body, except over an area covered by short trunks worn by the patient while undergoing treatment. He had also found the light bath a valuable adjunct in cases of tabes with debility when, owing to the patient's general condition, intensive antisyphilitic treatment had ceased to be efficacious, or had actually become harmful.

Dr. GILCHRIST (Baltimore, U.S.A.) described a new method of measuring the dosage of ultra-violet light by means of lithopane. He referred to attempts in the United States to ascertain whether it might be possible to desensitize individuals vulnerable to light by means of small doses, just as desensitization to proteins could be produced. He also mentioned the discovery of a new range of rays between the ultra-violet zone and x rays, which were called "border" rays. Investigations in haematoporphyria had revealed that the cause of death was the depression of blood pressure and dilatation of vessels. In lupus he had found diathermy the best method of treatment. He was optimistic about the treatment of psoriasis.

Sir NORMAN WALKER (Edinburgh) indulged in reminiscences. He said that the London Hospital lamp employed thirty years ago in Edinburgh did not then apparently give good results, but ultimately the patients did well. He asked whether strong lamps acting for a short time had as good an effect as weaker lamps acting for a longer time. His great recipe for the successful treatment of lupus was perseverance. Another indispensable factor was early and accurate diagnosis, which nowadays was far better than it used to be. He expressed optimistic views as to the prognosis and treatment of psoriasis.

Dr. W. MITCHELL (Bradford) preferred diathermy to any other treatment for lupus, owing to the excellent scars which were left. He also used it in the treatment of cancer of the tongue and tonsils. He mentioned an interesting case of a girl who developed menorrhagia after every exposure to ultra-violet light.

Dr. A. C. ROXBURGH (London) referred to the employment of ultra-violet light in the diagnosis of ringworm of the scalp. Infected hairs examined in a dark room by ultra-violet light passed through a piece of Wood's glass shone with a brilliant green fluorescence. They had been using this method at St. Bartholomew's Hospital for the past six months, both for detecting very early infections and for deciding whether cure had been attained after perhaps rather incomplete epilation with either thallium or x rays. He had found ultra-violet light very useful in tuberculosis of the skin as an adjunct to local treatment, but in one or two cases he had seen an unsuspected tuberculosis of the lungs light up. Other conditions which did well were multiple boils, superficial sepsis, and, in a few cases only, chronic dermatitis and eczema; the latter were very easily irritated by light, and treatment should commence with extremely small doses. He had found local applications by mercury vapour or the tungsten arc most useful in healing ulcers and sluggish wounds—as, for example, after mastoid operations—also in various forms of alopecia and impetigo contagiosa, but not in cases of premature baldness. In psoriasis progress was slow and uncertain. Acne vulgaris and rosacea sometimes benefited, but on the whole did better with x rays. Telangiectases following excessive x -ray treatment could be materially reduced by local treatment with the mercury vapour lamp.

Dr. HOWITT (London) said that the action of the sympathetic nervous system was an important factor in ultra-violet light therapy. He also emphasized the necessity of perseverance if good results were to be expected.

Dr. KERR RUSSELL (Newcastle-on-Tyne) said that there was no difference between the results obtained at Dr. Rollier's clinic at Leysin, where natural ultra-violet light radiations were used, and those obtained at the Finsen Institute, Copenhagen, where carbon arcs were solely used. Those who thought sunlight superior to artificially produced radiation should ask themselves, How could sunlight be used for the treatment of a case, say, of port wine stain? For these cases a lamp of the Kromayer type was essential. He deprecated the allusions to the psychical effects of the treatment.

Dr. CHRISTINA BARROWMAN (Newcastle-on-Tyne) said that ultra-violet light had a very wide application in the treatment of burns; the relief of pain, the prevention and cure of sepsis, the healing of fairly extensive areas without grafting and with little evidence of cicatrization, and the general appearance of well-being of the patient were important features. On the Continent the ultra-violet rays had been successfully applied through cellophane dressings; use of this artificial silk fabric avoided frequent change of dressings and allowed very easy application of ultra-violet rays. Recent infections of *tinea capitis* yielded to the action of the rays; she had cured a baby aged 2 months with two applications. In more chronic cases, although some of the recently infected areas disappeared, examination under Wood's glass showed that infection was still present.

The PRESIDENT emphasized the frequency of carcinoma following x -ray treatment of lupus, and sounded a note of warning as to the possible risk of a similar danger after the use of ultra-violet rays. An attempt should be made to find out the general principles which underlay the treatment. He suggested that in lupus there was always a positive skin reaction; this indicated that in lupus the antibody to tubercle was anchored in the skin. When the skin was exposed to ultra-violet rays an erythema was produced that caused congestion of the skin and absorption of those antibodies which were carried by the circulation to the tuberculous lesions. In all infective diseases where a positive skin reaction was present the ultra-violet ray treatment was likely to do good.

Dr. DORE, in reply, agreed that in lupus vulgaris other methods, such as diathermy and the use of salicylic acid, should be combined with light treatment. Continuous daily applications were required, but excessive exposure might have the opposite effect to that desired. Eidinow had recently stated that there was a period of immunity, lasting fourteen days, following the exposure of a given area to ultra-violet light, and suggested that better results would be obtained if that interval of time were allowed to elapse between the exposures. In the case of children it had been shown that too long or too frequent exposures had a detrimental action. He had tried the treatment of ringworm by ultra-violet light without success. Although it was possible that a superficial infection in an infant might respond (as it would to antiseptic applications), ordinary ringworm of the scalp in children could not be healed successfully in this manner.

THE TREATMENT OF LUPUS ERYTHEMATOSUS BY KRYSOLGAN.*

BY

HENRY C. G. SEMON, M.D., M.R.C.P.,
Physician to the Skin Departments, Royal Northern and
Hampstead General Hospitals.

THE etiology of lupus erythematosus is still a matter of conjecture, and no decisive facts have emerged since Dr. A. M. H. Gray summarized the position in a paper read before the British Association of Dermatology and Syphilology at Manchester in 1925. Two theories of causation are favoured—the tuberculous, mainly in France and Germany, and the streptococcal, which finds its chief adherents in this country.

The results of the gold therapy of the disease, which were not considered at Manchester, seem to me, so far as they go, to support the tuberculous theory, and I am further inclined to that assumption by a consideration of the facts elicited by Jörgen Schaumann from three *post-mortem* examinations of patients who died as a result of, or in the course of, the disease. This author's brilliant work on certain sarcoids, which he has renamed the benign lymphogranulomata, is well known, and entitles his present pronouncement in the case of lupus erythematosus to more than a cursory perusal. In these three fatal cases Schaumann demonstrated a "special granulomatous process in the lymphatic system, combined in the third case with classical tuberculous lesions, in which necrotic phenomena were conspicuous. . . ."

* Read in the Section of Dermatology at the Annual Meeting of the British Medical Association, Edinburgh, 1927.

I need not here detail the exact cellular structure of the tissue to which he refers; it is only necessary to emphasize that "disseminated in that tissue there were to be seen many small tubercle-like foci, mostly well defined, and often surrounded by a zone of lymphoid cells." Inoculations from these foci into guinea-pigs were negative as regards tuberculosis, but several weeks later the animals mostly succumbed, either to pneumonia or to a form of marasmus, in exactly the same way as had occurred after similar injection experiments with specimens from cases of sarcoid disease (benign lymphogranulomatosis), the tuberculous nature of which is now generally accepted as proven. The author further points out that coccal infections are not infrequently a terminal event both in lupus erythematosus and other "lymph system" diseases, and to me it seems likely that there is in lupus erythematosus an acquired susceptibility in this respect, which may account for the undoubted frequency of focal sepsis in tonsils, antra, frontal sinuses, and even teeth, in many of the cases, and may come to be regarded eventually rather as a complicating than as an etiological factor in the pathology of the disease. Some further support of Schaumann's belief is afforded by the "leucocytic formula" of lupus erythematosus, which closely resembles that usually found in the benign tuberculous infections; but the most cogent argument, and one which it is in the capacity of all of us to examine and criticize, is that based on the previous history, personal and family, and the results of the von Pirquet or complement fixation tests, in the individual patient. I am persuaded that, in the words of Schaumann, "les observations cliniques montrent trop souvent l'apparition du lupus erythémateux chez des anciens scrofulo-tuberculeux pour que nous puissions écarter toute idée de rapports de cause à effet." In the series, short though it is, of the krysolgan-treated cases I am about to report there was in the majority a history either of pulmonary tuberculosis or pleurisy, and the results of the von Pirquet test in the remainder were at least suggestive of a tuberculous diathesis.

The gold treatment of tuberculous manifestations of all kinds has been on trial for the past two years. There is no doubt of the value of the procedure in certain types and stages of this protean disease, and krysolgan is an attempt by the well known firm of Schering to produce a relatively non-toxic salt of the metal. It has the formula $C_6H_5.NH_2.SAuCOONa$, and is a member of the group of gold-thio-phenols. It is administered solely by intravenous injection, and should be dissolved in the retaining ampoule in one or two cubic centimetres of sterile distilled water. The makers state that in non-tuberculous cases "no effect is observed even after doses of 7.5 grains." The highest single dose advised in the treatment of lupus erythematosus is 1.5 grains. I have not exceeded 1.25 grains, for the drug is cumulative, and when, a week later, that dose was followed by one of 0.75 grain there ensued (Case 1) symptoms of prostration and cardiac weakness, although no permanent harm resulted.

The question of dosage is the most disputed point in connexion with the drug, and while the pioneers are still in doubt it is perhaps wise to err on the side of caution, even at the risk of therapeutic failure. My practice nowadays is to commence with a dose of 0.015 grain. A week later 0.15 grain is given, and then 0.375 grain. If no toxic symptoms supervene, the next dose would be 0.75 grain, but if improvement has manifested itself on the previous dose I should prefer to repeat it, and continue to do so weekly while its effects were favourable. Every case selected for the treatment must be tested for albuminuria, which, if caused by renal tuberculosis, is a direct contra-indication. One of the only two deaths recorded in the literature was due to anuria, resulting from a severe focal reaction to the drug.

There are other toxic symptoms besides albuminuria, but none of them so serious—for example, stomatitis, and dermatitis which may resemble that due to novarsenobillon, or more anaphylactic in type and resembling urticaria or erythema multiforme. I saw the latter type in one of my series (Case 1). Fleeting pains in fascial spaces are very common, especially in the neck and round the knee-joints, and it may be mentioned here that I found an intravenous

injection of 0.6 gram of sodium thiosulphate exceedingly quick and efficient in their removal in one severe case. Depression, fatigue, and melancholic tendencies were rather prominent in three cases. Febrile reaction, at any rate in the two cases observed as in-patients at the Royal Northern Hospital, were conspicuously absent. Focal reaction, indicated subjectively as irritation, and visibly as an increase in erythema, I have come to regard as of favourable prognostic import, though its absence need not discourage further treatment (Case II).

Since the first case in which I made trial of it exhibited some interesting and characteristic features, I report it in rather more detail than I shall give to the others.

CASE I.

A married woman, aged 50, came home from China in 1903 with suspected pulmonary tuberculosis, which was not then confirmed in London. In 1905 she had two or three attacks of pleurisy. Erysipelas of the face occurred in 1918, and in 1923 there appeared crusting in the nose, headaches, and a tendency to eczema behind the ears, with loss of hair. In 1924 a redness appeared on the scalp margin, forehead, and in front of the ears. On November 26th, 1925, the patient had a scaly superficial type of lupus erythematosus of the pre- and post-aural regions, the forehead, and scalp margin. Very little cicatricial tendency was observable. She was a rather feeble subject, with cardiac extrasystoles, a poor colour, some dullness at the right base (? old pleurisy), and some crusting in the nasal cavities. On January 23rd, 1926, she had an operation for right antritis; a vaccine was made from a streptococcus recovered from pus. From February to April, 1926, twelve injections of the autogenous vaccine were given without any benefit to the lupus, and on May 28th the facial lesions were as above, and there were also scaly macules of a bright reddish tint on the backs of the hands and on the neck.

Krysolgan injections were given as follows: on August 8th, 0.0015 grain; on August 25th, 0.015 grain; on September 1st, 0.375 grain; on September 8th, 0.75 grain; and on September 15th, 1.125 grain. Severe joint pains followed this dose, with slight pyrexia and some hyperaemia of the lesions. No pyrexia was observed at any other time. An injection of 0.75 grain on September 22nd was followed the next day by symptoms suggesting cardiac instability and weakness, for which rest in bed was enjoined. On October 6th the patient felt better; all the lesions were paler. On October 20th 0.75 grain was given, and on November 3rd local hyperaemia was pronounced; additionally there were a few rose-coloured and yellowish-brown "medallion" lesions at the waist line (? von Noorden's anaphylactoid rash). On November 24th all the lupus lesions had involuted; there was delicate scarring, and over the right pre-aural region a slight brownish-purple discoloration, possibly due to local direct action and deposit of a gold salt. In March, 1927, the husband reported that the lesions had not recurred and that the general health was in every respect greatly improved. He added that he would immediately acquaint me of any local or general manifestations that might take place in the future.

In this case we cannot, I think, ignore the very striking history, which is suggestive both from the tuberculous and streptococcal points of view. Apart from the suspicion of pulmonary tuberculosis, there were three attacks of pleurisy, while erysipelas, antritis, and other evidence of a susceptibility to streptococcal infections may have had some etiological influence at a later date. Her general condition was poor at the commencement of the treatment, and appeared to be aggravated by the autogenous streptococcal vaccine from the antral infection. The spread of the eruption to the backs of the hands at this period suggests that the streptococcus was the actual sensitizing agent. It is a fact that the lupus erythematosus was completely eradicated in this case, but not before the patient had run some risk by the more or less severe anaphylactic reactions set up by the krysolgan injections. That these effected a cure of the local condition was gratifying, but even more so was the effect on the general health. The symptoms of fatigue and mental lassitude, the weak action of the heart, and the inability for sustained effort of any kind were greatly benefited, and, in her husband's words, "she is now capable of doing much more than formerly, has more strength and energy, tires less easily, and, in short, has astonished me by her capacity for sustained effort. Her heart, too, which had given her so much trouble, is now much stronger—very little pain and palpitation, oedema, etc., now."

To me it would seem that in addition to the visible effects of the treatment on the lupus lesions there must have been some subtle action of the drug on some deep (possibly glandular) focus of an active type in the chest or abdomen.

CASE II.

A single woman, aged 67, had had scattered lupus erythematosus of the face, neck, tip of nose, and right ear for seventeen years. There was no history of tuberculosis or pleurisy either in herself or family. Various treatments, including carbon dioxide snow, autogenous vaccines from enucleated tonsils (1919) for a period of six months in a London hospital, and local applications, failed to do more than afford temporary relief.

On admission to the Royal Northern Hospital on January 13th, 1927, the von Pirquet reaction was strongly positive and persistent. She was of a stout, pale, phlegmatic type, and breathlessness ensued on slight exertion. Cardiac enlargement, and weakness of the cardiac musculature, with a pronounced pre-systolic bruit, were obvious features in the case.

Between January 13th and February 23rd, 1927, five doses of krysolgan were administered at weekly intervals, rising from 0.015 to 0.75 grain—in all only 2.04 grains. On March 9th all the lesions had completely involuted, leaving delicate, pale, and almost invisible atrophic patches in their original sites.

This patient had always been subject to vague rheumatic pains around the joints. They were greatly aggravated, especially in the neck muscles and around the knees, by the injections. The intravenous administration of sodium thiosulphate (0.6 gram) was very effective in relieving.

CASE III.

A married woman, aged 42, had had lupus erythematosus of the face, nose, tip of right ear, and scalp for twenty years. The lesions were scaly, of chronic erythematous and very irritable type. Scarring was very slight. She had had pleurisy seven years previously. Auscultation and x rays revealed nothing abnormal; the von Pirquet reaction was slightly positive. She received many local treatments—carbon dioxide snow, Kromayer lamp, phenol lactic inunctions, etc.—without much benefit.

She began krysolgan treatment, as an out-patient of the Royal Northern Hospital, on February 2nd, 1927. Between this date and March 30th four injections of krysolgan were given, rising from 0.015 to 0.75 grain—1.515 grains in all.

On April 27th the facial lesions had involuted, and the scalp lesion, which had shown marked local irritability throughout the course, was pale and no longer tender to the touch.

When seen on June 30th the facial lesions had not recurred, and the patient looked and felt extremely well. She had put on 2 st. in weight since she first began the krysolgan treatment. The scalp lesions had not benefited at all from the treatment, and a further course, together with iodine (French *Codex*) by the mouth, has been decided upon.

CASE IV.

A married woman with two children had had a typical butterfly distribution of succulent type for two years. There was no tuberculous history. A sister also has lupus erythematosus, and attended with the patient on one occasion for diagnosis. In December, 1926, an abdominal mass in the ileo-caecal region was thought by Dr. Bruce-Williamson to be due to tuberculous glands. The von Pirquet reaction was very violent, and accompanied by fever and prostration for three days. Focal reactions developed in the lupus lesions a week later, and subsequent paling was noted at a later date. The improvement was only temporary.

She was admitted as an in-patient on March 20th, 1927. Examination for focal sepsis in the teeth, sinuses, and tonsils was negative. Between March 23rd and May 19th six injections of krysolgan were given without any constitutional effects; dosage 0.015 to 0.375 grain at weekly intervals.

On May 19th there was great improvement in the general health, with gain in weight and decrease of the ileo-caecal mass. The lupus lesions, which had reacted throughout with increase of irritation, were still present on the cheeks and bridge of the nose, but were reduced to linear dimensions, the central portions having cleared up without any tendency to atrophy or scarring. She is continuing the treatment with injections as an out-patient.

CASE V.

A married woman, aged 27, first seen as a private patient on December 12th, 1925, had had lupus erythematosus of the cheeks and temporal regions for four and three-quarter years. The tonsils had been removed at another dermatologist's suggestion, also several teeth, without benefit to the eruption. Vaccines from the above sources proved ineffective. At her confinement all the lesions involuted, but recurred a few months later.

During treatment applied by me between March 19th and November 29th, 1926, six injections of silver salvarsan effected a marked improvement. Other treatments included application of carbon dioxide and Unna's microbrenner, quinine and tincture of iodine (French *Codex*) by the mouth without ascertainable results. Krysolgan was begun on November 29th, 1926, and doses of 0.375 grain to 1 grain were given at intervals of not less than a week. Up to May 22nd, 1927, 5½ grains had been administered. There is now very great improvement, three of the lesions—those in the temporal regions and on one cheek—have completely involuted, the former with a slightly bluish relic (? gold deposit); there is a slight tendency of a very small lesion to persist on the right cheek.

CASE VI.

A man, aged 46 (a private patient), twenty years ago was treated for pulmonary tuberculosis in a sanatorium in California. He first consulted me on June 25th, 1925. Fifteen years ago he first noticed a warty and flaking condition of the nose in the region of the left nostril, and similar small patches behind both ears over the mastoid processes. When first seen by me he had typical but exceedingly chronic lupus erythematosus, which had led to some considerable atrophic deformity in the left naso-labial

angle. Previous treatment by radium in New York was doubtless responsible for the few telangiectases present. There was scarring of the patches over the mastoid processes. The lupus was slowly progressing with a raised scaly edge on the left upper lip. The internal aspect of the left choana was slightly affected.

On June 25th, 1925, carbon dioxide snow was applied to the advancing edges; two applications were sufficient, and the patient returned to America. When seen again, on March 21st, 1927, the condition was very much the same as when he was treated two years previously.

A course of krysolgan treatment was agreed to, and between March 21st and May 13th six doses, rising from 0.075 to 0.75 grain, were injected—2.3325 grains in all. On May 13th, 1927, there was very definite flattening of the raised hyperaemic edge, and complete cessation of the tendency to scale. A complete cure could not, however, be claimed. Throughout the course the patient complained of more or less severe pain in the back of the neck, and a feeling of fatigue and mental depression. I think that in this case the marked cicatricial effects of the disease and the consequent damage to the local circulation militated against a free access of the drug to the affected area.

CASE VII.

This patient, a man aged 30 (a severe case of neurasthenia due to shell shock), had been under treatment by various physicians at the Ministry of Pensions and the Hampstead General Hospital since 1915. On July 20th, 1925, the lupus erythematosus was limited to the scalp, where there was an extensive cicatricial, hyperaemic and denuded patch including the vertex, frontal, and some of the parietal areas.

The nervous state of the patient prohibited any drastic local applications, and treatment was confined to soothing lotions and the internal administration of tincture of iodine (French *Codex*), which was continued without any effect on the local condition, but with benefit to the general health, until December, 1926. There was no history of any tuberculous condition in the patient or his family. The von Pirquet test was weakly positive.

From January 24th to April 4th, 1927, krysolgan treatment was given in doses rising from 0.015 to 0.75 grain weekly, the total administered being 3.3 grains. The result showed no appreciable objective effect on the lesions at the conclusion of the course, although there appeared to be some increase of the hyperaemia, and the patient complained of aggravation of the irritation after two of the larger doses.

Note.—It is, of course, open to question whether the diagnosis of lupus erythematosus was justified. Syphilis was excluded by a Wassermann test.

CASE VIII.

A man, aged 33, first seen on August 6th, 1926, had a nine years' history of a red scaly patch limited to the bridge of the nose; there was a slight cicatricial tendency. He was subject to frequent sore throats and colds. There was no suspicion of tuberculosis in the patient or his family. Carbon dioxide snow applications effected some improvement, but on February 28th, 1927, there were four fresh areas or relapses in the previously affected area. From March 21st to May 23rd, 1927, four injections of krysolgan—1.88 grains in all—effected a striking improvement in the local lesions. There was brownish discoloration in the central part of the area, similar to that described in Cases I and V.

This case cannot be claimed as a cure, and is still under observation.

CASE IX.

A man, aged 41, an out-patient at the Royal Northern Hospital, had typical butterfly localization of the chronic scaly indurated type of lupus erythematosus on the cheeks, lower third of the nose, and the lobes of both ears. It was first noticed about a year ago. There was no history of pleurisy, glandular trouble as a child, or tuberculous affections in his family. The von Pirquet test was feebly positive. Dental and throat reports were negative. No treatment of any kind had hitherto been given or applied for.

He was given injections of krysolgan in doses as follows: On June 8th, 1927, 0.015 grain; June 15th, 0.375 grain; June 22nd, 0.75 grain; June 29th, 0.75 grain. On this date some local improvement was noted; the lesions were decidedly paler and less scaly. On July 6th he received 0.375 grain; he complained of depression and feeling dazed since the last dose; the urine was normal; there had been no febrile reaction hitherto. On July 13th he was again given 0.375 grain—making a total received by the patient of 2.640 grains. He now showed very definite improvement, both objectively and subjectively, in the feeling of irritation. The nose had completely lost its tendency to scaly exfoliation, and there was less erythema, and the infiltration had almost involuted. Similar changes, rather less marked, were noted in the remaining lesions.

This is the most typical case of the fully developed disease in my series. The patient is greatly encouraged by the results so far obtained, which are certainly striking. In this case I am supplementing the krysolgan with oral administration of tincture of iodine (French *Codex*) 5 to 30 minims thrice daily.

It is obvious that with so small a series no very definite conclusions can be emphasized, but there are a few points of interest. Of the nine cases reported, two are assumed to be well, and both were demonstrated as cures at the Dermatological Section of the Royal Society of Medicine. Only four months have elapsed since the cases were exhibited, and relapses may yet occur. In one case the

facial lesions cleared up, but the scalp lesions were not influenced to any extent. Five cases were greatly improved, and one, a case limited to the scalp, remained uninfluenced.

I am therefore able to record 22 per cent. cures, 66 per cent. improved, and 11 per cent. uninfluenced. These results do not compare favourably with those reported in Germany by Martenstein in 1922 (66.5 per cent. cures, 14.5 per cent. improved), Ullmann, Fried, and other workers. Schamberg has recently published success up to nearly 50 per cent. in twenty-five cases treated with sodium and gold thiosulphate (sanocrysin). It is quite possible that my series differs both in their selection as suitable cases and in the relatively small amounts of the drug administered.

The striking preponderance of either a tuberculous history (three cases) or a strongly positive von Pirquet reaction (four cases) in a series of nine, one of which was not examined from this point of view, lends considerable support to the theory advanced by Schaumann and those who favour the tuberculous etiology of lupus erythematosus.

In conclusion I desire to state that in my opinion krysolgan has established itself as a most valuable remedy in the treatment of lupus erythematosus, and that if it really has a specific action on tuberculous foci its effect lends further support to the theory of a tuberculous origin of the disease.

THE TREATMENT OF RINGWORM OF THE SCALP BY THALLIUM DEPILATION.*

BY

G. B. DOWLING, M.D.,

Dermatologist, West London Hospital.

ÉPILATION of the whole scalp is generally admitted to be an absolute necessity in all cases of ringworm of the scalp, with the single exception of kerion, which does not require this treatment.

While x-ray depilation has been the customary method of treatment for about thirty years, and on the whole a very successful method, there are certain objections to it which are obvious and well recognized.

1. X rays can only be employed with safety by those who are highly skilled and constantly employed at the work, for the dose must be very exact. A small margin of error on either side will result either in failure to produce complete defluvium or, on the other hand, in some degree of permanent alopecia. The possibility of the latter accident is the most serious objection to the method.

2. X-ray depilation is impracticable, or at any rate very difficult, for children of 3 years of age and under, for the reason that they cannot as a rule be made to keep still for the time necessary for a depilatory dose. Dr. J. M. H. MacLeod has overcome this difficulty by means of a special apparatus which he has invented, but it is a method which at present, at any rate, cannot be applied universally.

3. A very unpleasant, though temporary, inflammatory reaction of the scalp occasionally follows irradiation, while any inflammation already present is invariably aggravated, so that cases of inflamed ringworm (I do not refer to kerion) are not suitable for immediate x-ray depilation.

Any reliable alternative method of producing defluvium would therefore undoubtedly be a welcome addition to the already existent methods of attacking the disease.

The depilatory action of thallium acetate has been well known for many years, and about thirty years ago Sabouraud attempted to use the drug for the treatment of ringworm. He came to the conclusion, however, that the method was unsafe; in all probability the doses he gave were too large. At all events it was given up. After Sabouraud's therapeutic failures no attempt to make use of thallium for its depilatory action appears to have been made until quite recently, and it is due entirely to the experimental researches of A. Buschke that the method has at last attained a degree of practical usefulness.

The advantages of making use of this property of

thallium are obvious, but a dose had to be found that would be effective and at the same time non-toxic. So, about twenty years after Sabouraud had abandoned his therapeutic trials in this direction, A. Buschke, at first alone and afterwards in collaboration with L. Peiser, undertook the experimental work on animals which eventually resulted in establishing the minimal dose that could be relied upon to make the scalp depilate. This was established to be 8 mg. per kilo of body weight. An effective method of administration was found to be a single dose by the mouth, dissolved in sweetened water. Buschke obtained imperfect epilation when the drug was given mixed with food.

The therapeutic value of the treatment has been tested on a large scale in Mexico by Cicero, and on a somewhat smaller scale by Buschke in Germany, by others on the Continent, and more recently in England. A very large number of cases, altogether approaching 1,000, were reported in 1926, and the results were stated on the whole to be remarkably successful.

My own experience has been 90 cases, of which 10 are still under treatment—a sufficient number to warrant some definite conclusions concerning its value. The technique advocated by Buschke has been followed. I have given 8 mg., 8.5 mg., and 9 mg. per kilo of body weight, dissolved in about 2 oz. of sweetened water; 8 mg. has been found rather too small a dose, and I have generally used one or other of the larger doses, using 9 mg. only in certain circumstances, to which I will refer later.

I have employed two preparations of thallium acetate—one made by May and Baker, the other by Kahlbaum of Berlin, which is the preparation used by Buschke. I have not been able to observe any obvious difference in the depilatory action of the two drugs. Kahlbaum supplies the drug in tablets containing 1 decigram, 1 centigram, and 1 milligram, so that it is a simple matter to convert the weight of the child in pounds to kilograms, multiply by 8.5 or 9, and administer the required number of tablets in water.

The effect of this single dose of thallium acetate is well known; about the seventh day the hair begins to loosen, and by the fourteenth day it comes out in a most dramatic fashion. By the nineteenth day depilation is complete, except for some sparse, fine, unpigmented but quite long hairs of the lanugo type, scattered over the scalp, but found mainly near the hair margin, particularly in the frontal region. These hairs never come out, and incidentally they appear never to be infected with ringworm. The eyelashes and eyebrows do not fall, though the outer third of the eyebrows thins out occasionally, reminding one of the appearance of the eyebrows in thyroid insufficiency. In adults the pubic and axillary hairs and the beard do not come out with a dose sufficient to make the scalp depilate. The infected stumps, though absolutely loose, do not fall with the readiness of the uninfected hairs. In actual fact most of the fall appears to be the result of slight traction—for example, by the hair brush. The stumps, being very short, naturally escape this kind of traction.

The same failure of the stumps to fall out spontaneously also occurs not infrequently with x-ray depilation, when adjuvant measures have to be used, such as the application for some minutes of adhesive strapping followed by sudden withdrawal. This is a very important point, for although these loose infected stumps may come out eventually, and their persistence for a few days or even several weeks after depilation does not necessarily mean that the case will not be cured, yet it is necessary to use a fungicide treatment all over the scalp with some thoroughness to guard against reinfection of the new hairs, which begin to appear almost immediately. This injunction of the whole scalp must not be stopped until it is certain that not one of the infected stumps is remaining.

Occasionally this difficulty does not arise, for the stumps come out with the rest of the hair. This is particularly the case in inflammatory ringworms. But as a general rule it may be stated definitely that the stumps do not come out as readily as the normal hair, except in inflammatory cases, or so well as in a good x-ray depilation. The procedure, then, is as follows: A single dose of thallium

* Read in the Section of Dermatology at the Annual Meeting of the British Medical Association, Edinburgh, 1927.