exposure, serve still further to lend weight to the observation made of the beneficial effects of the Light Bath in such glandular cases. The question of undue lighting up of glandular activity at the root of the lungs arose in the consideration of Case 27, whose cervical glandular condition and chest condition appeared insufficient reason for temperature elevation. In view of the observations made of Cases 19, 28 and 32, the latter two especially, such a possibility might well be considered. In Case 17, five discharging sinuses were well healed in a period of less than three months, and their quality and suppleness/

suppleness offered a striking contrast to existing cicatrices, in the repair of which no special method of treatment had been adopted. The reduction of disfigurement by the application of the Light Bath was an additional feature. Such definite results were not obtained in patients presenting firm discrete glandular enlargements of the Hodgkin's type. In one case only, Case 33, was complete subsidence noted; of other five patients presenting a similar type of glandular affection, reduction of varying degree occurred in three, whilst two remained in statu quo. Of special interest was the observation that patients suffering from glandular Tuberculosis, before all other types treated, progressed physically, and voluntarily expressed an appreciation of the beneficial effects of the exposures to the Open Arc Lamp.

(5) Osseous Tuberculosis.

In this group two cases are included - Cases 40 and 41. While both are still undergoing daily exposure, at the date of conclusion of this work, favourable progress has been made. As in glandular lesions with associated sinuses, so in the Osseous form also complicated by sinus formation, a stimulation of the breaking down process has been observed. In Case 41, marked reduction in swelling has thus occurred with a return of affected parts to more normal proportions and with a decided alleviation of pain. A favourable end result might be expected in case 40, in view of the gradual process of sinus healing, but in case 41, prognosis must be guarded on account of the extent of the Osseous involvement. While improvement has undoubtedly occurred after a prolonged period of daily exposures, a further prolongation of this period will be necessary and final healing a very questionable matter.

CONCLUSIONS.

From the year's experimental application of the rays of the Crompton Open Arc Lamp in the treatment of those various types of Tuberculous lesions, I am convinced of the inestimable value of this method of treatment in patients suffering from glandular Tuberculosis, especially when glandular enlargement has discharging sinuses in association. The Light Bath might be employed with beneficial results in the healing of post-operative glandular wounds, and in the reduction of inoperable gland masses presenting areas of caseation, with sinuses formed spontaneously or surgically produced. In exposed and superficial Tuberculous lesions resulting from the caseation of affected glandular tissue, with ultimate rupture spontaneous or otherwise of a Tuberculous abscess/

access so formed, irradiation by the Open Arc Lamp would expedite healing and conduce to the formation of a firm supple level cicatrix. Through the initial stimulus applied by the rays of the Open Arc to the process of caseation and the subsequent stimulation of the process of repair, a striking adjunct to success is added to the treatment of glandular conditions which is solely surgical. In patients presenting firm discrete glandular enlargements without evidence of breakdown, its value has been proved, though to a less degree than where open sinuses exist. An additional important feature in the treatment of glandular Tuberculous lesions by this method is the absence of keloid from the terminal cicatrices, and therefore the minimum of disfigurement produced when the healing process is complete. Undoubtedly, in an Institution such as this, hygienic conditions and good nourishing food serve to enhance the effect of such irradiation, but, even when due regard is paid to all such considerations, the intrinsic usefulness and beneficial sequels of this system of graduated exposures to the open Arc Lamp in patients suffering from glandular Tuberculosis must be evaluated highly.

While in Cutaneous Tuberculosis the results are less striking, and a much more prolonged period of treatment is indicated, the method deserves full recognition in view of the dilatory response of such superficial lesions to other forms of treatment. In patients presenting areas of Lupus Exudans, a prolonged period of exposures is likely to produce a favourable end result - in Lupus Non-Exudans, in the light of findings recorded in this work, progressive improvement and ultimate healing is a very doubtful matter.

In so far as Osseous Tuberculosis is concerned, the two cases quoted suggest further experiment. It might be beneficially employed in cases presenting open sinuses following surgical procedures, and serve a useful purpose in an association with the surgical treatment of bone lesions.

In the improvement of patients with Laryngeal involvement, no opinion can be offered, since, during the year, only one such case was subjected to the irradiation of the Open Arc Lamp: and in the case of patients presenting a Pulmonary lesion, while the findings recorded are not encouraging, further experiment on different lines might be found to offer an indication for the application of this method of graduated exposures to the Open Arc Lamp in specially chosen cases.