HELIOTHERAPHY
WITH
QUARTZ LIGHT

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Line spectrum of alpine sun lamp (actual photograph)
The same, showing also presence of continuous spectrum (actual photograph)

The above plate shows the visible and ultra-violet section of the great electromagnet spectrum. The spectrum as shown, includes part of the infra red, the visible and the ultra-violet rays. The colors of the spectrum are written above their respective wave-lengths.

The photographic reproduction of the actual spectrum of the Alpine Sun Lamp gives a clear idea of the richness of the lamp in the ultra-violet region. It will be seen also from the lower photograph that a marked continuous spectrum is present in the lamp ray as also in natural sunlight. It will be noticed that all that portion of the rays of the lamp falling to the left of the line 3900 Angstrom units, cannot be detected at all by the human eye.

In order that it will be readily understood just what dimensions we are dealing with, it might be mentioned that the bright line shown at 3022 Angstrom units would correspond to approximately 175/1000 of an inch in length.

Quartz Light Therapy

THE SUN from the very beginning has directed the destiny of our animate world. All plant and animal life is dependent upon its benevolent radiation. This radiation is now believed to consist of vibrations or waves in a hypothetical ether, that pervades all space. These waves, just as the waves in the ocean, are not all the same length or frequency. Some are very long invisible waves of short frequency, such as were discovered by Dr. Hertz in 1877, and are now the means of transmission for our wireless telegraph and telephone.

Much shorter waves than the above, but likewise invisible, are the infra red. These are the source of all our heat radiation. Whether we feel the heat from the sun or from a hot stove, we are experiencing the effect of the infra red rays. From the infra red we pass into the narrow band of the visible spectrum. Of this spectrum, the red are the longest waves, the violet the shortest. Beyond the violet we again pass into the region of invisible light, namely the ultra violet (or so called chemical ray) and lastly into the region of short Roentgen or X-rays and radium or gamma rays.

The preceding has briefly outlined the entire field of electromagnetic vibrations. The portion with which we are more closely concerned is the visible and in particular the ultra violet radiation.

The ultra violet radiations (often referred to as Chemical or Actinic rays) may be conveniently subdivided into the near, middle, and far ultra violet. With so many light waves in the ultra violet alone, it has been necessary to establish a unit of measurement to differentiate between the different waves. This unit, based on the metric system of measurement is called the Angstrom A° and is equivalent to a wave length of one ten millionth of a millimeter or one two-hundred and fifty-four **millionths** of an inch. Other units which are multiples of the Angstrom are also frequently employed, such as the micron (μ), one one-thousandth of a millimeter, and the millimicron (μμ), one one-millionth of a millimeter. These units are all related as follows:

$$0.1\ \mu = 100\ \mu\mu = 1000\ A° = 0.0001 \text{ millimeters} = 39 \times 10^{7}$$

(0.000,0039) inch.

On the bases of these units visible light extends from about 7500 A°, in the red to 3800 A° in the violet. The near ultra violet extends between 3800 A° to 2930 A°. The middle ultra violet, between 2930 A° and 2000 A°, the far ultra violet 2000 A° and less.

The ultra violet rays defined by the near ultra violet are present in large quantities in sunlight at high altitudes. Their intensity at ordinary altitudes is, however, considerably diminished due to the absorption by the dust particles present in our lower atmosphere.

Experience has shown that much of our well being and health can be attributed to this near ultra violet in our sun light, hence the beneficial effects of mountain sunshine. Sun light is, as we all know, a germicide, and this effect has been attributed to the ultra violet.

Sunlight is more or less unsatisfactory as it is hard to control and entirely dependent on atmospheric conditions. Consequently various artificial light sources have from time to time been proposed. Iron arcs have been employed as a source for ultra violet radiation, but are unsatisfactory when radiation of intensity comparable to sunlight is

desired. In the course of experimentation it was discovered that the high temperature electric mercury arc was very rich in ultra violet radiations, emitting not only practically all the wave lengths of the near ultra violet, as found in sunlight at high altitudes, but in addition emitted radiations throughout the middle ultra violet, and even a few of the longer wavelengths in the far ultra violet, and there quartz-light therapeutic possibilities were offered by this artificial source that were not possessedly sunlight itself. A transparent container became a necessity in order to render the mercury arc serviceable. Glasses were not to be considered, for they have no or little transparency for the ultra violet. Thus, an ordinary electric light or spark projected through a colorless or a violet colored glass will produce very little or no ultra violet light.

Transparent quartz is transparent to ultra violet radiations of wavelengths as short as 1840 A°, is very heat resistant, and possesses an exceedingly small coefficient of expansion. It is thus, except for its cost, an excellent material for use as a container for the mercury arc.

Thus were evolved the quartz light, Alpine Sun and Kromayer Lamps, the spectrum of which, together with a table of comparison is shown in figure No. 1. In the Alpine Sun and Kromayer Lamps, mercury vapor, contained in a vacuum tube of fused quartz or rock crystal, is brought to a very high temperature by an electric current thus producing a light of great intensity.

As the light intensity varies directly with temperature, quartz permits a very high temperature to be attained. A great advantage over ordinary glass, even if this latter should be transparent to ultra violet, which it is not.

Experimenters more or less conflict as to the extent of penetration of ultra violet light into the skin. They all agree, however, that it cannot penetrate more than a millimeter. Extensive penetration is in reality not necessary, for even an extremely small chemical change near the surface will have a far reaching influence upon the entire system. Indeed the slight penetrability of the skin by ultra violet radiation is doubtlessly the reason why ultra violet radiation can be used without harmful after effects. The worst that can result from long exposure is a severe sunburn. On the other hand, the danger from the extremely penetrable X-rays are only too well known.

Researches in photochemistry and photophysiology are continually showing that the shorter wave lengths are the most active chemically. The Sun's spectrum ends at 2930 A°, whereas the water cooled Kromayer Quartz Light emits radiations as short as 2000 A°, and the air cooled Alpine Sun Lamp at close range emits the ultra violet to 1850 A°.

It would be expected that under corresponding conditions, the quartz light would be effective in a much shorter time than the sun light per se. Such, indeed, appears to be the case. The therapeutic value of the ultra violet radiation of shorter wavelengths than that found in sun light is still awaiting investigation. That a difference of just a few Angstroms can have a vast influence is evident from the work of Alfred Hess and Mildred Weinstock (J. Amer. Med. Assoc. March 10, 1923), who found that ultra-violet light of 3240 A° wavelengths had little or no value in protecting against rickets and that waves of 3020 A° were of great value in this respect, it is at once evident that here is a case where the Quartz Light is much more efficient than sunlight. Examples of increasing efficiency are bound to multiply as the whole subject of Quartz Light Therapy is more and more established.

ACTINOTHERAPY IN GENERAL PRACTICE: CASE HISTORIES*

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Editor's Note.—In view of the almost startling results achieved by Rollier and his followers in the use of natural sunlight in the treatment of surgical tuberculosis, it is not at all surprising that artificial actinotherapy should be attracting the attention of the profession and it is rather a pity that the method is not being more extensively tried out so that an evaluation of its possibilities could be more rapidly and more readily made. Dr. Kern has used actinotherapy not only in conditions in which data from medical literature would indicate its use, but has gone afield and has found that it gives gratifying results in other conditions, of which he presents case histories. If actinotherapy will enable the general practitioner to duplicate the salvation of sanitarium surroundings for tuberculous patients it will indeed prove a tremendous economic asset for all concerned.

* * * * *

As a *doubting Thomas* I began sometime ago to use Actinic Rays in connection with my general practice. At present, case records show that I have given several thousand treatments in diseases in which actinic therapy was indicated by reason of reports made by other medical authorities having had years of experience in the use of Quartz Mercury Vapor Lamps. The results obtained by me have been an agreeable surprise, and in my opinion this method of procedure is one of the most valuable and useful therapeutic aids extant. In numerous cases lacking previous data from medical literature, *e. g.,* mumps, chorea and scabies I also secured gratifying results.

Dr. Edgar Mayer, of Saranac Lake, N. Y., has covered the subject of natural and artificial sunlight very thoroughly both from an historical and scientific standpoint, in the American Review of Tuberculosis, Vol. 5, No. 2, 1921. Armamentarium consists of three Alpine and two Kromayer lamp outfits.

Sciatic Neuritis

Case 1. Sciatic Neuritis.—Mrs. V., 27 years, married. Suffering from left sciatic neuritis past two months. Stayed in bed one month. Treated by several physicians with routine treatment: hot applications, salicylates, liniments, etc. She was brought to my office in an automobile and helped up the stairway by her husband. The left sciatic nerve was tender along its whole course, especially under the knee and the sides of the calf muscles, and at the internal malleolus. Seven Alpine Sun Lamp treatments were given, beginning with 3 minute exposures, and increasing gradually to 20 minutes. In three weeks she reported herself well to the lodge to which she belonged. She could sleep well and walk without pain, although her leg was still weak from partial atrophy of the thigh muscles. A sacroiliac belt was applied to support the pelvic bones, and an elastic stocking to left leg.

With the necessary mechanical supports (iliosacral belt) where indicated, the Actinic Rays have helped all cases of sciatic neuritis that have come under my care and remained for a reasonable number of treatments.

* *Extracted from The Ohio State Medical Journal, April,* 1922.

Pruritis

Case 2. Pruritus Ani.—Mr. S., 38 years. Suffered from severe itching around the anus for past three months. Says he has not had a good night's rest during all that time. The skin is thickened and excoriated from scratching. Six treatments with the Alpine Sun Lamp, the rays directed against the affected region, at a distance of one and one-half feet, gave complete relief. Severe reactions necessary. I saw the patient in October, 1921, one year following treatment and there had been no return of the pruritus. A moist pruritic eczema of the scrotum was cleared up with three exposures.

Case 3. Pruritus.— Mrs. G., 34 years, married, three healthy children. She shows a reddish patch, slightly elevated over the skin surface of the mons veneris, which is causing severe itching, preventing sleep at night. Five bi-weekly treatments with the Kromayer Lamp, distance 2 inches, five to ten minutes' duration, gave her complete relief and disappearance of the lesion except for slight pigmentation over the burned area.

Tonsilitis and Mumps

Case 4. Acute Tonsilitis. Miss S., age 14. Acute tonsilitis of one day duration. The pillars and the soft palate above the right tonsil are reddened and edematous. I opened a peritonsillar abscess one year ago, on the same side. The throat and tonsils were rayed through a small Sharpe localizer, attached to the Kromayer lamp, two minutes on each side. The relief was immediate. She came back two days later and stated that her throat felt fine. She could eat and swallow without much discomfort the same evening after the treatment.

Case 5. Mumps.—Frank B., age 17, was seen by me in the apartment adjoining my office. Both parotid glands were swollen and painful. Painful orchitis on left side. The patient had not eaten for 48 hours and could open his mouth only with difficulty. He was conducted to my office, put under the Alpine Sun lamp; his cheeks rayed two minutes, distance foot and a half. The scrotum was rayed the same length of time. The patient got up from the couch smiling, his pain relieved, and he had his lunch the same evening. Next morning I found him sleeping; ten hours of sound sleep! The temperature hovered around 101° for the next few days, the patient had slight headache, which was relieved by aspirin, but the severe pain never returned.

Scabies

Case 6. Scabies.—Mr. P., age 27, has had severe itching and multiple skin lesions which were diagnosed as a result of scabies. He shared his bed with a man just arrived from Europe, who undoubtedly was the carrier of *sarcoptes scabiei.* The itch was intense, and the lesions were scattered over the whole body, especially around the waist line. A six minute exposure, front and back, with the Alpine Sun Lamp, distance 2 feet, was given. I also prescribed Ung. Sulphuris to be rubbed into parts that would show no reactions (redness). He later reported that he slept the first night, and only used the ointment around the armpits and the groins, where the rays did not reach the skin.

In four other cases of scabies I used shorter exposures and repeated them at a few days' intervals. The relief from itching was immediate.

Some cases experienced slight itching when the reaction from the burn began to subside and the top layer of the skin peeled off.

Epididymitis

Case 7. Gonorrheal Epididymitis.—Mr. M., age 34, married. Contracted gonorrhea several years ago. He developed severe epididymitis. I saw him at his home, ordered hot applications and prescribed opiates for severe pain. Two days later he came to my office. The parts were very tender and painful. Treatment: Kromayer lamp, distance 3 inches, exposure 5 minutes. The patient slept the same night without morphine, notwithstanding the burn from the rays. Three more treatments were given, the prostate massaged and rayed through a Wagner applicator (made of quartz glass). The pain was completely relieved, the prostate reduced in size and urine much improved. Urotropin was given as a routine measure. The hot applications were not needed after the first treatment. In October, 1921, the patient came to me from the army hospital for tuberculous ex-service men in Indianapolis. Since my last treatment he had no further attack of epididymitis or prostatitis. The urine contains a few shreds, the prostate is not excessively tender to pressure, the epididymes are only slightly endurated. The lung symptoms are improving under the sanitarium treatment.

Case 8. Tuberculous Epididymitis.—Mr. M., age 38 from Lorain, O. Noticed a swelling about the right testicle six weeks before he came to me for treatment. Two other doctors had him previously and tried sinusoidal and high frequency treatment. The patient's right epididymis was enlarged to the size of a small walnut; it was nodular and only slightly sensitive to touch or manipulation. A hydrocele was forming on the same side. The case was diagnosed tuberculous epididymitis with hydrocele. Dr. Neary, of Charity Hospital, operated upon the man for hydrocele and excised part of the tunica vaginalis, which was covered with small granular reddish lesions resembling tubercles. The epididymis was found as a hard semilunar lobular body. No caseous areas were found. Laboratory report on the excised tissue (tunica vaginalis) was: "Giant cells. Probably tuberculous." After leaving the hospital the patient received 14 biweekly local and general actinic ray treatments causing severe reactions a few times. The prostate was massaged and rayed at the same time. In August, 1921 the epididymis was half its former size, softer in consistency, the patient had no pain nor discomfort, his general physical health was much improved. He was allowed to return to work and ordered to take one treatment a week the next two of three months to prevent the further development of tuberculous lesions.

Acute Nephritis

Case 9. Acute Nephritis.—Mr. G., age 39, was seen by me at his home for severe pain in both flanks and in the left inguinal region. Marked tenderness over McBurney's point, which suggested an attack of appendicitis. A specimen of urine showed marked trace of albumen. He gave a history of sitting two days previously on the sill of an open window, his body perspiring. The patient was told to stay in bed, hot applications were applied to both kidney regions. Nephritin tablets were prescribed and given, 3 tablets every 2 hours. The third day he came to my office with difficulty; urine still showed marked trace of albumen, the lumbar regions were tender on pressure. Treatment: Alpine Sun Lamp, dis-

tance 2 feet, exposure 4 minutes, repeated at two day intervals. Seven days after the first treatment, the patient went to work, his urine was free from albumen and the pain gone. (The outcome of this case was a surprise to me. What effect the Nephritin tablets and hot applications had, I am unable to say. From my other experiences with the actinic rays in nephritic cases, there is no doubt in my mind that these rays often have a very beneficial influence on the diminution of albumen in the urine).

Pulmonary Tuberculosis

Case 10. Pulmonary Tuberculosis.—Mr. V., age 37, laborer, married, 4 children. He came to my office in June, 1920, complaining of loss in weight, weakness, cough, and shortness of breath. Temperature 101°, pulse 120, coarse râles over the left apex and left lower lobe; a few moist râles in the right apex posteriorly. No cavities were detected. His weight a year ago was 150 pounds, now he weighs 126. Examination of sputum showed tubercle bacilli. I gave the man the alternative of going to the City Tuberculosis Dispensary, where he might apply for a place in the City Sanitarium (because he was a poor man with a large family); or of taking the Sun lamp treatments for a period of six months. He preferred the latter course. I started him with 2 minute exposures under the Alpine Sun Lamp, distance 3 feet. The time was increased gradually to 20 minutes, back and front. The treatments were given twice weekly for eight months. Occasionally there would be an intermission for a fortnight to give the skin a chance to throw off the tan. The beneficial effects of the rays were noticed from the beginning. Cough was lessened after a few treatments, night sweats were relieved, temperature came to normal level in four months, his appetite increased, he began to gain weight after the initial loss of a few pounds. In March, 1921, his weight was 146 pounds. He reported himself well to the lodge, and thought he was able to return to work. Only routine hygienic treatment beside actinotherapy and occasional prescription of digitol for myocarditis were given. The last time I saw him, October, 1921, he was working steadily six nights a week. (He was the first tuberculous patient among the hard working class of people, out of a number of about 30 similar cases, for whom I had the pleasure of writing the final report of recovery to a lodge or insurance company, instead of the death certificate for the Health Department.)

Case 11. Pulmonary Tuberculosis.—Miss W., age 17, high school girl. Her uncle, two sisters and one brother, died of tuberculosis.

She came to me in April, 1920, complaining of weakness, chills and fever. She had pleurisy with effusion three years ago and stayed in bed six weeks. Since that time up to a few weeks ago she has enjoyed good health. Her weight one month ago was 118 pounds, now she weighs 107. The afternoon temperature 100°. Physical examination during the first visit showed no lesions in the lungs. She was examined in consultation by Dr. Updegraff of Cleveland; he found a few faint moist râles on deep inspiration at the left apex. A fluoroscopic examination showed enlarged bronchial gland and a few pathological areas in left apex. The next two months, while in bed, her afternoon temperature ranged between 99° and 103°. She was getting weaker, cough increased and also the night sweats. She came to me for actinic ray treatment June 1, 1920, her weight being 102 pounds. She began to gain in strength, the fever came down steadily until in October, 1920, it only occasionally rose to 100°; the expectorations, chills and night sweats were relieved, and she was able to visit her uncle in Colorado, where she stayed three months with her sister, a registered nurse. The

nurse reports that in a few weeks of her stay in the West she was free from fever, was able to return to her home in Michigan and help with the work about the house. In June, 1921, her weight was 117 pounds. (She took actinic ray treatments only four and a half months, and was not regular in attendance. I believe that phthisical patients should be kept under treatment a year or longer, and be rayed once a week on their return to work). In June, 1921 she had a relapse and lost six pounds in weight; her temperature would reach 100° and she felt weak and tired. Returned to Cleveland. August 9th her weight was 111 pounds and afternoon temperature up to 99.4°. Treatments were given three times a week. November 29 her weight is 118 pounds. She has had practically normal 4 p. m. temperature for a month. The physical signs, a few dry râles, are limited to the original focus of infection, the left apex.

Rheumatism and Complications

Case 12. Rheumatism and Pyorrhea.—Mr. V., age 32, had an attack of rheumatism, beginning March 26, 1921. He was treated by another physician before coming to my office, on June 1, 1921. Physical examination: tender lumbar vertebra, both hip joints involved, sciatic neuritis on both sides, worse on the left. He was hardly able to get off and on the street car on his way to the office. Five Alpine Sun Lamp treatments gave him considerable relief. Salicylates in 20 grain doses and later Atophan were used in conjunction with the lamp treatments. June 18th, I noticed that he had pyorrhea alveolaris. All upper and lower front teeth were affected. Dr. Klauser scaled the teeth and gave his opinion that the pyorrhea was of at least two years' standing (2nd stage). Local treatments to gums were given with Kromayer lamp, June 18, 20, 22, 25, 27, 29; July 1, 5, 9, 16. The body was rayed with the Alpine Lamp. He was able to return to work on July 5th. His gums showed marked improvement with five treatments, and on July 16th (one month after beginning Kromayer lamp treatments) the gums appeared healthy and firm around the teeth. The patient was advised to report once a week for local treatments to the gums to prevent the recurrence of pyorrhea and rheumatism. August 7th, his gums look healthy, no trouble in his legs, he has been working since July 5th, although his back is still *weak* and feels *stiff* on arising in the morning. He failed to take weekly treatments as suggested, still on December 10 his gums look healthy, except around the two lower middle incisors, where the edges are slightly reddened and inflamed (gingivitis). No pus can be expressed from the gums. His joints and sciatic nerves show no signs of disease.

Case 13. Rheumatism, Chorea.—Mrs. K., age 18, married. Attack of rheumatic fever 2 months ago; was in bed 1 month. Now she complains of involuntary jerky movements in her arms and legs, preventing her from doing household duties. Troublesome cough, which made me suspect tuberculosis; rheumatic pains in joints; losing weight; temperature 100.5°. Eight Alpine Sun Lamp treatments relieved her cough; she was free from rheumatic pains and chorea. Gained in weight 5 pounds. Bimanual examination showed her to be 3 months pregnant.

Case 14. Acute Chorea.—Girl Anna J., age 11. Tonsilitis 2 weeks ago, followed by myocarditis and cough. One week ago her mother noticed that she began to act *queer*. The neighbors said it must be *St. Vitus Dance*. The patient is not able to stand on her feet without sup-

port; she is unable to feed herself; her speech is defective. She was brought to my office in an automobile from her home four blocks away. Treated with the Alpine Sun Lamp, distance 3 feet, duration 3 minutes back and front; exposure increased 3 minutes each treatment. Three treatments were given every other day the first week, subsequently two treatments a week, eight exposures in all. For the fourth treatment she could come to my office without support. Choreic movements completely disappeared in four weeks. Salicylates and digitol were given for rheumatism and myocarditis.

In another patient, with mild chorea of two weeks' duration, one treatment with the actinic rays and heavy doses of salicylates, the physical symptoms disappeared in five days, but mentally the child showed certain peculiarities several months after recovery as is often the case in patients with chorea.

Another girl, 13 years old, with acute chorea of 3 weeks' duration was given 10 exposures within four weeks. The improvement was noticed after the second treatment, in four weeks the choreic movements have practically all disappeared; even her speech was greatly improved.

In a case of chronic chorea of 2 months' standing three treatments did not have much effect, and the patient discontinued the treatment. Further exposures might have improved the condition.

Other Conditions

Case 15. Cellulitis.—Mrs. M., age 52. Cellulitis of right leg and ankle. Skin reddened and tense above the external malleolus. Oedema of the ankle; severe pain, preventing sleep. First treatment: Alpine Sun Lamp, distance 2 feet, duration three minutes. Relief of pain almost immediate, leg feels much lighter. Oedema diminished 50 per cent in 24 hours, leg cured in five days. Vaseline applied to burned areas, later talcum powder.

Case 16. Carbuncle.—Mr. K., age 30. Beginning carbuncle near the tip of the right mastoid process. Kromayer lamp with medium Sharpe localizer applied 5 minutes. Pain greatly relieved after treatment. At the second visit, two days later, the *core* came away with the dressing *en masse.* The wound was dressed with antiseptic solution, and healed within a week.

Case 17. Leucorrhea and Erosion of Cervix.—Mrs. G., age 34. Pain in pelvis and leucorrhea for 2 months. Cervix eroded, bleeds readily. Slight retroversion. Antiseptic vaginal douches ordered. Two Kromayer Lamp treatments, using Wagner applicator, ten minutes' exposure. Pessary for retroversion after last treatment. Two weeks later, the patient reported that she has no more pain, leucorrhea relieved, cervix mucosa looked healthy. Pessary was removed in four weeks. August 8, 1921, two months since her discharge, the patient is still in good health except for some stomach distress, which was undoubtedly due to gastroptosis. A belt was ordered for her pendulous abdomen.

Case 18. Chronic Eczema.—Baby B., 3 years. Moist, discrete, eczematus patches, about a dozen in number, ranging from the size of a split pea, to that of a dime, on the inner sides of both thighs and under both knees. Duration two years. Severe itching, preventing sleep at night. Mother had taken the baby to the dispensary clinic a number of times, and was given various ointments which relieved the itching, but had little effect on the lesions. Eleven Kromayer lamp treatments, producing severe reaction, were given. July 29, 1921, two weeks since the last treatment, the skin is clear, except for slight brownish pigmentation at the sites of former lesions. General body radiations were also given with the Alpine Sun Lamp. No other local applications were used except olive oil to relieve the temporary pain from the actinic ray burns.

Conclusions

1. Actinotherapy is an effective mode of treating many chronic and obscure cases which the general practitioner, heretofore, had to refer to the specialist.

2. Ultraviolet rays are antiseptic, bactericidal, markedly analgesic, nerve sedative, and greatly assist in promoting general metabolism.

3. Actinotherapy is one of the best treatments in early stages of tuberculosis wherever found, and far superior to natural sunlight on account of its applicability at all places and in all climates. It is of special merit to patients who are unable to go to sanitaria and who wish to be with their families during the treatment.

4. In simple neuralgia and neuritis the actinic rays are almost specific. giving in many cases immediate relief.

5. Severe reactions and prolonged treatment are often necessary to obtain satisfactory results in some chronic cases.

6. Only the men who use this modality persistently and conscientiously know its real value.

THE QUARTZ-LIGHT THERAPY IN THE TREATMENT OF ROENTGEN RAY TELANGIECTASIS

By H. H. Hazen, M.D.,

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The present tendency to use the roentgen ray and radium in many conditions has resulted and will result in various types of sequelae to some patients. One of the most frequent of these unfortunate accidents is the production of telangiectasis. As is well known, this condition may result either from one erythema dose, or more rarely from a number of doses where pigmentation was produced. These marks, at times, are extremely unsightly and are the source of much mental discomfort to those having them. It should be noted that there is always some accompanying atrophy of the glandular structure and of the fibrous tissue of the skin.

In the past there has been no thoroughly satisactory way of removing these dilated blood-vessels. The electric needle, carbon-dioxide snow and multiple punctures with a galvanocautery have been recommended, but all of these methods leave much to be desired. The well-known effect of the Quartz Light lamp in producing an obliterating endarteritis led me to the employment of the Kromayer lamp in attempting to clear up these telangiectases. MacKee in his recent book, "X-Rays and radium Treatment of Diseases of the Skin," mentions this method favorably and refers to the work of one or two other authors.

Up to the present time eight lesions have been treated. Three were comparatively small telangiectasis due to radium placques, two were large areas covering the whole of the thyroid and thymus areas, and the remainder were mild scattered lesions resulting from one erythema dose in acne.

With an active lamp, using a quartz compression lens, I have found it necessary to give from fifteen to twenty minutes to each area. In no instance have more than two treatments been necessary to obliterate the vessels in the areas so treated. The results are a complete disappearance of the dilated blood-vessels, but naturally the atrophy of the skin remains unchanged and usually the result in appearance is that of a small, slightly whitened scar. However, these results are so encouraging that it seems worth while to record them..

Extracted from the American Journal of Roentgenology, Feb. 1922

QUARTZ-LIGHT RADIATION

By Dr. G. W. Ross, Toronto, Canada

Since we are especially concerned today with the region below but near the violet end of the visible spectrum, I will refer only to certain demonstrated properties of these so-called ultra violet rays.

When the skin is exposed to the rays of the Mercury Quartz Lamp for several minutes at a distance of two feet, a reaction commonly occurs, but only after a latent period of several hours; (and in passing it should be noted that the skin reaction, redness, and heat, occurs immediately upon exposure to the red or infra-red rays). The usual reaction resembles a moderately sharp sunburn, which in point of fact it virtually is, and this reaction lasts several days, according to the degree of burning, to be followed in most patients by pigmentation; compare the "taming" consequent upon repeated sunburning. Should the skin exposed to the Ultra Violet rays be sensitive, or the initial exposures prolonged, or administered close to the skin, then a blistering occurs, again comparable to that of a severe sunburning. Unlike the inflammatory reaction of x-rays or radium, however, there is no destruction of tissue, and consequently no scarring, nor is a Chronic Dermatitis induced, nor Telangiectasis. The worst that may happen, therefore, is a painful burn or a blistering which time and appropriate treatment cures.

I shall later refer to the principles that guide most operators in administering these rays therapeutically, and will now proceed to discuss briefly the various beliefs concerning the effect of Ultra Violet radiation.

These are:

A. Local on the skin.
B. General.

A—Local on the Skin:

What is the penetration of the skin by the rays? This is by no means exactly settled, although it is certainly slight, and probably not far beyond the superficial layers. The actual depth is likely about one or two millimeters.

Histologically certain changes have been noted: dilatation of the superficial and deep capillaries, loosening and vacuolation of the epidermis; exudation into the corium; a division of the nuclei of the epithelial cells; a migration of the leucocytes, and dilation of the lymph spaces. Repeated exposures lead to pigmentation in most individuals. Next are the rays Bactericidal?

Experimental data are abundant demonstrating the *bactericidal action* of Ultra Violet as well as of other electro-magnetic rays. The well-known destructive action of sunlight on bacteria is mainly dependent not upon light *per se* but upon the chemical rays. Their effect is materially intensified and accellerated, by moisture and the presence of oxygen.

Certain observations lend weight to an opinion by many and advocated especially by Wichmann that Ultra Violet rays stimulate the production of *anti-bodies* by the skin. Undoubtedly a skin that has been rayed either naturally by sunlight, or artificially, becomes more or less immune to infections. For example, during an epidemic of small-pox at Leysin, no patient whose skin had become pigmented as the result of exposure to sunlight, showed any eruption from Variola, whereas the unpigmented suffered severe eruptions.

Again Edgar Mayer reports "that the intradermic tuberculin test in guinea pigs and patients, often gives a reaction of lessened extent when the injected area is treated locally with short exposures of the Ultra Violet rays, either before or after injection. Recently tanned skin gives a slightly lessened reaction."

Further points of interest may be noted:

Ultra Violet rays acting upon Tuberculin for forty-five minutes at a distance of two feet almost completely destroys its power to induce intradermic reactions.

Dipththeria and Tetanus toxin rapidly lose their toxity whereas their corresponding anti-toxins are much less readily affected. Complement is destroyed.

Vitamines are unaffected (Hess).

Recently an interesting theory has been advanced that Ultra Violet rays break down the cellular elements of the skin, thus releasing cell proteins. These are absorbed and induce a non-specific immunity response similar to the hypodermic introduction of any foreign protein.

I refrain from offering any opinion on these various observations, but hope that I have impressed upon you as it has been impressed upon me that *first* the action of the chemical rays upon the skin is associated with profound changes, and second that these have been earnestly studied by numerous competent investigators.

The *general reaction* is even more interesting and more obscure. The pioneer work of Rollier, amply confirmed by other workers the world over, has demonstrated, at least so far as tuberculosis is concerned, that the healing rays of the sun (believed to be mainly the Ultra Violet rays), exercise a profound influence upon the course of the disease.

In support of this statement I might quote extensively but will content myself by referring to a paper by Hyde and Lo Grasso of the J. N. Adams Memorial Hospital, Buffalo which, in particular, care for children suffering from non-pulmonary tuberculosis—bone, joint, glands, etc. Most of their work has been heliotherapeutic, of which they speak with enthusiasm.

"Some of the patients, on admission, present a pitiful picture. They are anemic, emaciated, and fever ridden and with features suggestive of suffering; yet, in a few weeks, these patients go through a complete transformation. The pain, often intense, disappears in about ten days; the temperature takes a steady drop, weight is taken on rapidly, the features return to normal, and the blood condition is improved."——"The most characteristic local result that stands out foremost in the treatment of joint tuberculosis by heliotherapy and one of the greatest importance and advantage is, according to Dr. Rollier, the return of motion in the affected joint. He has attained this motion even in cases of fibrous ankylosis where the condition has existed for years. Although we have not had such results in cases of existing fibrous ankylosis, we have attained good motion in early joint tuberculosis."

And elsewhere comment as follows:

"It is well to note that solar radiation is of benefit not only in cases of so-called surgical tuberculosis, but is being applied with excellent results in cases of puerperal sepsis, anemia, convalescence and infectious diseases, and in fact in all diseases where the resistance of the patient is below par. It is being used in the European War in the treatment of all kinds of wounds."

Recently A. F. Hess of New York has published some remarkable observations in connection with Natural and Experimental Rickets and the effect of the Ultra Violet Rays on this disorder. In substance he found that rats fed on a rachitic diet (poor calcium Phosphorus and the anti-rachtitis vitamine) did not develop rickets if exposed to Ultra Violet radiations, further that the exposure of children suffering from this disease resulted in their cure.

An important contribution to this subject has recently been made by Dr. F. F. Tisdall of this city, working at the Hospital for Sick Children, to this effect, namely; that rachtitic children when appropriately exposed to Ultra Violet rays show after a time and during the process of cure an increase in their blood calcium and Phosphorus.

Commenting upon Dr. Hess' address upon this subject before the Royal Society of Medicine in London, Sir William Bayliss stated his belief that in some way actinic rays acting upon the skin, induced the formation of a powerful chemical substance possibly of the nature of a ferment.

* * * * *

So much for certain fundamental scientific observations. Let us now proceed to the practical side of our subject. There are two forms of Mercury Quartz Lamp in ordinary use, namely, the water-cooled lamp (Kromayer) and the air cooled (Alpine Sun). The first is used where one desires intense local radiation of short duration, as in the naevus flammeus, and the other both in local radiation of less intensity and where more general radiations are indicated, as in anemia.

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Radiation may be either Local or General—local for example in carbuncle, or Lupus Erythematosis or general in anaemia or both local and general in Tubercul Ademitis. Where the skin is being rayed the desirable reaction as a rule is one which produces a definite erythema after several hours and lasts a day or two—followed by some pigmentation. The occurrence of pigmentation necessitates continually longer exposures—just as one observes in ordinary exposure to the sunlight along with tanning of the skin.

* * * * *

Of course a new, and one believes a powerful form of energy, is bound to be "tried out" in almost every disorder. Extravagant claims based upon enthusiasm and insufficient experience or inaccurate observations or "the pranks of nature" in doing for herself things we ignorantly attribute to our own efforts, are all tending to discount the whole method of treatment. But let me remind you that x-ray and radium therapy and indeed any new method at variance with established principles and practice rightly has been compelled to pass through its "trial by fire." Just because we do not understand or cannot comprehend is no justification for ultra-conversatism. You will observe perhaps that I am pleading for the "open mind."

Time will not permit to do much more than enumerate some of the various conditions that have been subjected to treatment by Quartz Light Rays. Where any comments are offered they are based upon my own experience or upon statements which I, at least, cannot question.

* * * * *

Local Radiations

A

DERMATOLOGICAL

1—Acne, Vulgaris and Rosacae
2—Eczema, acute and chronic
3—Varicose ulcers with eczema
4—Dermatitis Venenata
5—Carbuncle and Furuncle
6—Certain forms of Alopecia (Alopecia Areata)
7—Herpes Zoster—especially for control of pain
8—Lichen Planus—irritation rapidly controlled
9—Lupus Erythematosis
10—Lupus Vulgaris
11—Puritis (Vulvae and Ani)
12—Psoriasis and Seborrheic Eczema
13—Seborrhoea
14—Burns
15—Urticaria
16—"X"ray Dermatitis and Telangiectasis
17—Icthyosis
18—Naevus Flammeus

Local Radiation Non-Dermatological

1—Bruises and Hematoma
2—Gun-shot wounds
3—Post-Operative wound infections
4—Neuritis including Sciatica and the Neuralgias
5—Myalgia (lumbago, etc.)
6—Teno-synovitis
7—Gynaecological
    Leucorrhoea
    Pelvic cellulitis, etc.
8—Genito-Urinary
    Prostatitis
    Epididymitis
    Orchitis
9—Oto-Laryhgological
    Chronic antrum disease
    Chronic Otitis media
    Tonsillitis
    Pharyngitis
10—Diphtheria Carriers

—B—

1—Osteomyelitis
2—most cases of non-pulmonary tuberculosis
(a) bone
(b) joint
(c) Pott's disease
(d) discharging sinuses (rectal fistulae)
(e) laryngitis
3—All local conditions where the general bodily vigor is low—Asthenic states

General Radiations

1—Bronchitis
2—Anaemia
3—Psychasthenia
4—Insomnia
5—Pulmonary Tuberculosis
6—Chronic Sepsis
7—Tuberculous Peritonitis
8—Genito-Urinary Tuberculosis

In conclusion may I quote Edgar Mayer of Saranac Lake.

"Most of our efforts have proved of little avail in teaching us the exact manner of the action of light; and until we know more definitely how it affects protoplasm and the body physiology, we must rely chiefly upon empiricism." And Bovie

"When we learn more concerning the relation of the organism and this imponderable part of its environment, radiations will find a place as secure as that now held by chemicals in rational scientific medicine."

Extracted from original article, 1923.

* * * * *

TREATMENT OF TUBERCULOSIS OF CHILDREN WITH QUARTZ LIGHT

Thirty cases of lymph node tuberculosis, 14 of wet pleurisy and 21 of exudative and adhesive peritonitis, all between the ages of two and fifteen years, were treated with the quartz lamp. The favorable results manifested themselves first in general betterment, but only after six to ten months were the modes favorably influenced. As a supporting measure for surgical treatment, fistulae and wounds healed well with radiations after excision of nodes. Excellent results were had in tuberculosis of the mesenteric nodes after laparotomy. Wet pleurisy healed after short periods of radiation. Forty to fifty exposures were sufficient in 12 cases. Serous peritonitis healed completely after sixty to seventy exposures, and adhesive types after thirty to thirty-five exposures. Pulmonary tuberculosis with signs of ulceration was not suited for treatment. The dosage used was five minutes' initial exposure at a distance of one metre, followed by a gradual increase of three minutes daily, until thirty minutes were reached, and then a decrease of the distance down to 25 cm. Fever was lost during the radiations.

Behandlung der Kindertuberkulose mit der Qurzlampe, A Mulierowna, Pediatr. polask, 1921, *ii,* 53.

Extracted from the American Review of Tuberculosis, June, 1922.

QUARTZ LIGHT; ATOMIC PHYSICS; CARDIO-VASCULAR CONDITIONS*

Donald McCaskey, M. D.,
New York City

A few years ago we applied our laboratory knowledge in terms of molecules. Then came the atomic theory and its application in 1896. Instead of the molecule being the unit planetary system around the centre of which the atom revolved, it was found that the atom was the unit complex structure. It was the unit planetary system of itself, comprised of electrically charged particles of infinitesimal size with a central positive nucleus and negative electrons revolving around this positive centre, each electron revolving on a fixed orbit analogous to our sun and its planetary system.

We now know that the rays from radio-active substances, among which is Quartz Light, consists in part of electrons ejected from the atom at enormous speed or velocity. Further, we now know that protoplasm of living cellular tissue absorb ultra-violet light in a way homologous to a piece of blotting paper absorbing liquid.

In this absorption or penetration of actinic radiations into the protoplasm, the theory now is that the high velocity electrons are projected into or even through the interior of the atoms comprising the protoplasm. They collide with other electrons revolving in their respective and fixed orbits. Deflection occurs and in turn a general disturbance of the planetary system of each atom. The extension occurs to the molecule and from the latter to the mass of molecules comprising the unit cell. From the latter the extension goes on to the mass of unit cells which comprise the living tissue, with the resulting phenomena of an energy reaction.

An energy reaction can occur in various form of manifestations, either as heat as potential or kinetic energy. No matter which phase of the metamorphasis or cycle the dynamic energy may enter into, it represents a corresponding alteration of the anabolic as well as katabolic circuit in the oxidizing process of life which we call metabolism. It is the degree and the delicate balance of this oxidizing process, which is purely dynamic, upon which the healthy stable conditions of the atom depends.

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In 1914 Dr. Edward C. Titus of New York reported the evidences of his proof regarding his studies in the "USES OF LIGHT IN THE TREATMENT OF DISEASE." In 1916 Matthew Steel of Brooklyn proved this electron shake up reaction in his studies of "THE INFLUENCE OF ELECTRICITY ON METABOLISM." Since then scores of other workers have added the results of their investigations to our knowledge. Just the other day down at Bellevue Hospital under Dr. Russell L. Cecil, I was doing some experimental work in Lobar Pneumonia. The problem being worked out was the index or degree of germicidal power of a Kromayer Lamp on Type No. 1 Pneumococci. I found that with this particular Quartz Kromayer burner with but 5 seconds exposure, temperature 32 Centigrade, fresh Type No. 1 Pneumococci just removed from an autopsied Lobar lung and cultured on fresh blood agar were killed dead as the proverbial door nail.

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* *Extracted from article.*

We know that in the use of Quartz Light a photochemical reaction occurs in the protoplasm *per se,* the same as on a photographic plate. A photo plate film, however, is comprised of an inorganic salt in a colloid, while protoplasm is both organic and inorganic in a colloidal state. With the absorption of this actinic light goes the taking up by the tissues of dynamic energy. It is sufficient to say here, however, that something constructive does happen of a chemical nature in a patient's body when Quartz Light is used on the patient's tissues.

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One factor in the human mechanism—the Cardiovascular system —is what I shall deal with in this paper.

From a study of 106 routine Einthoven electrocardiograms made from September, 1916, to April, 1922, from my own private patients all treated by Quartz Light, several fundamental deductions can be drawn. The period of treatment of these patients, ranged from six weeks to six years of continuous radiations over the entire body, from weekly to monthly doses. Duration of doses ranged from three minutes to four hours at a distance varying from 36 inches to 4 inches from the patient's body to the burner.

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The burners I used and still use are those made by the Hanovia Chemical Company. Underlying this Quartz Light Therapy was the fundamental regulation of the patient's blood chemistry, so that the chemical constituents of the blood were brought closer to and even up to the ideal standard. I refer to the blood plasma index of the Carbon Dioxide, blood sugar, creatinine, urea nitrogen, blood urea, non-protean nitrogen, hemoglobin, lymphocytes and differential, red blood and white cells and a routine Wasserman. In the 24-hour urine besides the routine analysis, I refer particularly to the total nitrogen eliminated, the ratio of urea nitrogen to the total nitrogen, and the ratio of ammonia nitrogen to the total nitrogen.

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Supplementary to and underlying the study of these 106 electrocardiograms, I found that the oxidization function of the patient's mechanism was markedly increased (in one case the increase jumped from 40% to 65% in two months, with a 10% rise in hemoglobin from 78% to 88% and a jump in lymphocytes of 15%.) The endocrine system of the patients revealed varying degrees of improvement in co-ordinating function (and singularly in four of these cases there was in the beginning a marked eosinophilia—one as high as 16%, which dropped to 3%—and the remainder dropped to 2%.)

The patient's subjective symptoms of hypertension, hypotension hyperpnoea, tachycardia, lassitude, headache, precordial distress, bowel irregularities, were removed or greatly alleviated, and the prophylactic resistance against acute infection increased.

We have much more to learn regarding the structural as well as the dynamic mechanism of the cell. One thing is pre-eminently true from my six years metabolic work with Quartz Light, THERE IS A CONSTRUCTIVE DYNAMIC EFFECT UPON HUMAN CELLULAR BIOCHEMISTRY FROM QUARTZ LIGHT, whether the cells be epidermis, nerve, glandular, blood serum, blood corpuscles or cardio-vascular tissue.

THE USE OF QUARTZ LIGHT IN DERMATOLOGY.*

By E. Lawrence Oliver, M. D.,
Boston, Mass.

Whatever may be the comparative value of quartz light in the treatment of bone tuberculosis, in dermatological therepeutics this light is often vastly superior to natural sunlight. For example, in a recent case of chronic eczema of the palms, with marked thickening of the horny layer and great itching, the itching was relieved and definite visible improvement occurred within a week after a single exposure of ten minutes at a distance of eight inches from the source of light. I feel absolutely confident that natural sunlight would have had little or no effect in such a condition. Two subsequent similar cases tend to show that the improvement in the first case was not a coincidence.

Let us now consider some of the skin diseases in which this light is often of value.

Ulcers of Various Sorts: Most of these cases that I have treated with Quartz light, about twenty-five in all, have been ulcers of the leg, of the varicose variety. Two of these cases had shown little or no improvement after a month's rest in bed, combined with good local treatment of the usual sort. The ulcers in both of these cases began to heal rapidly soon after weekly quartz light treatments were instituted, complete healing taking place in less than two months in both instances and this with the patients "on their feet." The other cases have almost without exception shown improvement more rapid than one would expect from other methods of treatment. A striking feature in many of these cases is the firmness and thickness of the new epithelium; it is often hard to realize that it is in reality scar tissue, so closely does it resemble normal skin.

The dose that I like to give is that which will produce a decided erythema of the skin about the ulcer. The average initial exposure in my cases has been two minutes, at a distance of ten inches from the source of light; the ulcer itself and a band of surrounding skin an inch wide being exposed, the skin beyond this being protected by gauze or paper. If the dose has been correctly gauged, and this is not always easy, a decided erythema appears the day following the exposure, this erythema lasting about a week, but causing little discomfort as a rule, in fact, it is not infrequent that pain incident to the ulcer is greatly relieved. Most of the cases treated have had weekly exposures, as this has been found to produce the best results. It is probable that nothing is gained by more frequent exposures. I believe that in ulcers of the skin, especially those of a varicose type, ultra-violet light will produce more rapid healing than can be obtained by any other known method of treatment.

Another skin affection often greatly benefited by quartz light is the flat vascular naevus, the so-called port wine mark. In these cases the Kromayer Lamp is much superior to the Alpine Sun Lamp, for the Kromayer Lamp can be pressed firmly against the skin, thereby pressing the blood out of the superficial vessels, allow-

* *Read at the meeting of the Section of Medicine of the Massachusetts Medical Society, June* 20, 1920.

[*Extracted from the Boston Medical and Surgical Journal, Vol. clxxxiii, No.* 6, *pp.* 155-158, *August* 5, 1920.]

ing deeper penetration of the rays, which at best have but little penetrating power. Treated in this way with exposures of five to twenty minutes, improvement follows in the majority of these cases. Fifty per cent improvement after a single treatment is not very unusual. Of sixteen successive cases of this type that I have treated in private practice the amount of improvement was "worth while" to the patients in all but two cases. These two were almost complete failures, both having dark skins highly resistant to light. It is quite possible that even in these case, result could have been obtained if much larger doses had been used.

Port wine marks that fade on pressure, as a rule, are by far the most amenable to this treatment, a fact which helps greatly in prognosis.

The desired reaction in these cases is a blistering burn of the area treated, for if such reaction is not produced, little improvement can be looked for. Such a burn over a small area, 4 or 5 cm. in diameter, causes only slight discomfort, rarely enough to cause any loss of sleep. Furthermore, the treatment itself is absolutely painless and hence easy of application in children as well as adults.

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Another affection which often responds very favorably to quartz light is alopecia areata. Bald areas of long standing often show regrowth of hair after four or five exposures to this light at intervals of two to three weeks, the lasting active hyperemia induced seeming to give new life to the hair follicles.

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Resistant patches of chronic eczema are frequently greatly benefited by quartz light. The itching can usually be greatly relieved and the thickened infiltrated skin may rapidly approach the normal in appearance.

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Severe cases of pustular acne vulgaris, where the lesions are large, respond well to quartz light and in selected cases it has proved its value beyond a doubt. In those cases of acne in which the skin is pale and oily, the active hyperemia induced by the rays usually lead to rapid improvement.

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THE QUARTZ LAMP IN THE TREATMENT OF DISEASES OF THE HAIR AND SCALP

Dr. Richard W. Muller
New York

My procedure is as follows: The diagnosis of the scalp condition is made by usual inspection. In cases of falling hair, the rate of loss is determined by a daily count for three successive days, of the number of hairs lost during the daily combing, and by noting how many of these hairs are long and how many short. The long hairs are old and the short hair is young. Patients who are losing relatively many short young hairs present a poor prognosis. The sittings for treatment are so timed that about one furrow or "part" of the scalp is exposed to the rays at one time, the remainder being protected. As much is done at one sitting as is convenient. The interval between treatments must be long enough to allow for the subsidence of whatever reaction follows the application of the rays. The remainder of the patient's skin must be carefully protected—especially the ears, face, and arms—against damage from the rays, and this is done by covering those areas with pieces of black cloth.

I shall not include any statistical data of my own in this paper, but shall do so in a future publication. Generally speaking, however, I will state that in the Nagelschmidt treatment we have found a method for treating the scalp and for the regeneration of hair hitherto considered hopelessly and permanently lost, that will prove little short of revolutionary in this field.

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"NEW POINTS OF VIEW IN THE DIAGNOSIS AND TREATMENT OF SURGICAL TUBERCULOSIS"

Dr. Fritz Konig
Surgical Clinic, University of Marburg

The Quartz Lamp manufactured by the Hanovia Chemical & Mfg. Co. has for long gained a place in our esteem. It is exceedingly useful for our purposes in the form called the Alpine Sun Lamp by Dr. Bach, of Bad Elster.

We have employed the Quartz Lamp, connected to mains of 220 volts, since June, 1912. For three months we have had two lamps in constant use, one of which hangs in the children's section and the other is employed for our patients in a special room.

We have at first studied the effect of this curative upon other diseases, and the experience thus gained applied to tuberculous patients to a greater extent. Dr. Hagemann will more explicitly report on these results later on.

For tuberculosis patients the treatment is given either locally or generally. Imprudent use may cause necrosis. In local application we adopt a distance of from 12 to 16 inches, in general treatment from 32 to 38 inches. We begin with a few minutes and gradually increase (in general treatment) to from one to two hours daily. Some patients have already undergone sixty single applications.

Hitherto we have not observed any injurious effects. The eyes and particularly delicate parts of the skin are protected by black cloth.

We have treated more than 50 patients suffering from surgical tuberculosis, about half of them locally.

Among these there were three cases of scrofuloderma following on extirpation of the glands—healing occurring after a few applications.

In the remaining cases glandular trouble, tuberculosis of the joints, fistula, etc., were present. Violent reaction always followed, sometimes even blisters formed similar to glacier sunburn. The glands were reduced, the fistulae discharged more freely, those on the surface healed up. A gratifying cure was recently effected. I had treated a male patient nearly sixty years of age for suppurating tuberculosis gonitis; after making good progress, he had a relapse involving tuberculous abscesses, fistulae, etc. It was only when the Quartz Lamp treatment was introduced that reabsorption set in with vigorous reaction. All the fistulae and abscesses have now been cured. Local treatment of deep seated diseases has in every case influenced them favorably and here and there cured them.

General treatment however has seemed more effective and this we have adopted in an increasing number of cases, especially for children. Six children or more, completely naked, lie under the lamp and are exposed to the Alpine Sun Lamp for two hours, after being gradually accustomed to the rays.

Under the treatment intense reddening and later pigmentation of the skin occur. In fistulae the first effect was an increased secretion, which then decreased until the fistulae were closed. Granulations became clear, infiltrations and oedema disappeared. Pain ceased. In all cases at first a feeling of fatigue and loss of weight occurred; later a continual increase was observed. Two patients have gained over 9 lbs., one of these being a highly tuberculous subject 17 years of age, with lungs affected and grave fistulous sacroiliacal tuberculosis, who could not progress at all under any other treatment.

Only one youth with a weak heart, another with an excess of adipose tissue, and one with infected fistular kyphosis lost weight. In the last case grave glandular infiltrations occurred in the neck during the treatment; these were cured after operation. The appetite is increasing and sleep is now calmer.

The improvement in general health has been evident in all cases, sometimes even surprising. Locally, as well, splendid results have been obtained. In the case of a girl who had undergone two operations for grave tuberculous coxitis with numerous fistulae and acute oedema of the vulva and the legs, the improvement which extensive operations had failed to effect, was obtained by the ray treatment. The oedema has disappeared, the wounds have become healthy, the fistulae are gone and the general condition is at present excellent.

According to the results so far published and incomplete as they are, I am convinced of the healing power of the Quartz Lamp, and would therefore strongly recommend this curative for further studies. Certain cases of tuberculosis of a superficial nature may be cured by a local application. Far more important, however, is the total radiation of the patient.

ULTRA-VIOLET RAY IN EYE, EAR, NOSE AND THROAT PRACTICE

Suggestions for Its Use

By Ira O. Denman, M.D. F.A.C.S., Toledo, Ohio.

This paper is presented for the purpose of interesting eye, ear, nose and throat specialists in a therapeutic agent extensively used in other fields than ours, but as yet not employed by us as a class.

It is easily possible to delve deeply into the scientific study of heliotherapy, and thus present a long argument in favor of its potency as a chemical and bactericidal agent, but I refrain; and instead, offer a short outline, hoping to make it more practical thereby. Neither shall I recite herein detailed case reports. I have it in mind to supplement this with a more exhaustive treatment of this and allied subjects in the near future, to which I shall append some case reports.

The object of this paper in a sentence is to urge my colleagues in special practice to avail themselves of the assistance of an agency that will in my experience, do certain things that nothing else will do, and certain other things better than other measures can do. Infinity is not claimed. It can not cure everything; far from it; but it is a most valuable aid, and to me an indispensable addition to my armamentarium.

At intervals, since the first century, attention has been given to the influence of sunlight upon the sick and diseased. This has been done by both scientific men and savages all over the world. During the past century more definite knowledge has been obtained regarding the curative or beneficial effects of sunlight than in any or all of the centuries preceding it. Phototherapy or heliotherapy has, only since the work of Finsen, been established upon a firm scientific basis.

Finsen, in the experiments which made him famous, in the latter part of the nineteenth century, succeeded in establishing the short wave length end of the spectrum and the even shorter waves beyond human perception, as a chemical therapeutic agent, having definite positive bactericidal power. The rays at the short wave end of the spectrum, the violet, and above them the ultra-violet ray, were definitely established as the therapeutic rays, whereas the longr red rays, which are the heat rays, and not rich in ultra-violet, had formerly been thought the curative agency.

Another discovery made about this time was the fact that the chemical therapeutic rays were non-conducted by glass, that it was impervious to them; and that fused quartz crystals did conduct them.

These discoveries, coming as they did in rather rapid succession, have resulted during the last ten years in the manufacture of appliances wherby this artificial sunlight is manufactured and applied irrespective of weather conditions, and in closed cavities such as the mouth, nose and ears, wheras Finsen was compelled to rely upon the caprices of clouds and vapors obscuring the sunlight, and could, of course, apply it to the external body surfaces only.

Moreover, sunlight, being rich in red and infra-red rays—heat rays—entails a limitation upon the length and strength of the treatment. As a result, the curative ultra-violet rays, being in the minority and overcome by the heat rays, are reduced to a fraction only of their possibilities when used separately. This separation of the heat rays and the cold rays of the spectrum is accomplished in the artificial generation of the ultra-violet ray in the vacuum quartz tube. Prac-

tically all such rays are of short wave length and cool. Therefore, they can be used to a full therapeutic quantity and generate no heat at all. Furthermore, they may be carried to excess where an actual destruction of tissues may result, and still the patient feel no heat. Of course, this is unnecessary when proper technique is applied.

Laboratory experiments with the effects of this agency show that the tubercle bacillus and the dipolcoccus are the most susceptible to its action. This is explanatory of the long-established, and until recently empirical, belief that sunlight is beneficial or curative in tubercular patients. Pulmonary and bone tuberculosis cases have been urged into the sunlight for a long period of time. With this recommendation is associated the advantage of high dry altitude. No doubt the higher altitudes owe much of their claim to restoration of health to the fact that there the sun's rays are least obstructed in their contact with the earth by clouds, dust and vapors. Empirically, also, came the discovery that tubercular patients showed better improvement when nearly naked, sprawling in the outdoor sun, than when inside of "Solaria" covered by a glass roof.

To dermatology we owe much of our present-day working knowledge of heliotherapy. The last decade has seen its adoption by dermatologists to the exclusion of many other therapeutic measures. Even the X-ray has lost much of its former prestige in this field. A factor of value, too, in this study is that its effects on skin lesions have the positive value of being obviously apparent to observers. I repeat that much of the definite knowledge of this interesting and valuable agency has been and is being visibly demonstrated by its positive curative effects in many skin lesions.

Actinic-therapy has been available for many years for general body radiation, including skin diseases, by the use of the Alpine Sun Lamp—the large lamp. Not until the lamp devised by Kromayer, which bears his name, was it possible to make actinic applications to the closed cavities such as the ear, nose and throat specialist requires. Only since 1913 has this lamp been available through its American manufacturers. This lamp generates great quantities of ultra-violet rays in a quartz vacuum tube in which an electric current passes through a metallic mercury arc. A high temperature causes the mercury to vaporize and the ultra-violet rays pass through the quartz tube from which it is directed to the field to be treated by suitable extensions, also of quartz.

The attachments include a small quartz rod for treatment within the auditory canal, a small rod for the eye, a larger rod for intra-nasal and sinus treatment, a tube tipped with a quartz condensing lens for intensifying the radiation of the tonsils and pharynx; a similar one, only periscoped, to direct the rays at right angles; and a large condenser for intensive radiation of external surfaces such as cervical glands, etc.

To convey the idea of the potency of this agency permit me to state that one minute exposure with this lens of a sensitive skin will produce an artificial "sun burn" with all the stages that one gets at the bathing beach—redness, then tan, soreness and peeling in four or five days—and the lens itself remain cold all through the exposure, the patient experiencing absolutely no sensation.

Broadly, indication for actinic-therapy in our special field as elsewhere, is infectious. It sterilizes corneal ulcers, traumatic injuries of the cornea or lids, all forms of conjunctivitis, especially the diplococcic

infection, eczema of the external ear, canal furunculosis and canal infection as in the bathers' ear, chronic middle ear suppuration, hay fever (not curative but relieves the patient by destroying much of the accompanying infection), pharyngitis, Vincent's angina (almost a specific) and tonsillitis, especialy the acute.

Donnelly, of Detroit, has carried out a series of experiments for the Detroit Health Department on sterilization of diphtheria carriers with success.

The Kromayer lamp has assisted me in relieving or curing all the above conditions with the exception of the last—dipththeria carriers. I have not had an opportunity to use it in such a case.

The conditions in which I was most interested when I installed the apparatus were feci of oral and naso-pharyngeal infection other than the tonsils and adenoids. These cases which have a red nodular throat long after a clean tonsillectomy and adenoidectomy has been done. Often such cases carry a little temperature and the cardiac condition, or the arthritis persists for some weeks or months after operation. I hoped by the use of the strong bactericidal action of the ultra-violet ray to hasten the convalescence in these cases. I am pleased to report that this I am now able to do.

It must be borne in mind that the lymph nodes in the tonsillar pillars, the infra-tonsillar nodule, the lingual tonsil and scattered about throughout the surfaces of the respiratory tract carries infection. Also the epithelium itself provides a lodgment for it, according to Rosenow. And, as these areas are not amenable to surgical extirpation, nor to medicinal measures, the actinic rays may well be depended upon to fill in the gap.

While treating some non-tonsillectomized throats in this manner, I discovered a slight shrinkage of the tonsils in the free nonsubmerged type. The shrinkage was accompanied by a diminution in the congestion and the cryptic discharge. Were it possible to secure a deep penetration of this ray, I am of the opinion that such tonsils could be destroyed by it. However, as the penetration is limited to two millimeters, sterilization can extend only that far. This is not, however, the entire action which we get from the agent. The local stimulation and increased metabolism which results, no doubt, raises the resistence of the infected field.

The limited extent to which the ultra-violet ray will penetrate constitutes its limitations. This fact made me highly desirous of bringing about a shrinkage of tonsillar tissue so that these rays could extend deeper toward the capsule. This was especially necessary in the submerged variety of tonsils. My next interest lay in the X-ray shrinkage of tonsils and adenoids as proposed and carried out by Dr. Witherbee, late of the Rockefeller Institute for Medical Research.

At the present time I have a series of cases of all varieties of tonsils under alternate treatment with the two. In addition, in those whose resistance is low, I have thrown in an occasional body radiation with the Alhaving had any trouble whatever this winter. I feel assured from the pine Sun Lamp. A few cases are discharged, but under observation, not having had any trouble whatever this winter, I feel assured from the progress already made that I shall be able to make a favorable report on a series of cases later.

I do not wish to be understood as proposing a substitute for tonsillectomy, I am doing and expect to continue to do tonsillectomies, but

in non-operative cases, and those who need, but refuse surgery, this may offer an alternative. One case I have now under treatment has a chronic mitral regurgitation and another is a hemophiliac, a sister having bled to death from a tonsillectomy. Another is a woman near seventy-five, an asthmatic, but who has a chronic tonsillitis with a severe arthritis, at times unable to walk. With such cases one should at least investigate thoroughly without bias or prejudice an alternative to surgery.

Extracted from Eye, Ear, Nose and Throat Monthly, March, 1923

LIGHT TREATMENT OF PULMONARY AND LARYNGEAL TUBERCULOSIS

Since 1914, patients have been treated in the Silkeborg Sanatorium, Denmark, in most cases with the mercury quartz light and only in a few cases with the carbon arc. Radiations were general, with daily exposures of ten to sixty minutes. There were no harmful results, but in a few cases it was necessary to discontinue these radiations because of fever, bronchitis, pleurisy and even erysipelas. The exposed patients were only those who were otherwise uninfluenced by ordinary routine. One hundred and thirty-three patients with pulmonary disease were treated with the quartz light; 80 were favorably influenced, 38 not influenced and 15 became worse. In 25 of 79 cases with bacilli, the sputum became bacilli-free. Twenty-five of 46 fever patients became afebrile. The general condition was bettered, as well as the appetite. Cases of pleurisy were favorably influenced. Of 22 cases of tuberculosis of the larynx, 6 were healed, 8 improved, 5 unchanged and 3 progressed. The conclusion was that light treatment in these forms of tuberculosis was a favorable aid.

Extracted from American Review of Tuberculosis, January, 1922.

PRURITUS ANI ET VULVAE*

By Herbert F. Pitcher, M. D.,
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Until the discovery of the bacterial origin of this disease, its treatment was entirely empirical. Every kind of wash and ointment has been used; carbolic acid, nitrate of silver, permanganate of potash, prolonged applications of hot water, and a thousand and one remedies without allaying the intolerable itching.

Surgical measures have been employed. Multiple scarifications, complete division of the sensory nerves of the affected parts, even ablation of the external genitalia, as performed by Howard Kelly, and Bourk's method. In several cases thus treated the itching returned. Later different electrical currents were used with some benefit. The glass vacuum electrode actuated by the high frequency current has been beneficial in some cases. The positive pole from the galvanic current has been used by Rolfe of Boston, who reported that 30 cases were benefited to some extent by prolonged ionic medication with copper and zinc ions. J. P. Lockhart Mummery used an alcoholic solution of iodine which he thought was driven into the tissues cataphorically by electricity. This method could have had a local action only, as alcoholic solutions are not electrolytes. None of these agents is curative; they alleviate the mild cases in some degree, but typical pruritus ani is a serious disease, and is dreaded both by the victim and the medical attendant. Sufferers of long duration frequently become addicts of choral or morphine. Women especially become so nervous and depressed from loss of sleep and suffering that they threaten to terminate their existence and the complaint is said to be on the increase. It was thought to be of so great importance that at a meeting of the subsection of Proctology of the section of surgery of the Royal Society of Medicine in London, April 13th, the meeting devoted special time to a discussion of the subject.

In men, the anal, perineal, and at times the scrotal regions are affected. These localities become thickened and excoriated, presenting a grey, foul-smelling surface which it is found impossible to keep clean. In women the disease may be limited to the genital region, or include the anal, the perineal, the labia majora and minora, clitoris, and all of the muco-cutaneous tissues. The parts, from much scratching and rubbing, will become swollen several times beyond normal. Some of these cases have extended over several years, and are the bane of the sufferer's existence.

There are a number of abnormal conditions in and around the anus, attended with itching, which should be distinguished from true pruritus ani, or some systemic disease like glycosuria or an anaphylaxis to some particular article of diet may be discovered. A thorough examination of the anal region and the rectum should be made. Many local causes for the itching may be discovered, hemorrhoids, fissures, anal fistula, worms or pediculi, and polypus of the rectum. Terrell of Richmond says a frequent cause of pruritus ani is small infected sinuses, which are found just beneath the ano-rectal line. A varicose state of the rectal vessels will cause what is commonly known as "itching" piles.

* *Extracted from the American Journal of Electrotherapeutics and Radiology, February,* 1922.

Any or all of the above conditions may be the cause of the itching and lead to pruritus ani; still they are not the disease *per se*. If a painstaking inspection be made of the anal region, and any of these troubles exist, the exact diagnosis can be reached. If, after a close inspection, nothing is found to explain the intense itching, and especially if it be of a paroxysmal character, the disease is undoubtedly true pruritus ani.

* * * * *

Twenty years ago I used, with more or less success, ionic medication of zinc and copper; later I used with better results the high frequency current by the application of glass vacuum electrodes followed with X-rays. This method alleviated the milder cases, but there was always an element of danger from burns in the use of the X-rays. Within the past two years I have treated 23 cases of pruritus ani et vulva with ultra-violet light. The results have been all one could wish. Not only was the itching alleviated at once, but the recoveries have been permanent. The number of cases was not large, to be sure, but they all responded so completely and permanently that I feel we have at last found, not only a scientific, but a safe remedy in a most distressing, and in some cases an incurable disease. Of the 23 cases, 14 were women and 9 were men; in 14 of the latter cases there was a local cause to start the infection, in the former there were 3 cases with a local infection, leaving 16 of uncomplicated cases, which were undoubtedly due to streptococcus fecalis.

In the preparation of the patient, all hairs are closely cut, as each hair casts a shadow which obstructs the light. The parts are thoroughly cleansed with soap suds, carefully dried, and any crusts removed. There is usually a redundancy of the anal folds, which serve as hiding and breeding places for the bacteria. With rubber gloves to protect the hands, these folds must be smoothed out in order that the light may sterilize all of the recesses. The healthy skin should be protected and the light localized, in order that no one place should be over treated. The Kromayer Quartz Lamp is the form of light that is most convenient to use locally. The lamp is held 3 inches from the parts to be treated. The initial application is 4 minutes, increasing from one to two minutes each treatment. Usually 3 treatments are given the first week, 2 the second week, and 1 every one to two weeks thereafter as occasion requires. From 6 to 12 treatments are generally sufficient to give permanent relief. The first treatment allays the itching to some extent, not because the bacteria are all destroyed, but because the light acts as an analgesic to the irritated nerve ends. Where the skin became infected through local causes, correction by operation did not relieve the itching, and applications of the ultra-violet light were necessary to effect a cure.

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In all cases of severe pruritus ani, general body treatment should be given to upbuild the system against any recurrence of the disease. With your permission, I will give a brief report of two cases, to illustrate the results of the treatment.

Case 1. Mrs. H. age 55 years, referred by her family physician. There was no real pathology, except a nervous system very much depressed as a result of pruritus. The disease affected vulva, perineum and anus. It extended on to the nates, groins and thighs. The anal and genital parts were thickened and excoriated by scratching. The

general health and strength had become affected through loss of sleep. She would be awakened when the spasm of itching occurred and find herself scratching. On account of the thickened state of the epidermis she was given 5 minutes' application as the initial dose over each locality, distance three inches, using the Kromayer lamp, after which she received a general body treatment. The first treatment quieted her nervous system and gave her a fairly good night's rest. She received 16 applications, including the general body treatments. She has remained well since—over two years.

Case 2. Mr. P., age 26, referred by Dr. B. Pruritus ani, affecting the anus, perineum and scrotum, had existed two years. He had been under treatment most of the time, with salves, washes and powders. There was no pathology present, except as a result of scratching. He received the usual treatment with the Kromayer quartz ultra-violet light. There was no itching after the sixth application, but he received four more treatments to make sure of permanent results. He has remained well since, something over a year ago.

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QUARTZ-LIGHT THERAPY IN INFECTION

By Arthur E. Schiller, M.D.,
Detroit, Michigan.

A perusal of the various methods of treatment of chronic ulcers and infected wounds shows such a variety that one is forced to the conclusion that no truly successful method has as yet been advanced. New methods are continually coming to the foreground, only to be relegated to oblivion and yet without experimentation and corolation of facts nothing can be accomplished.

The pathology of a chronic ulcer and an infected wound of long standing is very similar. The base is covered with exudate, the edges are elevated and covered with dead epithelium, the surrounding skin is thickened and there is a small cell infiltration surrounding the entire wound.

An important principle in the management of chronic ulcerating surfaces is the stimulation of granulation and of the epithelial forming powers of their borders. This is accomplished by the removal of inhibitory factors such as sepsis, defective circulation and inefficient general nutrition. For the production of these results numerous substances have been advocated. Scarlet red, a dye stuff introduced by V. Schmeiden in 1908, has been used extensively and fairly successfully. Nitrate of silver in strength of from one to one hundred per cent has been used. Thies recommends the sand bath, consisting of sterilized very fine sand sterilized by boiling and then dried. The sand is poured over the suppurating surfaces and is changed according to the rate of absorption and the char-

acter of the discharge. The duration of the treatment varies with the condition, but is usually from twelve to fourteen hours daily. Jaubert advises the careful preliminary preparation of the ulcer by means of tincture of iodin, peroxide of hydrogen, moist compresses, etc., and then a daily exposure of the ulcer of from twenty to thirty minutes to the direct rays of the sun. Unusually rapid and satisfactory healing is said to take place due to the production of active hyperemia and to the inhibitive action of sunlight upon bacterial growth. Widmer insists that the new epithelium formed under these circumstances is much superior to that produced by scarlet red, the approach to normal being sometimes so complete that the cicatrix can scarcely be differentiated from the surrounding skin. Richter affirms that an ordinary arc light with a powerful reflector is just as efficient as the rays of the sun. Frank E. Stowell treats chronic ulcers and wounds with static electricity and strapping.

If we are to determine upon a rational method of treatment of ulcers and infected wounds we must endeavor to stimulate the normal defensive power of the blood, for in the blood are found the real defensive agents of the tissues in the shape of phagocytes and alexins, which destroy bacteria and neutralize their poisons. Upon this theory rests the justification of the modern treatment of supporative condition by means of heat, passive hyperemia, etc., all of which, apparently, merely aid the natural functions of the body. There is no question in my mind that of all agencies advanced in recent years to aid the body to restore an ulcerated or infected part to normal, the ultra-violet ray stands pre-eminent in ease of application, lack of pain, freedom from danger and in results obtained. Sidney Russ of Middlesex Hospital, London, says: "If a powerful source of ultra-violet radiation be directed upon an infected wound, the result of an adequate exposure will be that the pathogenic organism on the surface will be directly killed. Cultural plates made show that bacterial cultures of all types, including the spores of tetanus bacillus, upon radiation by ultra-violet light between 2,960 and 2100 angstrom units were all promptly killed." Ultra-violet light acts as a decided irritant to the skin. Vitality, therefore, of numerous cells is decidedly damaged and in order to take care of this damage there is a dilation of the blood vessels as a means of removing the dead and damaged cells; in other words; restoration takes place. There is also a sedative action upon the cutaneous nerves, tending to reduce nerve irritation, thus rendering the most painful ulcer or wound practically painless in a comparatively short time.

I have used the ultra-violet ray in the treatment of abscesses, bone tuberculosis, tubercular glands, bone and joint infections, chronic leg ulcers, infected incision wounds following operations, infected injury wounds, indolent ulcers such as X-Ray burns, chancroidal ulcers, etc.

In an infective process leading to the formation of an abscess, the early use of the quartz light under pressure will, usually, abort the infection and prevent abscess formation. If the process has gone on to the breaking down of tissues, then distance radiation will hasten supporation, relieve pain and quicken the process of repair.

Tubercular Adenitis

Enlarged glands of tubercular origin respond to pressure treatment with the quartz lamp combined with general radiation over the entire body with ultra-violet light. The glands, which are at times united in a solid mass, become separated and gradually disappear. If there is a tendency to suppuration, the rays hasten this and the abscess may be

opened earlier. Continued treatment speeds recovery of the suppurating tissues. The patient's resistance is raised, there is increased metabolism with disappearance of languor, increased appetite and a quickening of all body functions.

Bone and Joint Infections

W. C. Campbell (Am. Jour. Ortho. Surg. XIV 191, 1916) applied heliotherapy in sixteen cases of bone and joint infections. Seven were tuberculous, four osteomyelitic, two pneumocommic, arthrites, one periarthritis following direct infection of the knee joint, one arthritis deformans and one decubictus. He noticed rapid expulsion of sequestra and marked an early beneficial effect in severe septic conditions. There is rapid evolution of the tuberculous process resulting in bony ankylosis in every case. Close attention should be given to orthopedic measures for the prevention of deformity as in any previous treatment, by using removable apparatus and extension.

In all cases of this type, sunlight, fresh air and good food are essentials, but for the patient that cannot afford the seashore or mountains we can supply in our artificial sunlight a method of hastening repair in the infected areas and building up of the body as a whole.

Skin Tuberculosis—Tubercular Ulcers

Respond more readily to compression treatment with quartz lamp than with any other known method. In these cases it is also a good policy to use general radiation to the entire body at least once a week for the systemic effect to be obtained.

Indolent Ulcers—X-Ray Ulcers

Respond quickly to surface radiation with ultra-violet light. The ulcer is cleansed the day before by using a moist boric acid or Dakin's solution dressing. The edges of the wound are denuded of epithelium by brushing with gauze and curretting with a dermal curet. The wound is then exposed to at first small, then larger amounts of rays. Sterilization of the lesion and stimulation of the granulations takes place, followed in a short time by regeneration of epithelium. Satisfactory results are obtained by using an amount of ultra-violet ray that will cause inflammatory changes in the normal skin. MacKee states that "indolent ulcers caused by third degree radio-dermatatis may be made to heal by exposure to the sun, or better still, to ultra-violet rays from the Kromayer or Alpine Sun Lamps." Needless to say, in chronic leg ulcers as well as in other types, all methods must be used to assist the treatment for the ultra-violet rays are not a panacea, but a valuamle adjunct,

Infected Wounds

Experiments made in the Great War show that sunlight was a wonderful aid in the sterilization and healing of infected wounds.

Leriche in the Presse Medical, May 24, 1917, writes that "recent infected wounds, with dead tissues excised and opened out flat, can be sterilized by sunlight in forty-eight hours. The first period of insolation lasts one-half hour, and the second two and one-half hours. After six days such a wound could be sutured. In deep wounds and fractures, sterility was obtained in four to six days. Where sunlight is subdued

the wounds can safely be exposed for a long time. Where bright and hot small progressive doses are indicated, not exceeding fifteen minutes on the first few days.

Leo and Vaucher, Paris Med., July 27, 1918, writes that "at all seasons direct sunlight rays have a positive therapeutic value and act like a drain, the edamatous tissues pouring out septic fluid, droplets of which become visible in ten to twenty minutes.

By far the greatest effect from the sun's rays are due to ultra-violet light and more rapid results can be obtained by the use of artificial ultra-violet light produced by the quartz lamp. Here the rays are always available, always constant and can be measured in quantity to give the desired result.

Infected abdominal incisure wounds clear in from one to two treatments, lessening the number of days of convalescence of the patient and relieving the surgeon of much worry.

In the prophylaxis of industrial wounds due to injury the ultra-violet ray finds a valuable place. Radiation immediately following injury will, in many cases, prevent infection, relieve pain and save the patient prolonged agony.

Chancroidal Ulcers

Are rapidly cured by radiation with ultra-violet light, using the ray frequently enough to sterilize the ulcer. Spreading is prevented, healing is promptly instituted and complications are prevented. The associated glandular enlargement must also be treated by the compression method. Where it is too late to prevent suppuration, the process will be hastened, and the duration of the subsequent abscess will be greatly lessened.

Summary

1. Ultra-violet light is an agent that should not be neglected in the treatment of infections.

2. It will stimulate the normal defensive power of the blood, sterilize tissues, produce active hyperemia, inhibit bacterial action and regenerate epithelium.

3. It is not a panacea, but must be used in conjunction with other surgical measures.

4. It will give quicker relief from pain and freedom from infection than any other agent.

5. It is fool proof and can be used on all parts of the body without danger.

Extracted from the Journal of the Michigan State Medical Society, June, 1922.