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Original Articles

RADIUM AND TRICHLORACETIC ACID IN DERMATOLOGY*

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In this paper I desire to discuss two agents which have proved invaluable to me in the treatment of certain diseases of the skin. It may seem strange that these two materials have been linked together in this title, instead of dealing with each agent separately, but when it is considered that in many cases radium and trichloroacetic acid are complementary one to the other, it will be more readily understood why such a title was chosen.

The use of radium and its great value in the treatment of certain affections has of course been recognized for years. Ever since Wickham founded the first Radium Institute in Paris and put radium therapy on a sound scientific basis, evidence continues to accumulate as to the great value of this therapeutic agent when properly used.

My attention was first drawn to the use of trichloroacetic acid as a valuable adjunct in treating skin lesions by my friend Dr. Douglass Montgomery, of San Francisco, who found it valuable in the treatment of seborrhœic and senile keratosis. Trichloroacetic acid occurs as white deliquescent crystals, having a melting point of 55° C. and readily soluble in water. It is a substance which has been in use for some time among dentists and laryngologists, but very little reference to it is found in medical literature. In many cases it has been supplementary to treatment by radium. Like the latter the scar left after its use is negligible, an excellent cosmetic result being obtained.

The most important effect of the acid on the skin is due to its keratolytic action. It dissolves horny epithelium. Mont-

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gomery showed this action by dropping some of the pure acid on shavings of horny epithelium. The shavings swelled up into a clear jelly, and on examination with a microscope an immense number of fat droplets was found along the intercellular junctions. It gave an appearance as though the intercellular substance was principally attacked and the fat was being squeezed out of the tissue. Such being its action it can readily be seen why it has such a special use in the treatment of keratosis. The thickened cornified epithelium is softened and falls off as an eschar, leaving smooth almost normal appearing skin beneath.

Technique.—The method of application is comparatively simple. When the tissue is much thickened a quicker result may be obtained if the dermal curette is first used to remove a large portion of the excrescence.

The acid may be applied either as the pure crystals or in concentrated solution. A dressing probe or match point or glass rod makes an excellent applicator. The lesion to be treated must first be wiped thoroughly dry, alcohol or ether being used. The normal skin around may be protected by vaseline. The acid is then applied and rubbed in with some pressure. The tissues quickly become a dead white, and the patient complains of a stinging pain. When this occurs mop off the treated area with water until all burning sensation has ceased.

In many respects the action of trichloroacetic acid is similar to that of carbon dioxide snow, but it is much less painful, as practically all pain is removed by the mopping with water. It can also be used in the form of pastes.

The dermatological conditions in which trichloroacetic acid may be of service are many and varied. As has been mentioned, it is a most useful agent in the treatment of keratosis, and the proper treatment of keratosis is important on account of the frequency with which epithelioma develops from keratotic lesions. Occurring most often in the elderly, particularly those who during their life time have been exposed to the wind and sun a great deal, still it is not uncommon to see keratosis develop in those of middle life. Depending on the type of skin upon which they develop keratoses are hard, thick masses, which can be scraped off with difficulty, being as it were torn from the underlying tissues, or they are soft, greasy, friable and readily removed by

light scraping, leaving the underlying skin soft, pultaceous and frequently undergoing epitheliomatous degeneration. Recognizing as we do the importance of removal of what we now regard as pre-cancerous patches, the early treatment of such spots of keratosis cannot be over-emphasized. Radium is a most useful agent in their treatment, preferably employed after the removal of the crusts by a dermal curette. It is used in sufficient dosage to produce a mild reaction.

Where many spots of keratosis are present, and the application of radium might be tedious and take up considerable time, the saturated solution of trichloroacetic acid may be substituted. In a few minutes numerous spots may be treated, and without very much discomfort to the patient. Recurrences are rare.

In the treatment of warts, moles and xanthoma it is very efficacious. If the wart or mole is much elevated above the surface of the skin, it is better not to attempt to destroy the whole lesion at once, but by successive applications gradually cause its disappearance.

Lupus Erythematosus.—The intractability of this condition very often to treatment is well recognized, as is shown by the long list of remedies which various authorities mention for its cure. No routine plan can be adopted, for what is successful in one case may not produce so beneficial a result in another. Several cases have done excellently by means of radium. Sometimes in the same patient certain of the lesions respond to radium, while others do not. One case of mine showed this in a marked degree. The patient had patches of lupus erythematosus on the cheek below the eyes, at the back of the ear, on the forehead and on the nose. She had had a prolonged series of treatments, when on the Pacific Coast and in Chicago with carbon dioxide snow with no benefit. After this she came to me. Under the action of radium the patches on the forehead, and behind the ear, and most of it on the nose disappeared, but the others would clear up for a time and then recur. Trichloroacetic acid came to my notice about this time, and I used it on these stubborn patches with very gratifying results.

Lupus Vulgaris.—Practically all authorities agree that the best results in the treatment of lupus are obtained by the use of the Finsen Light, but the tediousness of the treatment, and the difficulty the patient experiences in obtaining it render it not always the method of choice. Here radium exerts a remarkable influence, and if used in destructive doses causes retrogression of the diseased tissue, leaving as radium always does leave a

good cosmetic result. For small isolated nodules use has been made of applications of trichloroacetic acid, which is an agent of considerable value in such cases.

Nævi.—For small nævi destruction by caustic action is often the most convenient method of treatment. I refer to lesions so small as to perhaps deserve to be called telangiectases rather than nævi. There are one or two fairly prominent, dilated capillaries. It is recognized now, I think, almost universally, that no method of treating these vascular new growths can be compared for cosmetic result with the general obliteration of the vessels brought about by the proper use of radium. Some times for these very small points quick action is desired, and patients will not devote the time required for treatment. Electrolysis is used, but as a rule the resulting scar is far more disfiguring than the original mark. Solid carbon dioxide has its advocates, and certainly good results are obtained from its use. It is a painful procedure, however, and if too much pressure is applied great destruction of the tissues may be produced and considerable scarring result. Trichloroacetic acid in these cases acts well; it produces but slight pain during its application and the resulting scar is not disfiguring. One field where a wide sphere of usefulness exists is in the treatment of the telangiectases, which so often result after the use of X-ray. When destructive doses of X-ray have been used telangiectases, as it is very well known, are apt to develop.

The appearance of the part can be materially benefited by treatment of the dilated capillaries, which may be readily destroyed by applications of trichloroacetic acid, leaving a good cosmetic result. It is applicable also to condyloma and scar cicatrix.

Radium.—Speaking now more particularly of the use of radium in dermatology, one naturally turns at first to its value in the treatment of rodent ulcer, for of all forms of malignant disease this is the one in which radium is almost a specific. It was in the treatment of this disease that the therapeutic value of radium was first definitely established, and the way paved for the further research on its curative value in new growths.

A great number of cases of rodent ulcer have come under my observation in the last few years, and it is one of the most satisfactory things in the practice of medicine to note that the great majority respond readily to this treatment, and have remained cured over a period of years. It is true of course that certain cases do not respond as well as others. This is particularly so when all sorts of treatment, such as X-ray, CO₂, ionization, etc.,

have been previously employed. It would appear that from being acted upon by so many different physical agents, the tissues have lost their vitality and their ability to form granulations, so that while the disease may be arrested complete healing does not occur. Then again where cartilage or bone is involved great care must be exercised in the dosage given, as too heavy exposure may produce a very painful and prolonged inflammation of the parts. Ordinarily where such parts are not affected I have found the most lasting results to follow sufficient dosage to produce quite a severe reaction. This reaction comes on about a week or ten days after exposure, and shows itself by inflammation of the part with later the development of a radium crust. In about six weeks this crust detaches itself and a smooth, supple, scarcely noticeable scar is left.

The following cases illustrate the excellent results to be obtained from the use of radium, after other methods had proved ineffective.

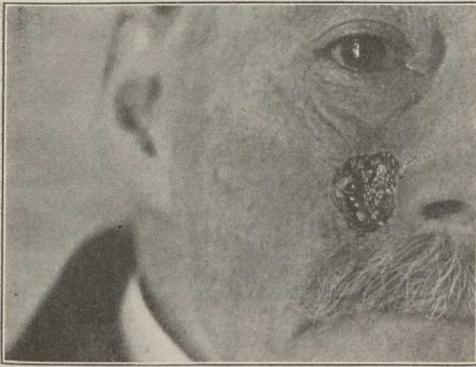


Plate I. Rodent ulcer of eight years' standing.



Plate II. Same patient as in Plate I. two months after radium treatment was begun.

H. S., aet 54, referred by Dr. Charles McKenna, Toronto. A rodent ulcer developed on the right cheek 8 years ago. Under the X-ray the ulcer healed, but broke down again in three or four months time. For 10 months he underwent treatment with the electric needle without result. When he first came under observation the lesion presented the appearance seen in Plate I; the ulcer was three-quarters of an inch in diameter, with a thickened margin and granulations covering its base. Following a single series of radium treatment healing took place, so that, in two months the

appearance was that shown in Plate II. At the present time the condition is most satisfactory, there being a smooth supple cicatrix present.

The second case was in a man of 39, referred by Dr. Baldwin, Benito, Manitoba. Five years ago an ulcer developed above the right eyebrow. With the exception of ointments no treatment was received for three years. During the last two years he had received treatment with carbonic acid snow, and had one application of the X-ray. The appearance is seen in Plate III; the ulcer being one and one-half inches in diameter, and extending down to the bone. The edges were much thickened. A heavy radium exposure was given, following which healthy granulations



Plate III. Rodent ulcer of forehead, present for 5 years.

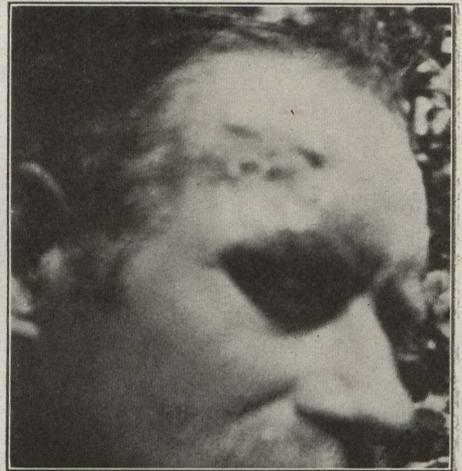


Plate IV. Healing produced by the use of radium on case illustrated in Plate III.

formed and gradual cicatrization took place. Plate IV shows the appearance at the present time. Complete healing has occurred.

Epithelioma of the Skin.—Radium used on squamous-celled epithelioma of the skin gives excellent results. Depending on the depth of involvement slight variations must be made as regards the length of application; screening the apparatus, etc. Where there is a good deal of thickening of the edge of the ulcer, or it tends to be fungating, preliminary curettage hastens the cure, the radium plaques being applied a few hours later. Prolonged exposures using heavily screened apparatus which emits only the harder beta and gamma rays, should be given, and healing takes

place with a minimum of inflammatory reaction. Naturally the tendency of squamous-celled carcinoma to form metastases in the neighboring lymph glands must not be overlooked.

One special use of radium in new growths of this nature is as a prophylactic following surgical removal. This is a wise procedure, and one which is quite firmly established as a routine measure in centres where special attention is devoted to the study of malignant disease. Certainly many cases in which one would ordinarily expect to have recurrences have been free from such by the combined use of operative procedure and post-operative radiation.

Epithelioma of the Lip.—Although not in the strict sense of the term a dermatological lesion, yet certain cases have given such satisfactory results with radium that one may perhaps be



Plate V. Epithelioma of the lip.
Before treatment.

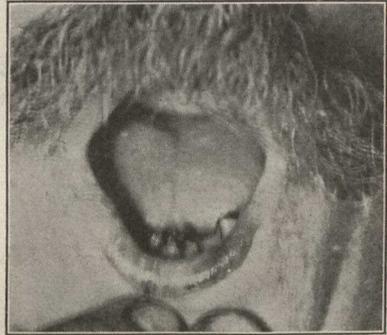


Plate VI. After treatment by radium.
The lip is healed and smooth.

pardoned for referring to it. When the ulceration is superficial and the lesion is freely moveable on the underlying tissues, in my experience radium furnishes a clinical cure, and from its ease of application and little discomfort to the patient is the method of election. I have seen cases previously operated upon, with recurrence, clear up completely under its use.

The two cases illustrated show what may be expected from the proper use of radium. The appearance shown in Plate V was present in a man 55 years of age, referred by Dr. H. L. Anderson, Niagara-on-the-Lake. It had begun as a small ulcer three years before. When he came under observation almost all of the red surface of the lower lip was involved, presenting a central ulcerated portion surrounded by a hard margin. The thickened edges were curetted and a heavy exposure to radium

given, resulting in a fairly severe reaction. Two months later the lip was quite healed and presented the appearance shown in Plate VI.

In a man of 77, referred by Dr. W. J. Wilson, Toronto, there was present an epithelioma on the left side of the lower lip, which had been cauterized by his physician without result. The patient was so feeble that operation was not to be entertained. The appearance is shown in Plate VII.

The ulcer was as large as a ten cent piece with indurated base and edges. Twelve hours exposure with a plaque containing half a centigram of radium was given. In ten days a crust had formed which detached itself in about six weeks' time, leaving a perfectly smooth healed surface, as seen in Plate VIII.



Plate VII. Epithelioma of the lip.
Before treatment.

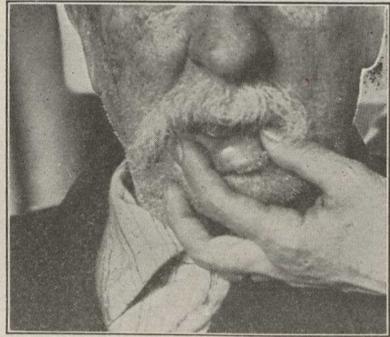


Plate VIII. Same case as Plate VII.
After treatment by radium.

Warts and Papillomata.—These benign growths of the skin yield readily to comparatively short exposures to radium. The importance of having such treated cannot be over-emphasized when one considers the frequency with which malignant disease of the skin develops on the site of a pre-existing papillomatous growth.

Acne Vulgaris and Acne Keloid.—Chronic cases of acne vulgaris particularly when associated with scarring respond well to radium rays.

Keloid.—This disfiguring condition met with not uncommonly after severe burns yields to no method of treatment as it does to radium. It would almost appear that keloid tissue was specifically influenced by the radium rays, and the prognosis is excellent when the lesion is not of too long standing. When the keloid is painful radium exerts a distinct anæsthetic effect. If

screened applicators are used for a prolonged period of time a gradual absorption of the keloid tissue may be brought about without any surface irritation. This method of course takes longer, and if time is a factor of importance, unscreened plaques may be used, and a destructive reaction produced.

A patient referred by Dr. H. A. Bruce had a severe burn involving the dorsum of both hands, and extending up the forearm. In healing an enormous amount of keloid tissue was formed, so that she was unable to move the wrist or bend the fingers of the left hand. (Plate IX.) She had a prolonged



Plate IX. Keloid before treatment, showing deformity and fixation of joints.

series of X-ray treatments without result. Her surgeon asked me to use radium which I did, with already a marked improvement. The keloid thickening is much diminished, in some places almost gone, the wrist is quite moveable and the fingers also. (Plate X.) Treatment has had to be suspended for some weeks owing to advanced pregnancy, but I hope to renew it shortly. The prognosis is excellent for the keloidal tissue to become all absorbed.

Naevi and Angiomata.—For the treatment of these disfiguring marks radium gives us a therapeutic agent which readily supersedes all other means which previously had been employed.

As regards the flat port wine stain the prognosis depends on the ease with which pressure will cause a blanching of the mark. If gentle pressure suffices to expel the color a very optimistic view may be entertained as to obtaining a good cosmetic result. Radiation is given in sufficient dosage to cause just a slight superficial reaction. This is repeated from time to time until fading has been produced. The keynote to success in the obtaining of a good permanent result in these cases is to be content to proceed cautiously. One must be prepared to keep the patient under observation for a considerable period of time,



Plate X. Shows improvement after a series of radium applications.
Note the flexion of the fingers.

giving treatment as indicated, and on no account to hurry. Moreover, one finds that with these cases the personal factor must be taken into more than ordinary consideration, and great care exercised that too much reaction is not produced. If one does unavoidably give too long an exposure to a patient with an exceptionally sensitive skin, telangiectases are apt to subsequently develop.

Angiomata.—These do exceedingly well under radium rays and are best treated by screened plaques applied for longer periods. In this way a gradual shrinking of the mass is brought about without surface reaction. This is important because where

the growth is so vascular there is some danger of hæmorrhage if ulcerative reaction should be produced. In these cases it is often possible to employ "cross-fire," a method devised by Wickham for producing as it were a concentrated fire on a tumor mass. Plaques are placed on opposite sides of the growth so that the tissues receive double radiation. Unless such angiomatic tumors are supplied by a large vessel, as evidenced by pulsation, the manner in which they appear to melt away, is most gratifying.

Lupus Erythematosus.—I have already spoken of the value of radium in Lupus Erythematosus. The difficulty of curing this disease is well recognized. Radium has however in some cases where not much previous treatment has been used been productive of good results, and the lesions have permanently disappeared. In using it treatment should be applied to the tissues surrounding the lesion as well as to the actual lesion itself.

Lupus Vulgaris.—Used in a destructive way, radium acts with good effect in this condition. Heavy doses must be given, and as in lupus erythematosus the surrounding tissues treated. Radium has a peculiar scope in the treatment of lupus in situations such as within the nasal cavity.

Pruritus.—The application of radium has a marked analgesic action, and this is well seen in the treatment of certain persistent cases of pruritus. Short exposures of strong plaques will relieve the intolerable itching after all other methods, including cauterization, X-ray, etc., have failed.

Chronic Eczema.—A similar satisfactory result may be obtained in the treatment of patches of chronic eczema. A dosage sufficient to produce a mild stimulation will result in the clearing up of persistent thickened patches which have resisted all other treatments.

Acne Rosacea and Rhinophyma can now be treated successfully with radium, as well as certain parasitic diseases and tuberculosis of the skin.

In this somewhat brief manner the great value of radium in the treatment of dermatological lesions has been discussed. To go more into detail would be beyond the range of this paper. The endeavor has been made to show the large variety of conditions in which such an accessory physical agent is not only useful but absolutely necessary if any satisfactory result is to be obtained.

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TWILIGHT SLEEP *

(Reprinted from the *New York State Journal of Medicine.*)

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It is fully ten months since "Twilight Sleep," as developed by Gauss, has been introduced in this country. During this period various obstetricians have given this method of treatment a fair trial, and have reported their work from time to time through the usual medical channels. It may here be stated that no medical subject in recent years has created such widespread discussion among the public. The press recounted miraculous reports daily of women who had gone through childbirth painlessly. Photographs appeared regularly together with exaggerated descriptions of the wonders that this method accomplished. Women were informed that labor conducted under the new treatment would suffer no shock, their vitality would be conserved, and that they would be in such fine and fit condition that they could leave their beds the day following the birth of their babies.

The vivid descriptions of "Twilight Sleep," as an absolutely painless labor, naturally attracted the attention of a great number of expectant mothers, and obstetricians were very soon confronted with a problem which they were, as yet, unable to solve. At that time the medical profession had to form their opinions on the work done at Freiburg, and other foreign clinics, and therefore the advice given to their patients was not based upon personal experience, or observation. Very soon investigations, as to the merit of this form of treatment, were instituted in many of our obstetrical clinics, and here, I dare say, that their early reports were tinged with a certain amount of enthusiasm due primarily to the fact that the statements of the mothers influenced, to a great extent, their opinions as to the value of this method of treatment.

In our enthusiasm we overlooked the most essential fact in the entire procedure, namely, that "Twilight Sleep" and painless labor are not synonymous, and that in a large number of cases pain is but little influenced. Furthermore, the degree of pain bears no relation to amnesia. A patient may suffer a great deal of pain during the progress of her labor, and still have no recollection of it the following day. This will always form the basis for differences of opinion

*Read at the Annual Meeting of the Medical Society of the State of New York, at Buffalo, April 27, 1915.

between the medical profession and women who have been subjected to this form of treatment.

That the testimony of these women is incompetent is obvious, and as such should be given no consideration in arriving at conclusions as to the value of this method. Scientifically, we must judge this mode of treatment from the standpoint of analgesia, and not amnesia. It is the actual diminution of pain that the medical profession should be directly concerned with, and all our efforts should be concentrated to accomplish this. It is of comparatively small importance to us, and should be to the woman, whether or not amnesia is obtained. Heretofore the report of successful cases were practically based upon the degree of amnesia obtained, making analgesia of secondary importance.

As our experience increased we, of necessity, were compelled to arrive at a different conclusion. We soon found that a large number of women suffered a great deal of pain and discomfort, and the question suggested itself to our minds whether we were not, to some extent, responsible for an inaccurate presentation of this subject to the medical profession. I believe it the duty of each and every one of us to correct this false impression, both from the medical and lay aspects, and to particularly impress the public that "Twilight Sleep" is not synonymous with painless labor. It is incumbent upon us to point out that professional journalists and other women, no matter how honest and well meaning they may be, are absolutely ignorant of the scientific aspect of this method of treatment, and cannot possibly have, or form a proper conception of it.

We have now reached a stage in the development of this work where we are confronted with a peculiar situation, which heretofore has been entirely ignored in the various discussions upon this subject. It is now well established that if this form of treatment is properly carried on, it will produce amnesia in approximately 75 per cent. of cases. Many of these patients, because of extreme intoxication of the more highly developed nerve centres, fail to retain the memory of pain, leave the hospital honestly believing that they have actually had no pain. Such women will, of necessity, tell other women that childbirth by this method is absolutely painless.

The attending physician, however, has before him an entirely different picture. He knows that these women have experienced pain, he has heard their screams, and was even accused of being cruel for refusing to administer "Twilight Sleep" to them. The opinions of the physician and patient concerning this form of treatment must always differ, and antagonism upon the scientific

merit of this procedure will always exist between them. It is quite improbable that any effort to harmonize them would meet with any degree of success.

It is certainly most unfortunate that the first comprehensive description in this country of this form of treatment appeared in the lay publications, for not only did it create a strong prejudice against it within the medical profession, but it also tended to reflect upon the professional reputations of such eminent scientists as Kronig and Gauss, who, after most painstaking efforts extending over a period of eight years, have succeeded in developing an accurate and well defined technic in the administration of scopolamine-morphine in connection with labor.

Our profession has invariably proved itself equal to all occasions, and in this instance it is to be regretted that a number of our foremost obstetricians were unduly hasty in expressing their opinion of this method through rather unusual channels without thorough investigation.

We all know that a legitimate amount of conservatism is absolutely essential on the part of the medical profession, so that a proper equilibrium may be obtained, and the public be protected against the results of over-enthusiasm. Those who are familiar with the history of medicine are fully conversant with the fact that most new methods of treatment, especially those which have been radical departures from routine and accepted standards, have always brought forth sharp protestation and even condemnation on the part of those who refused to progress with the advances made in science.

In reviewing the history of scopolamine in relation to obstetrics, we find that it is passing through the same process of evolution common to all new methods of treatment. It is but natural to expect, at this day, that a great deal of opposition should arise against it. Not only is it condemned by those who think that they have had some experience, but even by those who have made no attempt to give this method a fair trial.

To produce "Twilight Sleep" clinically, the attending physician must have a concrete conception or mental picture of what he is seeking to accomplish. In Dammerschlaf the patient is able to perceive but not apperceive. The patient should always be able to answer commonplace questions, even though the responses be somewhat delayed, indicating a sluggish mental state. Between pains the patient should rest quietly or fall asleep. During a pain the patient may moan or even cry out, move about aimlessly and entirely forget its occurrence as soon as it subsides. In other words, an inco-ordinate subconscious mental state must be evenly main-

tained and any deviation from this will invariably lead to undesirable results.

As a general rule, it may be stated that no form of treatment will meet with the same success in the hands of all who use it, even though the technic followed be the same. What then should we expect to accomplish with a form of treatment in which the technic and dosage varied with each and every instigator?

A study of the literature reveals the fact that there are two distinct groups opposing this method of treatment. (1) Those who have tried the method occasionally, based upon no definite technic, with results correspondingly unfavorable. (2) Those who have given this method a fair trial but have not followed the technic as outlined by Konig and Gauss.

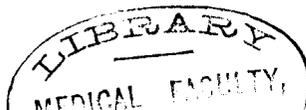
Before taking up the physiological action of scopolamine and morphine, it would not be amiss to touch upon the physiology of labor pains and our aim to modify or alleviate these by the use of drugs.

We must differentiate between objective pain by which we understand uterine contractions, and subjective pain, which is that sensed by the mother. Any method which has for its object the elimination of subjective pain, must, under no circumstances, interfere with objective pain.

It is a well-known fact that the pain caused by uterine contraction, does not affect all women alike. Every experienced obstetrician has occasionally seen a patient in whom labor had progressed to a stage of complete dilatation without any physical evidence of pain. We must, therefore, conclude that the degree of subjective pain depends upon the sensitiveness of a given nervous system. It is equally well known that the degree of sensitiveness can be modified by the use of many therapeutic measures.

The central nervous system is the seat for the perception of pain. Impulses are conducted to and from it. The degree of pain depends both upon the ability of the cortex of the brain to receive and upon the nerve trunks to conduct. If, by any method, we are able to minimize either the perceptive power, or the degree of conductivity, pain may be markedly diminished, or even entirely abolished.

From the above it may be seen that the progress of labor does not depend upon subjective pain, and that this may be diminished or eliminated without interfering with the normal progress of labor. Labor essentially depends upon the degree of uterine contraction for its successful termination. The purpose and object of this method of treatment is primarily to obtain a mental state in the patient by which the receptive and perceptive powers are dimin-



ished without the complete loss of consciousness. Clinically, this is best accomplished by the judicious use of the combination of scopolamine hydrobromide and morphine.

It is not my intention to discuss the various physiological manifestations produced by these drugs upon the central nervous system, for I feel certain that their effects are too well known to all. I shall only attempt to call attention to the effect produced by these agents in their relation to obstetrics.

The action of scopolamine is chiefly upon the central nervous system. It quiets the cerebrum and diminishes the perception of pain, without apparently influencing the contractility of the uterus. Labor, therefore, may progress uninterruptedly and the patient may not only fail to recollect these pains, but may even be entirely unaware of them.

CLINICAL TYPES.

Clinically these cases may be divided into three distinct groups: (1) Those patients in whom we obtain both amnesia and analgesia, that is, abolition of memory and diminution of pain; (2) patients in whom we obtain analgesia without amnesia; (3) cases which entirely fail to respond to this treatment.

TECHNIC.

In order to obtain the best results with this method, certain cardinal requisites must be strictly observed. It is absolutely necessary that the patient be so placed that she will be free from all disturbing influences. A physician or nurse should be in constant attendance. The effect of the drug should be carefully watched so that it may be repeated at proper intervals. Light in the room should be so arranged that the patient is not disturbed by it. The fetal heart sounds should be carefully studied. The solutions used should be obtained from reliable chemists, and should be accurately standardized. It should be perfectly clear, never having any sediment or flocculence, and should preferably be put up in ampules each containing the quantity required for a single injection.

For purposes of accurate statistics, special charts were printed, indicating the important points to be noted.

Our rule is to admit to the hospital only those patients who are in active labor. We, therefore, have no means of judging precisely when labor sets in, nor the average duration of the first stage.

Treatment is begun only when the patient shows definite signs of active labor. The patient is then put to bed in a dimly lighted

room, and an initial dose of 0.00045 gm. or approximately $1/135$ of a grain of scopolamine hydrobromide is injected intramuscularly. This is preceded by a hyperdermic injection of one-half grain of narcophin. The effects are now carefully observed with special reference to pulse, respiration, pupillary reaction, fetal heart sounds and frequency and intensity of uterine contractions. A second injection of $1/400$ of a grain of scopolamine is given about one hour after the first one. About one-half an hour after this injection memory tests are brought into play. The patient is shown some object, such as a doll or watch and a short while later she is asked whether she remembers having seen the particular object in question, or she may be asked whether she remembers having received a hyperdermic injection. Any test of memory will do. The repetition of injections is now primarily gauged by the degree of amnesia present, this being the guiding point throughout the treatment. The interval between injections is approximately one to one and one-half hours. The average normal case requires from five to seven injections, although at times it may be necessary to give only two or three, or as many as twelve or fourteen.

At the completion of the first stage, with the presenting part on the perineum, one c.c. of pituitrin is often given to hasten delivery. In using pituitrin in these cases, especial attention should be paid to the fetal heart sounds, for there may be danger of producing asphyxia in a child which is already oligopnolic. As soon as the child is born, the cord is quickly ligated and severed and the infant is removed to another room. The mother is made comfortable and usually falls into a deep slumber, to awake two to four hours later often in complete ignorance of the fact that she has already given birth to her child.

Our experience with this form of treatment consists of a series of 300 consecutive cases in the obstetrical services of Jewish Maternity and Lebanon Hospitals. As previously stated, these cases were subdivided into three groups with the following results: (a) 231 cases, or 77+% in which there was complete amnesia with varying degrees of analgesia; (b) 37 cases of 12+%, in which there was varying degrees of analgesia without amnesia; (c) 32 cases, or 11% in which the treatment failed to produce the desired effects.

TOTAL AVERAGE DOSAGE.

In primiparæ scopolamine hydrobromide $1/50$ of a grain. In multiparæ $1/66$ of a grain.

NUMBER OF INJECTIONS.

Smallest number, one; largest, twenty-two.

Dose of scopolamine, smallest, $\frac{1}{400}$ of a grain; largest, $\frac{1}{5}$ of a grain.

We shall now attempt to emphasize those phrases associated with labor and the post-partum period which are of special interest to the obstetrician.

DURATION OF LABOR.

Since our patients are admitted only when in active labor we have no precise means of judging its exact duration. Labor is unquestionably prolonged, the delay occurring in the second stage. The first stage is somewhat shortened.

The average duration of labor in our series figuring from the time of admission to delivery was eight and one-half hours. The average time that the patient was under the influence of scopolamine was seven hours in primiparæ and three and one-half hours in multiparæ.

RESTLESSNESS.

Six cases had marked restlessness requiring restraint. A great number displayed varying degrees of restlessness not requiring restraint.

HEMORRHAGE.

No appreciable alteration in the amount of hemorrhage was noticed by us, and Beruti by actual weights in over 400 cases proved that bleeding was somewhat diminished.

PERINEAL LACERATIONS.

Second stage is somewhat delayed and stretching of the perineum is more gradual and lacerations are therefore less likely to occur. Siegel reports six first degree lacerations in seventy-eight spontaneous deliveries in primiparæ, or 7 per cent. Harrar and McPherson report thirty-seven lacerations in 100 cases treated with scopolamine as against forty-five lacerations in 100 cases not so treated. In our series there were forty-five, or fifteen per cent. lacerations in which suturing was required. However, the fetal heart sounds must be watched closely or the life of the child may be endangered.

OPERATIVE PROCEDURES.

In this series labor had to be terminated artificially in fifty-two cases, or 17+%. In four patients the breech presented and delivery was accomplished by bringing down a foot. In forty-

eight cases delivery was terminated by the use of the forceps. Of these five were median and forty-two low. Two cases were nephritic with marked odema and it was deemed advisable to terminate labor quickly.

ANESTHETICS.

In the most recent report by Siegel of Freiburg in a series of over 200 cases, ethyl chloride by inhalation was administered as a routine during the stage of expulsion. This is done in order to further obviate any recollections of pain.

It has been found that in order to carry out this form of treatment successfully, the patient must be constantly kept under the influence of the drug. Should she at any time during the course of the treatment partially regain consciousness, she will not only recollect the pain which she actually experienced, but will reconstruct the entire progress of labor. Such isolated periods of relative consciousness are termed by Gauss "isles of memory." These are more apt to occur during the stage of expulsion. In our series we do not find it necessary to resort to the use of the general anesthetic for this purpose.

Ether was the anesthetic used when artificial delivery was performed. The use of chloroform for any purpose during labor was abandoned by us about three years ago. The patients were very quickly narcotized, taking the ether very readily and consuming very small quantities of it.

CONTRAINDICATIONS.

With the possible exception of kidney complications and primary inertia, we find no contraindications for the use of this method. Zweifel even goes so far as to recommend it in eclampsia and reports three cases treated successfully.

Endocarditis was present in eight cases with no untoward effects as a result of this mode of treatment. On the contrary we believe that this procedure is especially efficacious in labors associated with cardiac diseases, for it tends to eliminate, not only the mental anxiety, but the actual physical strain induced by the patient's efforts to help labor along.

CONVALESCENCE.

It is interesting to note how little these patients are physically affected by labor. The exhaustion that usually accompanies labor in primiparæ is partly eliminated. They usually appear restful the following day, for instead of having passed the previous day

in pain and wakefulness, they had gone through labor in a state of semi-consciousness without any undue physical exertion.

In this series one patient developed postpartum psychosis on the fourth day. Within the same week two more cases occurred in my obstetric service at Lebanon Hospital. Owing to my absence from the city scopolamine was not given in these two cases. I consider it most fortunate that this method was not used in two of the cases, for I feel certain that the mental state would have been attributed to the use of this drug. This naturally would tend to discredit this mode of treatment, resulting most likely in its discontinuance. That this coincidence would create a most peculiar situation was more so impressed upon me by the fact that when the attending neurologist was asked to see these patients, he immediately inquired as to whether they had had "twilight."

Another interesting illustration of this kind occurred in a child which was born oligopneic. Failing to improve, resuscitation by the catheter method (the only method used by us), was resorted to and continued for two hours, at which time the heart action ceased. It was early noticed that the cardiac impulse was on the right side. Permission for autopsy was finally obtained. The findings were very unusual. A large congenital opening was present in the left muscular portion of the diaphragm. The stomach, small intestine, greater part of the large intestine and spleen were in the thoracic cavity. Both lungs were collapsed, and the heart was situated on the right side. The liver occupied the entire abdominal cavity. Without autopsy, this death would undoubtedly have been attributed to the use of scopolamine. It has always been the fate of any new method of treatment to ascribe to it many complications that would have taken place ordinarily, and it is only through mere accident that we occasionally are able to account for them otherwise.

We have also observed that the tendency toward engorgement of the breasts is notably diminished in these cases. This is probably due to the action of scopolamine on the peripheral secretory nerves.

CONCLUSIONS.

1. Standard solutions are absolutely essential for the success of this treatment.

2. No routine method of treatment should be adopted. Each patient should be individualized. This method does not merely consist of repeated injections of the scopolamine at prescribed intervals, but the mental state of the patient should be made the guiding point. A subconscious state must be evenly maintained.

3. Facilities should be such that the patient is not unduly disturbed.

4. A nurse or physician must be in constant attention.

5. This method of treatment is best carried out in hospitals, although there is no reason why it cannot be accomplished in well regulated private homes. However, if for any reason, the physician attending a patient at her home, does not see fit to institute treatment early in labor, he surely can utilize this method in the second stage, and still save the woman a great deal of unnecessary pain. That this may be accomplished was demonstrated in eight cases in whom treatment was instituted at the end of the first stage of labor. All of these cases had marked analgesia with complete amnesia.

6. It does not affect the first stage of labor, but the second stage is prolonged.

7. Pain is markedly diminished in a great per cent. of cases, while amnesia is present in 75 per cent. of patients, but labor is not painless as is generally supposed.

8. This treatment does not in any way interfere with any other therapeutic measure which may be deemed necessary for the termination of labor.

9. Fetal heart sounds must be carefully watched. Sudden slowing calls for immediate delivery, if possible, or treatment must be discontinued. Fifteen per cent. of the babies were born oligopnolic.

10. Asepsis and antisepsis cannot be rigidly enforced.

11. No change in the course of the puerperium was observed, and convalescence progressed very smoothly in our entire series.

12. Women of a higher grade of intelligence are best suited to this form of treatment.

13. This treatment is best carried out in primiparæ or in multiparæ with tedious labors. It has no place in short labors.

14. This is an ideal form of treatment in patients suffering from cardiac disease.

Finally, every experienced obstetrician is fully aware of the fact that the number of births showing anomalies, such as premature rupture of the membranes, incomplete dilatation of the cervix, abnormal presentations and primary inertia are on the increase. It is equally well known that women following a profession requiring a superior mental development, have more difficult deliveries. The demands made by hard work, or by social obligations upon the modern woman in our large cities, are so great that their nervous systems are constantly overworked. What we consider a

normal nervous system now rarely exists, and therefore pain is not well borne.

In our opinion, subjective pain incident to childbirth, serves no purpose in nature, but is rather an unnecessary result of an unchangeable natural law that all severe muscular effort is accompanied by pain. The metabolic end products of muscular activity are irritating to nerve ends causing pain. Thus, we see severe pain accompanying the hurried muscular peristalsis of the bowel in ridding the system of injurious material, the excruciating colicky pain caused by the propulsion of a biliary or renal calculus, and finally, the agonizing pain incident to expulsion of the fetus from the uterus. In trying to relieve these pains, we are not in conflict with a natural purpose. If pain can be relieved, it is the duty of every physician to do so, and no effort should be spared to accomplish it.

For our part we are fully convinced that this method of treatment instills within the woman a feeling of confidence which naturally aids her in passing through this trying ordeal, and although the greatest number do suffer varying degrees of pain, still there is no mental recollection of it in 75 per cent. of cases, and if the physician, as well as the patient, contents himself with amnesia as the object to be accomplished then only will its proper place in obstetrics be established.

DISCUSSION.

Dr. W. T. GETMAN, Buffalo: I think the distrust of "Twilight Sleep" among the medical profession comes from two factors: Lack of personal experience with the treatment, or of non-adherence to the technic worked out so carefully by Gauss.

From all that I can learn of the bad results reported by various hospitals and men it has been from using their own technic rather than the one that has proved safe in a number of thousands of cases. These bad results come from repeating the dose of morphine, over dosage of scopolamine, and using some other index than that of the memory test for repeating the scopolamine.

We have used the treatment at the General Hospital in forty-seven cases, and I have used it in twenty-five private cases outside, without any foetal or maternal mortality due to the drug, and with better results as our experience increases.

We are, however, using it only in selected cases—primiparæ and in multiparæ where we expect a longer labor than normal, as I find that if started too late in labor in a primiparæ or in the ordinary multiparæ with a short labor, that there is a higher percentage of cyanosis.

The ordinary baby does not need any more attention than where no drug is given, as practically all of them breathe spontaneously.

There is a certain amount of idiosyncrasy in the patient's reaction to scopolamine as shown by one patient that received seventeen doses (the highest in our series) with absolutely no amnesia, but who twice called for a drink of water as the head was passing through the vulva, and seemed more interested in the fact that her throat was dry than in the birth of the head.

I have used it in three cases of preclamptic toxemia during induction of premature labor, and I think it was of material aid by lessening the wear and tear of the process.

Personally, I think very highly of "Twilight Sleep," and consider it perfectly safe if used properly.

ADDRESSING OF MAIL

In order to facilitate the handling of mail at the front and to insure prompt delivery it is requested that all mail be addressed as follows:—

- (a) Regimental Number
- (b) Rank
- (c) Name
- (d) Squadron, Battery or Company.....
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- (g) British Expeditionary Force
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Unnecessary mention of higher formations, such as brigades, divisions, is strictly forbidden, and causes delay.

ONTARIO MEDICAL ASSOCIATION

Organization and preparedness are the watchwords these days, and so it seems fitting that the Ontario Medical Association should make plans early for the annual convention to be held in Toronto in May, 1916. Work is now being done, not only to insure success at the next meeting, but also to co-operate with the profession throughout the Province in organization of County Medical Societies along the lines approved of by the Peterborough meeting. The latter is a big task, but seems well worth while and should commend itself to the profession.

In carrying out this campaign the Ontario Medical Association will be living up to the best traditions of its founders. In this connection a quotation from one of the Canadian medical journals of 1882, may not be out of place: "The Ontario Medical Association should promote sentiments of mutual respect and fraternity, the plentiful lack of which there is still great reason to deplore." It is the intention of the present Executive to do what they can to remedy the faults existent in 1882, and that still survive in an attenuated state in 1915.

It is interesting here to note that the Association has been in existence since 1880, and has held meetings annually since 1881. Dr. Adam Wright and Dr. J. E. Graham first conceived the idea of a provincial organization. At a preliminary meeting held to consider the matter of organization were Drs. Workman, Coventry, Graham, and J. H. Burns, Adam Wright and J. E. White. The first president was Dr. Workman. For thirty-five years the Association has prospered. There seems to be no doubt that the Executive, with the co-operation of the membership, will not allow the organization to languish even though under the stress of war conditions.

BOOK REVIEW

"WHERE AND HOW TO AMPUTATE," by Lowell E. Jepson, M.S.—"One of the most important things to consider in making an amputation is where and how this shall be done so that the patient can with the most comfort and satisfaction wear an artificial limb. This booklet concisely states the principal points to be considered and this information will be of practical help."—*Journal of American Medical Association*.

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COMMENT FROM MONTH TO MONTH

Medicine has been defined as primarily and essentially the healing art. Webster's International Dictionary says it is "the science and art dealing with the prevention, cure or alleviation of disease." In no sense, therefore, can it be applied to the mere administration of drugs, as that would rule out surgery, preventive medicine, obstetrics, etc. It is the practice of all methods which tend to alleviate pain, and to correct obvious mechanical injuries.

It has taken centuries to evolve all the principles of treatment. They are intimately associated in the art of healing. It has been a practice of gradual growth, century after century, and year after year, adding to the sum total of the present available knowledge. No system of the healing art can ever be dissociated from the practice of medicine.

New methods have, therefore, from time to time arisen, are arising and will continue to arise just so long as people desire to be treated and restored to that condition of health which they consider to be normal, and treated and restored quickly, easily and pleasantly.

Should, then, this healing art which necessitates the acquirement of a vast amount of study to gain even a fundamental knowledge to practise it, in all its branches, be left in the hands of

trained men and women, or allowed to become the plaything of every man who believes he has a speedy, easy and pleasant method of restoring people to what they consider to be normal health in themselves?

The trouble with new methods of healing is that they are always too comprehensive. In that way they immediately antagonize minds which are never impulsive. The conservative and safe mind demands ample proof before it will take on with the new method. This is seen, not only in the profession of medicine proper, but as well amongst all classes, professions and callings in the community. Others, however, are easily persuaded and run swiftly after strange gods.

The profession of medicine has long recognized that there cannot be too much education in preparing a man to practise the healing art. Indeed, from the day he first enters upon practice, each medical practitioner is a constant student. He recognizes that he must ever have a voracious appetite, and endeavors to assimilate and digest whatever new thing comes into his capacious maw. It is similar in every walk of life, for the ambition to succeed stirs almost every man to constant work and action.

The healing art is for the people, not for the practitioner of it, for it has to be practised upon him as upon others. No matter what is said to the contrary, the practitioner of medicine is first and always for the benefit of the people. That is the essential, altruistic principle.

As it is essentially for the people, it is quite natural, therefore, for a man who feels he has departed from what he regards as his normal state of health, to seek the easiest and pleasantest path by which to return. Whenever any of these easy paths are discovered by a member of the medical profession it is immediately given to the world. It is not kept for private gain. That is one of the finest principles in the profession of medicine. That points the difference between the profession and the people. Whenever a layman thinks he has a therapeutic discovery, it is exploited for his own personal gain. When laymen become seized of the same altruistic principle, in this regard, that all therapeutic discoveries will be for the benefit of mankind, quackery and nostrum-exploiting will cease, and there will be no further argument as to the body designated to put them into use. All men must either hand their discoveries in therapeutics over to the members of the healing art, or properly qualify themselves to put them into effect.