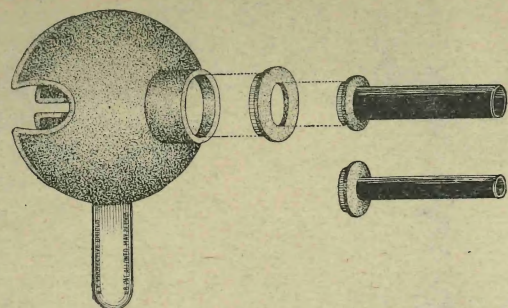




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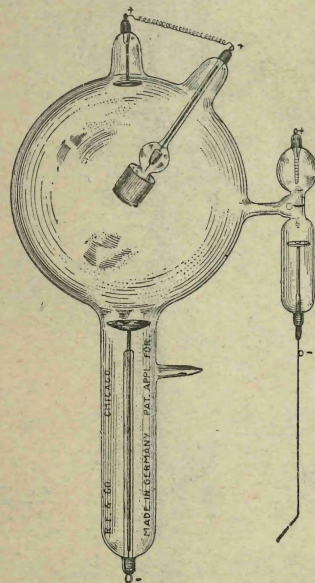
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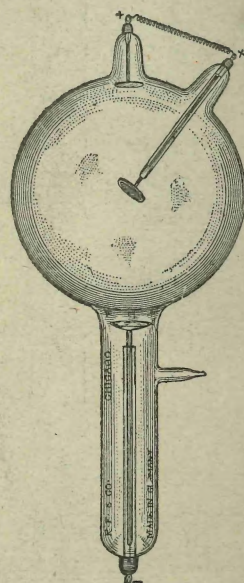
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Vol. III

July, 1903

No. 7

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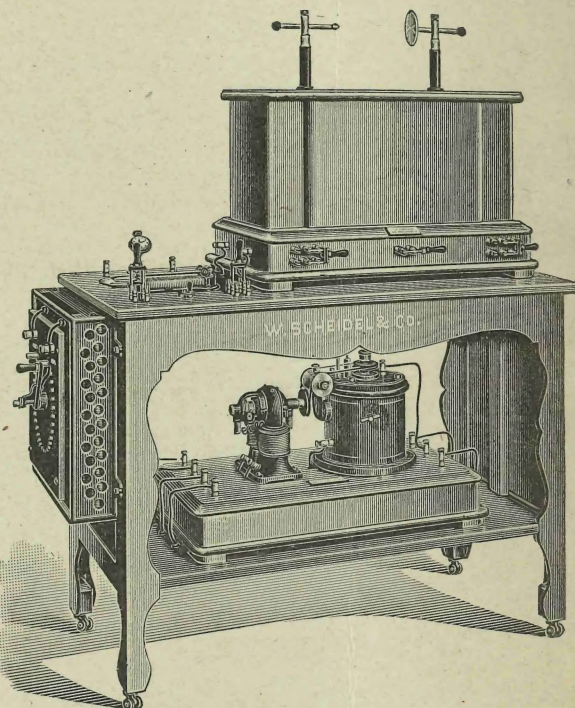
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THIS JOURNAL IS DEVOTED ENTIRELY TO ALL
BRANCHES OF ELECTRO-THERAPEUTICS

Contributions of actual experience by physicians using the X-Ray as a therapeutic agent are highly valued by this journal, and the editor is always willing to reserve space for such communications.

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American Electro-Therapeutic and X-Ray Era

Vol. III

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Original Contributions.

ELECTROLYSIS IN ITS RELATION TO SCAR TIS- SUE CONSTITUTING URETHRAL AND OTHER STRICTURES.*

By A. Augustus O'Neill, Ph. D., M. D., Columbus Hospital, Chicago Ill.

By failure and disgrace, condemned to the slum,
By fortune now enriched, back they all come.—*Anon.*

The recent advances in electro-therapeutics, made possible by the marvelous discovery of Professor Roentgen, Crooks and others in the X-Ray, has made another and perhaps one of the most important epochs in electro-therapy, and furnishes the profession with therapeutical aids of inestimable value and has attracted the attention of the professional as well as the non-professional world and given a new and second impetus to other departments of electro-therapeutics which have fallen into partial disuse and obscurity. I am sorry to notice, however, that this revival brings the subject forward hampered with the same barnacles which had impeded its progress in the past, and placed the whole subject in disrepute.

The subject of electrolysis in its relation to cicatricial tissue is one which for myself I settled years ago, having given it considerable attention and arrived at my conclusions after considerable experience and research. Electrolysis may be de-

*Read before the Chicago Electro-Medical Society June 30, '03

finer as a certain use of electricity to bring about certain electro-chemical changes in fluids, semi-fluid and solid bodies known as electro-chemical decomposition or dissolution. Electrolysis of organic or living tissues comprehends several physical processes, and it would be impossible in the scope of this essay to enter into the minute considerations which the importance of the subject would warrant, so we will this evening confine ourselves to the practical application of electrolysis to living tissue, but particularly to cicatricial tissue.

As electrolysis is the decomposition of compound bodies by electrical force, the same is applicable to living tissues by bringing the latter between the terminals of an electrical circuit. Then several changes and effects are produced (physiological-calorific-actinic-chemical); 1st. Dissolution of tissue within a certain area or limit (electrolysis proper). 2nd. Stimulation and irritation of tissue within certain limits (electrical stimulation). 3rd. The effects of mechanical-stretching—pressure and manipulation, produced with the electrode. 4th. Electrical osmosis (cataphoric action), entirely distinct from electrolysis.

We will consider each.

First, dissolution of tissue which takes place at and near contact points is the result of chemical galvano-caustic action; acid at the positive and alkali at the negative pole. The chemical action of these products upon the tissues and the destruction of the tissues from whence derived destroying their integrity, results in decomposition (electrolysis).

A secondary action, purely chemical and depending upon the metal of which the electrode is composed, the electrode being acted upon by the current as well as the results of tissue decomposition and this reacting again upon the tissues.

Second, stimulation and irritation of tissue, with its consequent hyperæmia and hypertrophy; physiological or pathological.

Third, effects of manipulation produced on tissues by electrodes, as stretching, etc., as in introduction of olives, sounds, etc., into the urethra, producing certain definite effects—attenuation, absorption, stretching.

Fourth, electrical osmosis, entirely distinct from, but ac-

companying electrolysis; when a current passes through living structures. "The emigration of the Ions is accompanied by a transfer of the fluid *en masse*." The degree of electrical osmosis is proportionate to the resistance of the fluid body. The direction of the osmosis is always from positive to negative. "Electrical osmosis is very marked in the case of pure water and diminished when the conductivity is imparted to the liquid by the addition of salts in solution." This is a most important consideration, as by it may be explained many tissue changes called obscure yet far reaching in their effects. The composition of the body offers about the same resistance as a weak saline solution to the electrical current, that is, offers enormous resistance, so that in all electrical currents passing through living tissues there is an active transportation of the water to the cathode. With this thought well in mind, let us briefly look at the composition of living tissue.

Under the influence of heat and light, as if with Divine touch, comes forth from the seeming dead or sleeping inorganic world that which constitutes the substratum of the animal organism, namely proteid, brought to us by the vegetable kingdom, an indispensable constituent of every living animal tissue and an essential for the manifestation of animal activity—proteids composed of non-crystallizable compounds, of hydrogen, oxygen, nitrogen, and sulphur, the combination or conversion of which into proteid is the secret of the vegetable world. "Our very conception of a living, functionally active cell, whether vegetable or animal, is necessarily associated with the integrity of its protoplasm, of which the invariable organic constituents are proteids."—Prof. Gangue. "The property of converting the proteids into living tissue belongs to the animal organism." Anything which interferes with the integrity of the animal cell limits or destroys its power of segmentation or reproduction, and we can easily comprehend that any considerable movement of the fluid in the living tissue toward the negative pole would so disturb the constructive metabolism as to impair nutrition, bringing about atrophy or degeneration of tissue so acted upon. If this transportation of fluid is not great, and the fluid balance of the cell contents is not much disturbed, restoration of the fluid balance within the tissues can and will take place within a certain time. The power

of such restoration or recuperation differs in different structures,—pathological structures, less highly organized than normal tissues and having a lower power of recuperation, are less fitted to withstand the disturbances caused by the effects of the electrical current. From this view was born the idea of carrying off cicatricial and connective tissue, and especially the tissues constituting strictures of the urethra, rectum, the cervix uteri and other canals, without interfering with the normal tissues adjacent as mucous membranes or epithelial coverings. Beautiful theory, which would enable us, should we close our eyes and give line to our imagination, to see the stricture dissolve and be destroyed and the electrical lines of force attacking these connective tissue accumulations to the exclusion of the normal structures with the same certainty and discrimination as the wasps were supposed to drive out all the Canaanites from the land of Canaan; and I would not be inclined to disturb so pleasant a dream by converting it into either a nightmare or a rude and abrupt awakening, if the carrying out of this beautiful dream were not attended with many dangers, fraught with many accidents resulting in some most deplorable physical disabilities, ruining the comfort, health and even the lives of many individuals—and for these slight reasons I dare disturb this dream and put an end to the Quixotic ripping of our wine-bags open under the delusion of killing giants.

When important and dangerous procedures are recommended to the profession by men of experience (and none others should make such recommendations), we assume the great responsibility of the effect of such procedures upon the health of humans, he should be careful in his observation, able to make proper diagnosis and to attribute effects to their proper cause. Nothing can be more reprehensible and condemnable than to recommend dangerous procedures on purely theoretical points, arriving at definite conclusions from unsound and indefinite speculations—procedures which may imperil the comfort, health and even the life of patients in the hands of the inexperienced practitioners who, perhaps, allow themselves to be guided by such recommendations. The great fault and dissatisfaction in the field of electro-therapeutics has been that in dealing with electricity in its application to disease we have

made the theologian's mistake of depending upon deductive and speculative philosophy and from conjectures thus formed arrive at conclusions which are made the working rule and basis, notwithstanding the contradictions of the facts and results of carefully conducted experiments along the sound basis of scientific demonstration.

Our greatest benefits have proceeded from dissectors, not dreamers. To refuse to dream is to refuse to work with part of our senses when we are privileged to use all. To close our eyes and depend upon "that something peculiar to each individual case, which we feel" and not watch the milliamperemeter and the results of electricity on these scar tissues, is to dream and delude ourselves. It is beautiful to dream; it is better to progress, and progress with firm and steady tread.

I fear I am encroaching upon your valuable time and indulging in persiflage beyond the privileges of this important subject; so to the issue.

All results are definite effects of definite causes. We have currents of known qualities and quantities, instruments of precision by which we may know beyond conjecture the strength and quantity of electrical currents, and we have tissues of known pathology and physiology and an approximate knowledge of its physical properties, save that something referred to as "vital principle." For our consideration we have to take into account cicatricial tissue constituting urethral and other strictures.

Cicatricial tissue, as we all know, is formed from granulation tissue, and granulation tissue always results and is produced to supply the place of normal tissue which has been destroyed by any of the various processes as well as replacing regions of its own tissue which may have been destroyed by inflammatory or other destructive processes. It is a shining, smooth surface-tissue of light color—connective tissue in type. The abundant blood-vessels which so richly supply the granulation tissue, largely disappear as this forms connective tissue, so that the latter is not so abundantly vascular as normal tissue and also lacks the nervous and lymphatic structures. The one great peculiarity of connective tissue which concerns us is that it finally contracts in all directions and dimensions, increasing in

density with a transforming tendency mimicking the structure it has replaced in some cases. In areas of not great dimension it is found invested with an epithelial layer forming a horny surface. From this it may be seen that it is less resistant to destructive agents than normal tissue, yet, like normal tissues, has the power of regeneration of itself in part, and if all should be destroyed, the normal processes of repair would again fill in the gap with a new supply of granulation tissue to become connective tissue; and this after the process of sloughing off of the necrosis produced by the agent which destroyed the first crop, and, sorry to say, the second crop, is apt to be larger to meet the larger demand, should some normal tissue surrounding the first lot be included in the destruction.

From the foregoing reasoning in the first part of my discourse on the qualities and effects of the electrical current, it may be seen that in its effects upon living tissues electricity cannot be more than a destructive agent nor less than a tissue stimulator or irritator, and between these extremities, or with the extremes, we endeavor to produce the results we call good.

The question of electrolysis is an old one. As early as 1803 Mongiordo and Landom¹ called attention to it, and shortly afterwards Fabre-Palaprat.

In 1841 Crusell² of St. Petersburg, in an address to the French Academy of Sciences, advocated dissolving urethral strictures with the alkaline pole without producing scars, and again, in 1849, a committee of the academy to whom his paper was referred reported adversely to his claims. Crusell became discouraged. Lerche followed, in 1849, with Crusell's method and discovered atonic ulcers would heal under the stimulation of a voltaic couple on their surface; by Graefe³, in 1852; by Ciniselli, in 1860; so we can see that the oft-made claims by Dr. Robert Newman and his adherents, as being the originator and the first to suggest electrolysis for strictures, are unfounded. The subject was old and well thrashed before Newman dreamed of it.

In the treatment of urethral stricture, mainly two statements or procedures are urged: First, carry off the stricture without impairing its epithelial cover or the epithelial portion of the urethra by that inscrutable and mysterious principle which some electro-therapeutists cannot name or mention, but can

close their eyes and realize it; second, to carry off the stricture by electrolysis, using such currents as will dissolve the cicatricial tissue and not impair the normal tissue surrounding it, and to do it in such a way that no more connective tissue takes place and no more return or recontraction of the stricture. Good.

In the two foregoing recommendations, while there is a diversity of opinion regarding the *modus operandi*, both seem agreed as to the rule which has become eminent—so eminent that there is vying for its authorship—the celebrated rule to be remembered by the five fingers on the hand: Three fives, five minutes, five milliamperes, and every five days—three fives which will not make a “full house,” but, I suspicion, may make a full hospital.

Will it remove a stricture to stay removed? Has it removed a stricture in the sense we understand stricture, and that removal by means of electricity? No!

I have had an experience covering several hundred cases of different kinds of stricture in different degrees of formation, and make the statement now, that where we have an organized cicatricial stricture, the currents of sufficient strength produced electro-chemical destruction, necessitating nature to replace such destruction with scar tissue. If an ordinary olive bulb be applied with currents of two, three or five milliamperes, for more than two or three minutes, not mentioning the long applications of the same current strength recommended by some operators, they will produce gross destruction of the tissues in contact. I will not simply cite the results in patients, but will detail experiments made with care and accuracy concerning definite currents applied to definite areas.

EXPERIMENTS.

Experiment I. Four milliamperes applied for five minutes to scar tissue, 13 years old, on the thigh. Result: Destruction of scar tissue and burn. Area, $1 \times \frac{3}{4}$ cm.

Present result, 8 days after: Regular process of cicatrization with inflammatory reaction; new granulation tissue taking place of the old.

Experiment II. Four milliamperes, 5 minutes, to similar structure on the thigh. Scar tissue, 19 years old. Result:

Same as preceding.

Experiment III. Two milliamperes, 3 minutes, to buccal mucous membrane; area, $1 \times \frac{3}{4}$ cm. Result: Mucous membrane whitened and roughened with necrosis appearance; sloughed off next day, reparative process requiring four days, membrane showing effects of destroyed epithelium, seven days.

Experiment IV. Two milliamperes, 3 minutes, positive electrode to same size area. Result: Destruction of epithelium, with blanching of mucous membrane for five days.

Experiment V. Platinum wire electrode, 1 cm. No. 18 wire, 2 milliamperes, 3 minutes, to scar tissue on thigh, 13 years old. Result: Characteristic electrolysis or galvano-caustic tissue destruction.

Experiment VI. Ten milliamperes, 10 minutes, on skin of rabbit, copper electrode. Circular area of contact, 1 cm. diameter. Result: A very bad burn, with considerable tissue destruction.

Experiment VII. Same size area as preceding, on surface of bladder; positive contact; copper, 10 milliamperes, 3 minutes. Result: Destruction of peritoneal covering of bladder.

By the preceding experiments it may be seen that very slight currents for a short duration of time may destroy the epithelial linings of the different cavities, and from this observation, with our present knowledge of the modes of tissue-resistance of pathogenic bacteria may be seen the danger. It is not necessary to call attention to the necessity of using instruments which have been sterilized and to handle them with aseptic precautions; this necessity is too well known, but I wish to call attention to the fact that clean instruments are not the only desideratum in the prevention of infectious inflammations. On the mucous membrane even of normally healthy individuals may be found many varieties of pathogenic micro-organisms with no injurious effects, provided the mucous membranes and their epithelial covering are intact. Lustgarten and Mannahey made bacteriological examinations of the urethra of eight healthy males and found ten different kinds of micro-organisms and among them a number that are known to produce cystitis, and when this is true of healthy individuals, how much greater is the danger in individuals subjected to infectious inflammations in the past with, in all probability, abundant viru-

lent micro-organisms now latent by nature's fortifications, should we destroy or lower the integrity of the mucous membranes or epithelium and thus produce atrium for infection. The question is answered daily in our hospital and private practice. Thousands of lives are lost annually from the remote consequences of catheterization. (Senn Surgery, 1902.) The same is true of the cervix uteri and rectum. A case in point: Young married woman, aged 22, nullipara; came to me a month ago in a deplorable condition. She had been subjected to electrical applications to the cervix uteri in an effort to relieve antelexion. After the third application she was seized with great pain, followed by pelvic inflammation, causing right pyosalpingitis. Was confined for weeks in one of our hospitals and is now an invalid and will probably never regain her former good health without a mutilating operation for the removal of the right tube and ovary, or even with that doubtful expedient. It is possible that the instrument used was perfectly aseptic, but was the cervix uteri or vagina so at the first application, much less so at the second application, when the mucous membrane damaged by the former application was in the struggle of repair, within all probability, an infected scar to be further injured and extended by a second and a third application. I might enumerate a number of such cases, but time will not permit. Urethral inflammations are common consequences of instrumentation, even in intelligent hands, but especially following electrical applications carried on to the extent of destroying the epithelial membrane (and mild currents of short duration will destroy the epithelium).

CASES.

Case I. Male, aet. 48. Architect. Perfectly healthy, excepting a feeling of pressure in rectum; never had any contagious urinary disease; could pass urine without effort or pain; consulted one of our most intelligent and leading practitioners; was subjected to the urethral bulbous bougie; current of unknown strength; hoping to relieve congested prostate, which was beginning to show evidences of senility; was immediately seized with intense inflammation; was confined to his bed in a most critical condition, from which he never recovered and is now, and has ever since been, leading a catheter

life. In this case I also think the instrument was sterile, but the micro-organisms resident in the urethra became capable of setting up an acute inflammation of bladder, urethra and prostate by an injury to epithelium and mucous membrane, as emphasized by Reymond.

(Ann. des Mal des Organes Genito-Urinaries. P. 253—1893.)

Case 2. Mr. O., young man, aet. 26, about to be married. Had gonorrhea six years previously, with resulting stricture. Has had no discharge for years. Subjected to electrolysis 2½ m. a. less than three minutes. Violent inflammation following within 48 hours, with typical discharge and an accompanying epididymitis. When he recovered from this attack I made an internal urethrotomy. No trouble since.

Case 3. Mr. J., Board of Trade member; was treated by a practitioner of ability, who used the ordinary sound, but by mistake turned on the positive current. By either surprise or thoughtlessness he used force in withdrawing the sound, and brought with it the mucosa of almost the entire urethra, not remembering that he might have reversed the current and thus freed the electrode. Multiple extensive stricture resulted; treated for a long time with negative current and result.

Case 4. Mr. A., double stricture of the urethra; had been treated for more than two years with electricity by two different physicians. No result. I made an internal urethrotomy of the stricture in the pendulous urethra and divulsion of posterior. Urethra retains caliber No. 32 F one year after.

Case 5. Miss S., treated with electricity for more than three years, off and on, for menorrhagia. Very dense cervical stricture resulted with consequent uterine algia. I performed hysterectomy and found the cervical endometrium destroyed and dense cicatricial tissue in its place.

Case 6. Miss B., treated for endocervicitis over a period of years, resulting in almost cervical obliteration. I performed hysterectomy and found substantially the same condition as in the preceding case.

Case 7. Mrs. S., treated for uterine fibroids extending above the umbilicus. Treatments continued over a period of years, in order to reduce size of the mass and possibly obviate operation. Mass reduced to about three times the size of the normal

uterus. A cystic tumor was uninfluenced by the treatment. Hysterectomy was performed on account of the great hemorrhages. On examination of the cervix I found it to be almost cartilaginous, so dense was the cicatrix.

Case 8. Mr. McC., treated for fully three years for urethral stricture. No result. Performed internal urethrotomy.

Case 9. Dr. T., urethral stricture. Planned to give electrical treatments. At the first treatment the contact of the electrode produced epileptic seizure while patient was on the operating table. Electrical treatments were of no avail. Internal urethrotomy performed. No epilepsy since.

Again the effects of electricity upon the canal of the cervix uteri is well established. A case of constantly occurring hemorrhage due to multiple myomata, subjected to aluminum electrode, positive current, 15 to 20 M. A., for 10 minutes; each sitting would stop the hemorrhage for a time, but recurred at almost each menstrual period, so that a great many applications were made from time to time for a period of six years, the lady fearing an operation. The hemorrhages became so distressing she finally decided to submit to an operation. I performed a hystero-myomectomy upon her and during the operation a small Syme's sound failed to enter the cervix, which was not dilatable, so dense the scar tissue. On section of the uterus, a hard mass almost cartilaginous constituted the cervical canal with complete destruction of the mucous membrane and some of the muscular structure, notwithstanding that in no case did the current exceed 20 m. a. I have operated upon three similar cases during the past year and present for your inspection some of the specimens. I understand, of course, that stricture of cervix is unavoidable. In treatment of uterine fibroids when proper currents are being used and would not urge it as a great objection, but simply cite these cases as illustrative of stricture produced by electrolysis, but in the later cases the question of infection following these applications is perhaps the most to be feared, and that notwithstanding that sterile instruments are used. A case of uterine myomata subjected to electrical application became inflamed, the patient narrowly escaping with her life. Patient brought to me from a distance by her physician. Examination of the discharge by Dr. Zeit revealed abundant staphylococci. When

the acute symptoms abated I removed the uterus and myomata, and now exhibit this large mass. I can cite other instances which would occupy too much time. From the foregoing it may be seen that mild currents which will not destroy the mucous membrane will not eradicate the stricture, either of urethra, cervix uteri or rectum, and in every case where scar tissue has been melted down by electrolysis such removal has invariably been, and must be, replaced with scar tissue. The brazen statements made of total removal of scar tissue, not to be followed by scar tissue, to say the least, shows a lack of intelligence. One LeForte claimed to remove rectal stricture by applying the galvanic current per rectal electrode over night—think of it! (*Gaz. des Hospitaux*, Paris, 1873; p. 221.) Dr. Newman of New York reports nine cures out of twelve otherwise incurable cases, and in one, upon whom he made an autopsy years after, found not the slightest evidences of stricture nor scar tissue. (*Tuttle, Diseases Rectum*, 1902.) Dr. Tuttle, commenting upon these cases, repudiates the claim. Now let us be honest—did Dr. Newman ever see such a case? I say, most emphatically, no. Nor anybody else; and the most charitable construction of his report is that he may be excused on a lack of pathological knowledge. Such statements are as dangerous and misleading as they are disappointing. We can easily put the test by using the currents of the same strength, 5 to 20 M. A., the same duration of time and same distribution of electrodes, and satisfy ourselves as to the soundness of such statements.

CONCLUSIONS.

(1) Electrolysis, when applied in current strength which will not injure the mucous membrane and epithelium, will not dissolve a stricture.

(2) Currents sufficiently active to carry away scar tissue do so by destruction of scar tissue to be replaced with scar tissue.

(3) Weak currents will temporarily dilate a stricture, and this more readily than by mechanical dilation, and such may be accomplished without injuring the mucous membrane, provided very weak currents are used.

(4) Electro-cautery incisions are equivalent in every particular to internal urethrotomy, excepting that the scar must

slough off before healthy granulation can take place, and are applicable to limited number of cases as a procedure of preference; but the incision, whether electro-cautery or knife, will heal by granulation (scar tissue) tissue, substituting a stricture of larger caliber for a smaller one.

(5) Inflammatory conditions can follow even with sterilized instruments any current of sufficient strength to impair the epithelial lining or mucous membrane, thereby creating an atrium for infection, the pathogenic micro-organisms being almost omnipresent.

(6) Scar tissue cannot be removed or absorbed by electricity in such a way as not to be followed by scar tissue.

I am conscious that there is a seeming positiveness in my statements regarding electrolysis in the treatment of urethral and other strictures, and I am intentionally and carefully positive; my only desire is to place electro-therapy on a sound basis and in no way wish to ignore or decry the many efforts of workers in this field, barren in result though many may have been, nor to insinuate a lack of scientific knowledge in men with mistaken conclusions, remembering that—

“Without genius learning soars in vain;

And without learning sinks again;

Their force united crowns the sprightly reign.”

Nor would I use the criticism of malevolence with a torch of infernal luster, whose rays fall only on faults.

“No light, but rather darkness visible,

Seemed only to discover sights of woe.”

Electrolysis is a most valuable therapeutic means in numberless ways and conditions and I simply emphasize the dangers that they may be avoided, recommend its virtues within proper limits, and I hope in the near future to have the honor to present a paper on the uses of electrolysis.

“Our bane and physic the same earth bestows,

And near the noisome nettle blooms the rose.”

DISCUSSION.

Dr. Prescott said that in passing even sterile instruments through the urethra there was considerable danger of carrying the infection into the upper parts of the canal, because the lacunæ are the favorite haunts of micro-organisms, and when

these are dislodged by the sound and carried to the bladder, cystitis would be produced. The presence of these bacteria is almost invariable in case of stricture, because this condition results from a gonorrheal infection. He had therefore found it advantageous to thoroughly wash out the urethra and bladder with a potassium permanganate solution for passing the sound.

Mr. Treadwell said that he was much interested in Dr. O'Neill's experiments because he acted as a subject in experiment No. 1. The indicated electrodes were applied to a longitudinal scar on his thigh. The skin was thoroughly washed with soap and water and was afterwards wet with alcohol to make the resistance as small as possible. Dr. O'Neill's largest aluminum sound was used and though the milliamperage was small—that is, less than 5—the electrodes felt much like a hot iron producing considerable local reaction at once. Even after six weeks the scar is reddish brown where the electrode was applied. He was so well convinced by his reading that large currents could be administered upon mucous membranes from electrodes of small area, that Dr. O'Neill consented to make experiments 3 and 4, although the doctor was perfectly satisfied that the mucous membrane would not tolerate large currents. In order to avoid the electro-cautery of a small electrode an olive bulb of the largest size, was used. The bulb was placed firmly against the mucous lining of the cheek and great care was taken to prevent dispersion of the current by the saliva. Although the current was limited to three milliamperes and was administered less than 5 minutes, the mucous membrane was blanched and roughened and sloughed off the next day. There was, however, no infection, and therefore no considerable amount of irritation. This was altogether different from what one would expect by the recommendations of administering large currents as advocated in the books on Electro-Therapeutics. Neither the positive nor negative electrode adhered to the membrane. In both cases the electrode felt hot and the treatment would have been unbearable with 5 milliamperes. The area of contact was always large—namely, equal to the plantar surface of last phalanx of the little finger. In view of this fact it would seem that applications over a smaller

area in the urethra must produce even greater irritation, and because of the numerous reports of only slight irritation with larger currents, he wondered whether the mucous membrane of the mouth were not more sensitive than the membranes of the urethra or rectum.

He had just received Rockwell's treatise on Electro-Therapeutics and had noticed the judicious and conservative tone of the author in many departments of the subject. In no place was this more marked than in the author's treatment of stricture. In this disease the author does not recommend the galvanic current, for after a thorough trial he found the results were unsatisfactory. He detailed a case treated under the superintendence of Dr. L. Bolton Bangs, the eminent authority in genito-urinary surgery. The treatments were carried out carefully and persistently, but there was no effect on the size of the stricture. Dr. Bangs subsequently performed external and internal urethrotomy with the final result of the easy passage of a No. 26 F sound. Dr. E. L. Keyes also tried the method recommended by Dr. Newman on eight cases, and gives the following conclusions:

"My study of the subject and the experience it had brought me, digested with all the impartiality I possess, leave me to state that the allegation that electricity, however employed, is able to remove organic urethral stricture radically lacks the requirements of demonstration."

Dr. Burdick said that there is no doubt that a 5-milliamperes current would destroy both cicatricial tissue and the epithelial lining of the urethra in contact with the electrode. In his paper before the society he recommended the galvanic current applied by a blunt-pointed knife platinum electrode of the olive type, to cut the annular stricture without pain, and the patient would not need to go to bed. To be sure, it would be necessary to dilate the urethra after this cut, and the result would be the same as in urethrotomy—namely, the substitution of a stricture of larger caliber for a small. This dilation could be accomplished at one sitting. He had not found in any of his cases a violent reaction noted by some operators. He certainly did not mean to suggest that the stricture would be absorbed. He always boiled his instruments in order to thoroughly

sterilize them, having a special apparatus which he bought early in his practice, and he thoroughly cleansed the urethra with an application of peroxide of hydrogen and glycerine for several days before the sitting wherever possible. He had known of several cases of infection produced by the passage of the sound where the only attempt at sterilization was wiping the instruments with a towel. Disastrous results might well be expected of such cases. Since the reading of his paper he had treated two cases of stricture, in which the dilation desired was obtained in periods respectively of one hour and a half to two hours and a half. It must also be admitted that there would be a gradual contraction of scar tissue in the enlarged stricture and this must be foreseen at the time of the first dilation.

Another case was a doctor's wife, having uterine fibroid tumor. Her heart was in such poor condition that she could not take an anesthetic. It was very difficult to control the hemorrhages at the time of the menstrual period. He used the platinum inthra-uterine electrode every month for six years, and sometimes two or three times during the month. There was no operation for the fibroid tumor and now, after the menopause, the patient is all right and the fibroid is certainly not larger than when the treatment was first instituted.

He had found that with a large pad covering the abdomen for the different electrodes, he could administer 35 or 40 milliamperes without causing any local reaction. Dr. O'Neill's experience is certainly more extensive than his, but he could not account for the negative results. When copper electrodes are used, ulcers are sometimes formed on mucous membrane, which are difficult to heal, and which leave considerable induration after cicatrization has taken place.

Dr. O'Neill, in closing, said that the infected cases reported were treated, with one exception, by other men of recognized ability; his results were, therefore, no poorer than those of the great majority of careful observers, and the infection certainly could not be laid to lack of surgical cleanliness, for he had performed thirty-four hysteromyomectomies during the past year without the death of the patient or infection.

Replying to Dr. Burdick's statement that he boiled all his instruments, Dr. O'Neill called attention to Dr. Burdick's last

paper before the society, in which he said that the instruments could not be boiled without damaging the insulating material and that he therefore kept them in a solution of formaldehyde. Dr. O'Neill said that he sterilized his instruments with formaldehyde, but that this must be washed off before the instrument is applied to mucous membrane. Ordinary tap water is loaded with germs and is therefore unfit. It was his custom, therefore, to momentarily immerse the electrode in a vessel of boiling water and then allow the instrument to cool just before inserting into the urethra.

But even these precautions are not sufficient, for the best bacteriologists and pathologists agree that the urethral membrane is loaded with bacteria and the abrasion of this membrane by electrolysis will create an atrium for infection. Notwithstanding the fact that only a few cases are thus infected, he felt that these few were enough to condemn the use of the current.

He had applied 10 milliamperes to the urethra for a short time without causing much pain to the patient, and although there was without doubt a superficial destruction of the mucous surface, no serious infection resulted and the patient was not obliged to go to bed. But this result was not because the instrument was aseptic, or due to the skill of the operator, but this was simply one of the few cases with no resident urethral micro-organisms.

Dr. O'Neill never uses the copper electrode, but always aluminum, nickel-plated or platinum.

The mucous membrane in the mouth is not different from that found in the urethra in its reaction to the current. Mucous surfaces in all parts of the body will present similar reaction to the current.

The statements read from Rockwell's treatise on Electro-Therapeutics bore out his experience. Dr. Bangs is conceded to be of the highest authority in genito-urinary surgery. He certainly gave Dr. Newman's method a fair trial.

LaForte was the first one to recommend the linear cautery electrode, and Dr. O'Neill recognized that it might be of value in a few cases where an operation was impracticable, but the patient should be warned of the risk incurred.

Regarding the application of galvanism to fibroids, he said

that even if the electro-therapeutist was able to carry the patient to the menopause without any great increase in the size of the tumor, it was no indication that the neoplasm would not take on great activity at a later time when operation would be difficult. In a few cases the galvanic current might be of value when used but a short time before operations, in limiting the infiltration of connective tissue, but the operation should not be indefinitely postponed unless the case were an inoperable one, as these neoplasms frequently undergo malignant transformation after the menopause, and it must be remembered that only a small minority remain quiescent or diminish after the menopause.

REFERENCES.

- ¹Traite d'Électricité et du Magnetism. Tome III. Bequerel.
- ²Crusell, Ztg. des Med. Vereins 1841.
- ³Graefe, Deutsche Klinik, 1852.



A CASE OF SCIRRHUS OF THE BREAST*

Reported by Elmer E. Prescott, M. D.

Mr. President and Members of the Society:

I have been requested by members of this society to exhibit for your consideration this evening a case of scirrhus of the right breast—and for matter of convenience of introduction, I shall divide the exhibition into three portions. The prelude, the case in question, and the prologue.

*Read Before the Chicago Electro-Medical Society, June 30, 1903.

The prelude pertains to this young man, Bartholamel H. I will briefly call your attention to his case by explaining that while he was looking down an elevator shaft, resting his neck upon a piece of 4x4, and while he was in this position the counter weights of the elevator shaft struck him, striking him on the back of the head, producing a compound fracture of the back of the skull, just below the external occipital protuberance.

The fracture was transverse and linear in nature, being about two and one quarter inches long, and the same was not depressed when I found him. The scalp was torn from ear to ear and was also turned inside out over the man's face. The extent of the scalp injury you can see from the scars which still exist.

I also present to you in the same subject a compound fracture of the left lower jaw bone, a dislocation and fracture of the left collar bone and also call your attention to the scars around his throat and neck, extending from ear to ear in perpendicular lines, showing where all the flesh was torn from the anterior portion of the man's neck where it had come in contact with the 4x4 timber I described in the early part of my introduction.

In two weeks' time I had these wounds all healed, the stitches out and had all the dressings off, except that pertaining to the compound fracture of the jaw, which I was obliged to leave on for a period of four weeks in order to get a solid union.

I now introduce to you this evening the case in question, Mrs. A. H. I was not acquainted with this good lady until after the injury of her son, whose case I just exhibited to you. She came to me, stating that she had a cancer of the breast; that she had been to the Cook County hospital, the Presbyterian hospital, the Rush Medical college and the Mary Thompson hospital, and to about twenty private physicians and surgeons, who told her that her case had progressed so that it would be a crime to operate on her, as the cancer would only return with greater vigor and leave her in a more delicate condition than if no operation had been performed. She accordingly came to me with tears in her eyes with the above

history, asking me, if after I had done so much for her son, I could not do a little for herself.

I looked at the breast and I can assure you I had many misgivings, especially when you consider the oedema of the arm and forearm and hand and the continuous annoyance of numbness and prickling feeling of the hand and fingers, and if it had not been for the X-Ray at my immediate command, I would have done just what all my brother physicians, both in and out of our hospitals, had told her, viz.: Refused to operate.

I will show you first the scirrhus which I removed from her right breast, and call your attention to the retracted nipple that is so characteristic of this form of cancer.

I also call your attention and ask you to feel of the growth as I pass it around. You could easily detect the stone-like hardness of the mammary gland.

I also call your attention to the mass of axillary glands which I removed from the arm pit, and further direct your attention to the same hardness that you found in the mamma and the connecting mass of lymphatics that connects the mamma with the axillary glands. In removing this mass I made no attempt to remove the pectoral muscles from the chest, owing to the extensive infiltration of the cancer mass into these muscles—even extending down to the ribs—and ask you to kindly feel of the fifth and sixth ribs, and by comparing them with the corresponding ribs on the opposite side of the chest, you will notice at once the peculiar curling up of the two ribs, which is so peculiar to this form of cancer, when it has progressed to the extent that this cancer has.

The further personal history of the case is this:

Mrs. H. claims to be 53 years of age; married at 15 years; four children, all in perfect health; no history of miscarriages; never had any form of sickness outside of the regular infantile diseases that all children are heir to; but about two years ago she was struck, while doing some housework, by a board over the right breast, and after that there was a continuous history of tenderness over the breast, which increased until a nodular formed, which has terminated in the mass which I removed on the 15th day of March, and which I present for your consideration this evening.

The prologue, which I referred to in the early part of the history of this case, I will show you by asking Mrs. H. to remove her fascinator from her head, and you will at once see the immense depression left after removing an osteo-carcinoma.

I present to you at the same time a photograph of the woman an hour before the operation, and by comparing the two you can readily see the extensive operation that I was compelled to perform.

In conclusion I wish to state it is now about four months since the operation upon the breast and about eight weeks since the operation upon the head.

I want to call your attention to the even, smooth scar tissue; that we have no form of induration appearing in the site of any of the wounds, except a slight thickening in the axillary space, where, after I had removed the axillary glands, the closing of the arm against the chest has produced this cicatricial tissue and mass, it appears as a nodule, while in reality it is only a cluster of scar tissue.

You have heard the woman speak with her own lips and tell you that she has had no return of the pain since the operation, either in the breast or in the head, which she told you was continuous previous to the operation.

To remove the scirrhus from the breast, where the pectoral muscles are infected, as they were in this case, and leave them in place, knowing as I did from their firm adhesions to the ribs that if I attempted to remove them we would open the pleural cavity and bring on empyema and the countless other diseases that would terminate almost in immediate death, I think I am more than justified for that one reason alone in bringing the case before you.

It is early to say that there will be no return of the disease, but suppose there is—the four months of perfect quiet which I have given this good woman—the four months of perfect ease, the returning use of her arm and fingers; the oedema rapidly disappearing from the arm and fingers. Is this woman not more than repaid for any chances that she has taken in the return of the disease after the operation, in consideration of all of the good results that have so far followed the operation? Could such an operation have been done five years ago.

previous to the introduction of the X-Ray in such cases? Is there a record of another operation of this character, which has been reported? If there is I am unable to find it and I will consider it a favor if any one will call my attention to such a case.

In final I wish to say that in treating this woman, immediately after the operation, that is, the next day, I drew her bed in front of the X-Ray and administered daily treatments right through the dressings, not waiting, as most of our surgeons do, after operations of this character, for reappearance of the disease before the application of the X-Ray. I kept up the daily treatments for a period of two weeks, using a medium tube and a static machine, the tube being about fourteen inches from the breast and the exposures ranging from three to eight minutes.

After the removal of the dressings I reduced the frequency of the application of the X-Ray to once in three or once in four days, and have so continued up to the present time.

I have occasionally produced a slight dermatitis over the breast, which has disappeared on the application of resin ointment.

On the back of the head, you will note that the hair has come out, but this will return, but if it did not, it would be a small consideration compared to the growth which I removed so successfully.

ELMER E. PRESCOTT, M. D.

110-112 Washington boulevard.

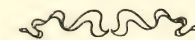
DISCUSSION.

To a question concerning the depth of the tumor in the occipital region, the reply was given that the tumor only penetrated through the dura mater and not to the convolutions of the brain.

Dr. Burdick said that the first case illustrated how hard it was to kill some people, and mentioned two accident cases which recovered though there seemed to be no hopes at first. Commenting on the case of carcinoma, he said that Dr. Prescott had evidently done all that was possible for the case, but that it was too early to make any positive statement. It was an exceedingly rare occurrence to have a metastatic nodule developed in the brain, and he would suggest that the tumor be

submitted to a competent pathologist to see whether it might not be luetic infection.

Dr. Prescott in closing said that there could be no doubt of the diagnosis of either tumor, and that he felt satisfied all progress of the disease had been checked by the X-Ray treatment. He would, however, follow up the X-Ray treatment for a considerable length of time and keep the patient under close surveillance. He felt confident that metastatic nodules could be controlled when discovered early enough.



EXPERIMENTS WITH A BLUE X-RAY TUBE.

R. Friedlander & Co. made a blue X-Ray tube for experimental purposes to determine whether any additional chemical or ultra-violet radiations could emanate from such a tube. The walls of the tube are of cobalt blue glass and the fluorescence of this tube is therefore not so brilliant as that of an ordinary X-Ray tube. There is a possibility that there may be a difference in the radiation emanating from this tube and my first experiment seems to indicate that the radiation from this tube is more powerful than from an ordinary tube of the same vacuum. Two tubes were connected in series; the blue tube and an ordinary tube of the same type. Each was enclosed in an R. F. Protective Shield with a diaphragm of equal size to allow equal cones of radiation to pass from the tubes. A piece of willemite, a silicate of zinc, was held alternately in front of the tubes. It fluoresced more brilliantly in the radiation from the blue tube than from the ordinary X-Ray tube. This radiation was evidently not ultra-violet because it could not be reflected with either a plain glass or concave mirror. It seemed to be the X-Ray because it passed through a book of three hundred pages and made the piece of willemite fluoresce. Very little fluorescence was produced from the ordinary glass tube, although the fluoroscope proved that the X-Ray penetrated the book. I am also taking a series of X-Ray pictures with the two tubes in series, but am not yet ready to report. The subject requires considerable research before any positive conclusions can be formulated.

C. H. TREADWELL, B. S.

Editorial.

I am happy to have the paper of Dr. O'Neill appear in the Journal and I coincide with his views, as I have met with the same bad results he refers to. It is high time for the Medical profession to come to some definite conclusion with reference to the use of the negative galvanic pole for the dissolving of strictures of the urethra. The compensation for the amount of time wasted in the course of treatment is altogether out of proportion to the benefit derived. Other means give better and quicker results.

WM. F. BUTTERMAN, M. D.

MINUTES OF THE JUNE MEETING OF THE CHICAGO ELECTRO-MEDICAL SOCIETY.

The meeting was called to order by the president, Dr. Gordon G. Burdick.

The reading of the minutes at that meeting were dispensed with.

Report of the treasurer was read.

The application of W. P. Coons for membership was favorably reported by the board of directors, and the report was ratified by the society.

Papers and Discussions:

First paper, by Dr. Elmer E. Prescott, exhibiting a case of carcinoma of the breast, removed surgically with involvement at the base of the skull some two months later. X-Ray exposures immediately followed the operation. Paper discussed by Dr. Burdick.

Second paper was given by Dr. A. Augustus O'Neill on "Electrolysis in Its Relation to Scar Tissue Constituting Urethral and Other Strictures." Paper discussed by Dr. Prescott, Mr. Treadwell and Dr. Burdick.

The society then adjourned until the 29th of September.

C. H. TREADWELL, Sec'y.

Abstracts and Reprints.

CLINICAL HISTORY OF TWO CASES OF EPITHELIOMA TREATED BY THE ROENTGEN RAY.

Reported by Henry Perkins Mosley, M. D., of New York City, in the *American Medicine*.

The apparatus used consisted of a ten-plate Waite and Bartlett static machine and a 50 cm. coil made by the Heinze Electric Co., of Boston, used with the Heinze liquid interrupter. The hospital supply of 110 volts direct current is used to run the motor for the static machine and is also used directly into the interrupter for the coil, for which no rheostat nor transformer is required. The areas have been usually at a distance of 15 to 30 cm. measured to the target of the tube. The surrounding tissues have been protected by lead foil. The time of exposure has been 5 to 10 minutes on alternate days. Occasionally more or less frequent exposures have been given, according to the case. When the coil was used a current of $1\frac{1}{2}$ to 2 amperes was passed in the primary. Tubes of various makers have been tried and the most satisfactory results have been obtained with those tubes which give out a large number of rays which are not highly penetrating. It seems that the tubes of high vacuum cause dermatitis more readily than those of a low vacuum, but the curative effects do not seem to be so good with them in spite of the fact of their being able to influence so actively the healthy skin.

I.—EPITHELIOMA.

CASE I.—Epithelioma of the lip. The patient, Michael C., a laborer, aged 50, was born in Ireland.

Family History.—There is no cancer and no tuberculosis in the family. His father died in a famine in Ireland and his mother died of fever.

Previous History.—When 26 he had pleurisy for 6 months and has had two attacks since, the last 15 years ago. He

denies all venereal disease. He was formerly a hard drinker, but now uses only one pint of beer a day. He has smoked constantly a short clay pipe, which stuck to his lip but which, he says, did not get hot.

Present Illness.—Six years ago he "pulled skin off his lip" by its sticking to the pipe. It bled quite a little. He kept smoking and the area gradually increased in size. It has never healed and has bled considerably. Various ointments and applications have been used. He tried smoking on the other side of the mouth, but the area did not heal. Scabs would form and fall off about twice a week. He noticed no swelling in the neck. He absolutely refused any cutting operation, so that it was impossible to get a section for the pathologist. Dr. George T. Jackson, of this city, said, however, that there was no doubt of the diagnosis.

Physical Examination.—March 7, 1902: To the left of the middle of the lower lip there is an ulcer about $\frac{1}{2}$ inch by $\frac{1}{4}$ inch. It is very slightly indurated around the edges; there are slight scabs on its surface; and it bleeds easily. There is no enlargement of the cervical glands.

Treatment was begun March 7, 1902. To excite the tubes the coil usually was used, occasionally the static machine. The tubes used were of very low vacuum placed at a distance of 30 cm. for the first few treatments, but soon this distance was diminished to 15 cm. The time of exposure was 5 to 10 minutes. In all, nineteen treatments were given, about 3 a week, but the patient was of necessity irregular in presenting himself owing to his occupation. On May 24, 1902, the last treatment was given, the ulcer being healed. August 31 a letter from the patient said there had been no return. October 7 the patient was seen and there had been no return. It is perfectly healed, only a very slight thickening being left. There is no glandular involvement. The patient still smokes constantly, but on the other side of the mouth.

The patient reacted most satisfactorily to treatment. Seven months have elapsed since the last treatment and there is no evidence of return. No burning was produced. The growth was superficial and there was no glandular involvement, but it had proved resistant to other methods of treatment.

CASE II.—Epithelioma of the lip. Charles McH., Irish, aged 80.

Family History.—His father had a cancer of the lip removed by operation without recurrence and died years later of senility.

Personal History.—For 65 years the patient has smoked a short-stemmed pipe. Since the middle of March, 1902, he has noticed a slight induration at the middle of the lower lip which has never healed. It scabs over. The scabs fall off and it bleeds, being a source of great annoyance.

Physical Examination.—August 28, 1902: There is a small indurated area at the middle of the lower lip about one-half inch in diameter covered with a scab, which, being removed, causes bleeding. There is no enlargement of the cervical glands. The clinical appearance is typical of epithelioma.

Dr. A. J. McCosh advised against operation on account of the patient's age and infirmity. Treatment was begun August 28, 1902. The coil was used to excite tubes of very low vacuum placed 8 to 15 cm. from the area treated. The treatments were given irregularly at first, but between August 28 and September 30, 17 exposures of 10 minutes each were made. As no effect seemed to be produced the treatments were then given more frequently, 13 exposures being made between October 1 and October 18, at the end of which time the area had markedly increased in size, being *twice as large* as when first seen. The patient was advised to discontinue treatment temporarily on October 27. On November 17, when next seen, there was a marked improvement, the area having diminished in size to its original dimensions. Four treatments were given on alternate days and the patient disappeared, being confined to the house with a severe bronchitis (?). On December 17 he again presented himself, showing to my astonishment a lip absolutely healed, with healthy mucous membrane in place of the ulcerating area and a disappearance of all induration. Up to this time the number of treatments had been 36. He is still having weekly exposures.

The improvement and final healing after rest and cessation of the treatment was *remarkable*. There is in certain cases a cumulative effect of the rays, their influence continuing after the treatment is stopped.

THE RELATIVE FREQUENCY OF THE X-RAY BURN.

(Continued from the May issue.)

One of a few X-Ray workers in whose practice no X-Ray burn ever occurred is an English physician, Dr. Sharp. It is hard to find the cause of this from a distance, and her article is not clear on this point. She thinks it is her technique, but even under a much more careful application of the Ray than Dr. Sharp employs, grave accidents have followed.

My statistics shows that X-Ray burns occur, but we do not know the why and wherefore.

Physicians of great experience, when asked the question how high they estimated the probability of an X-Ray burn, were very cautious in quoting figures, and their answers certainly did not intimate that here we have to do with "a very dangerous agent."

Gocht stated in 1898 that in the Hamburg-Eppendorf hospital, out of a total of over 2,000 exposures, there was only one burn.

Albers-Schoenberg, in the same year, was also of the opinion that the probability of a burn is only very small. He, perhaps the most competent X-Ray expert, says that despite of his frequent radiations for diagnostic purposes up to that time, he *never* had seen a burn. And that was at a time when exposures of twenty minutes were customary, and the tube was placed very near to the body.

It is obvious that in radiotherapeutics, where the exposures are often made and have to be made day after day, if we want to be successful, the possibility of the burn will increase. And we must not forget—in drawing our conclusions—that for diagnostic purposes the Rays are nowadays much more harmless than in former years.

Hoffa says the occurrence of the burn is in the proportions of 70 to 10,000, which small figure (0.7 per cent) is not obtained in the statistics of even the most harmless operation.

Yes, it may be said without exaggeration that through certain internal and doubtless through many of the "specialistic" measures far more persons will be injured than through the application of the Roentgen Rays.

In the course of six years, having made over 3,000 fluoroscopic examinations and photographs under the use of different kinds of apparatus. I have not seen one single injury; taking the hours of exposure in radiotherapeutic employment into account, the ratio of injury is not more than about 1:1,000 (0.1 per cent).

It has been said that the individual "disposition" was an important factor in the relative frequency of the X-Ray burns. It cannot be denied that there is a disposition, but what this "something" called disposition consists of nobody seems to know, and the candid critic must admit that it is nothing but a word to cover our ignorance.

Let us first consider the disposition, as it is said to exist, according to the types of the pigment of the body, i. e., let us see of what consequence the color of the skin and the complexion is. There are observers who claim that these factors are of much importance. Only he can support this opinion who, prejudiced by his pretended success, does not know the literature.

To prove this I give a brief review of the material of one radiotherapeutist. According to Sjorgen and Sederholm, the injuries were as follows:

A—Blondes.

Case 13, with 21 exposures; reaction mild.

Case 4, with 19 exposures; reaction mild.

Case 6, with 12 exposures; reaction very mild.

B—Brunettes.

Case 1, with 22 exposures; reaction strong.

Case 2, with 20 exposures; reaction very strong.

Case 5, with 18 exposures; reaction present.

Case 7, with 16 exposures; reaction strong.

Case 8, with 15 exposures; second period, reaction strong.

Case 9, with 15 exposures; reaction medium.

Case 10, with 18 exposures; reaction intense.

Case 11, with 29 exposures; pronounced swelling.

Case 11, with 35 exposures; very strong reaction.

Which goes to show that both the blonde and the brunette patients "react"; if a certain degree of Roentgen irritation is exceeded, which it is impossible to estimate in each single case, they will "burn."

Besides this *congenital disposition*, which cannot be denied, there is a *temporary disposition*, the existence of which I always assumed, although I have never seen it mentioned in the whole literature.

According to Beck (New York), the weather plays an important role in the origin of the X-Ray burn. If an observer like Beck, who *disposes* of a very great material, expresses such an opinion it is our duty to examine it.

Of course, at a time when a "cold" is nothing but a name for a nursery tale, when the causes and factors of a disease are supplanted by a bacterium, the true devotee of science on leaving the doors of his alma mater will smile on how far behind the older physicians are. The introduction of a factor like the weather into the causative factors of the X-Ray burn will, therefore, not be approved (not find universal consent). But every X-Ray worker whose hands show the well-known desquamative dermatitis knows that he must be more careful in winter, while in summer even a weeping eczema spontaneously disappears.

Considering, however, that a face that has just been exposed to the X-Rays is more liable to be influenced by the difference of temperature and moisture in the room and without, we must admit that such an irritation has not always only a transitory effect.

And how many incidental irritations of this kind may a radiated surface be exposed to?

We have, therefore, to take this factor into account and perhaps the future statistics will also consider this point.

On the other hand, we have a case where, despite of a dressing, a Roentgen ulcer occurred (Deutschlander) after one week.

Thus we see that a similar origin for the X-Ray burn—as far as they depend on the condition of the tissues of the patient—cannot be found. Just as everywhere in nature, it will not be the ridiculous "ens" which could be called the cause of a pathological process, but we have rather to assume a chain of circumstances which eventually lessen the relative immunity of the tissue and in combination with an accidental cause render the latent disease manifest.

Whether this irritation is another radiation of the same quality or a radiation intensified by a longer seance, a shorter tube distance, a longer spark, etc., or climatic factors interfere, will be all one for our standpoint.

At any rate, the riddle can hardly be solved by laying stress upon minor details and heaping reproaches upon the radio-therapist, nor by coining nice words and phrases.

"Nescimus," the conscientious physician will say, who knows everything that pertains to the subject, but at the same time it will be his endeavor, both by improving the technique and heeding suitable amendments, to ameliorate the matter.

A certain percentage of lesions and burns will always happen unless our human actions, thanks to the progress in literature and civilization, will become ideal.

But the Roentgen accidents of to-day have to be judged from the viewpoint that they are extraordinary occurrences, the prevention of which is beyond the power of the conscientious X-Ray therapist.

The introduction of the word "misfortune" in the place of "carelessness" will certainly be but beneficial to our special branch of science.

(Translated from *Arztliche Rundschau*.)

A. DECKER, M. D., Chicago.



A CASE OF LUPUS.

Reported by May Cushman Rice, M. D., Chicago, Ill.

The atypical character of the following case has made it one of unusual interest. The rapid development of the disease and extensive involvement of the tissues having misled some of our eminent diagnosticians.

Mr. F. was referred to my clinic at the Illinois School of Electro-Therapeutics for X-ray treatment by Dr. Nellie Flint.

When he presented himself for treatment Nov. 15 he was in a most pitiable condition. His forehead, nose, both cheeks and lower lips were the seat of large ulcers, which frequently discharged pus and were covered with heavy crusts. His nose was enlarged and entirely bridged over with crusts. His nasopharynx was ulcerated and causing a constant desire to clear his throat, which he was unable to do. The patient in describing it said that his throat felt perfectly rigid and as hard as a rock. His lower lip was especially disagreeable to him, as the ulcer extended well up in his mouth, exuding so much pus that he succeeded in taking food with great difficulty. There were also large ulcers of the same character upon both arms. His appearance was so repulsive that he had the greatest difficulty in obtaining a lodging place and was obliged to take his meals in his room. There was marked depression of spirits, loss of appetite and insomnia. The following notes were contributed by Dr. Cora Howerth, who attended him the first few weeks of his illness at Hahnemann Hospital and who first made the diagnosis of lupus.

"Last March he was taken ill with grippe, followed by intermittent fever. At about ten o'clock each morning his temperature began to rise. He complained of chilly sensations—his hands and feet were cold, his finger nails blue. After the chilly sensations had passed away the temperature arose sometimes as high as 103 degrees, followed by such profuse sweats that his linen and bed had to be changed every morning. He had attacks of very severe pain in his forearms and legs, a temperature above normal all the time, but higher in the afternoons, and was sleepless and very restless. His appetite was good, but his bowels were constipated. An eruption resembling urticaria, accompanied by severe burning and itching, appeared upon his hands and thighs. This disappeared in two days, leaving nothing in its wake. In a few days another eruption closely resembling smallpox appeared, this one being composed of sensitive furuncles which contained a thick greenish discharge and formed hard black scabs. These disappeared in a few days, to be replaced by others. This eruption invaded the face, scalp, arms, the middle of the back and chest. Be-

fore long his throat ulcerated and his suffering in attempting to swallow liquids was excruciating. The discharge from the posterior nares and throat was the same in character as that from the ulcers on the surface. The ulcers would heal for a time, but would break out again. In breaking down they always began in the center and in healing did the same. A slight swelling of the inguinal glands subsided under hot fomentations." At the end of six weeks he left the hospital and went to his home in Enfield, Ill., where, although he gave no history of syphilis, he was treated for that disease until August. He then returned to this city and consulted Dr. David Lieberthal, who prescribed large doses of mercury, both internally and by inunction. Under this treatment he grew steadily worse, both as to the condition of the ulcers and his general health. He was also seen by several other physicians, among them Dr. F. H. Montgomery, a skin specialist, who was very positive in his diagnosis of syphilis. Dr. C. B. Collins had previously expressed the opinion that it was a case of ecthyma. After the ulceration in the throat appeared he changed his diagnosis to syphilis. Dr. C. S. Neiswanger saw the patient when he came for X-Ray treatment, made the diagnosis of syphilis and advised the use of iodides and mercury rather than the X-Ray.

A microscopical examination was then made, however, by Dr. Nellie Flint, who found the tubercular germ, whereupon X-Ray treatment was begun.

The static machine was used to excite the tube, which was of low vacuum, and placed six inches from the face of the patient. A lead foil mask covered the eyes. Daily ten-minute exposures were made to each side of the face. After the 14th exposure a slight dermatitis developed, when the treatment was interrupted to allow this to subside. During this time the discharge increased. The patient also suffered severe neuralgic pains in the forehead, which he attributed to taking cold, as he had been out daily in very severe weather. He suffered to an extreme degree from depression of spirits—would come to my office and cry aloud for five or ten minutes, and on several occasions threatened suicide. After ten days' rest he again resumed treatment, which was now given only three times a week. From this time on there has been

a steady improvement, until at present, two and a half months since the beginning of treatment, the crusts have entirely disappeared from his face, leaving a reddened but healthy skin. The nose, which was apparently a solid crust, has regained its normal size and appearance. The ulcers in the naso-pharynx have wholly disappeared. The lower lip, which the patient believed would be completely destroyed, shows scarcely any sign of the disease. The forehead, though healed, presents some scars which are due to destruction of tissue during the process of the disease. He is now under treatment for his arms. Owing to the fact that his general health has suffered considerably at times during the treatment from absorption of toxic substances, I believe it was wise to allow his face to heal before treating his arms. Otherwise exposures would have been too long. His general health is improving rapidly. His appetite is good and he sleeps well. While for a year past he has scarcely been tolerated sufficiently to gain food and shelter necessary for existence, his appearance to-day is such as not to debar him from taking a position. To say that he is happy and grateful only feebly expresses his state of mind.

Such cases as this show the great possibilities of the X-Ray, and emphasize the importance of a microscopical examination in making a correct diagnosis.

(*New Albany Medical Herald.*)



HYPERTRICHOSIS TREATED WITH THE X-RAYS.

By Ida M. Wilson, M. D., Columbus, O.

I always welcome the American Electro-Therapeutic and X-Ray Era, and I was very much interested in Radiotherapeutic Observations by Dr. Zeisler found in the June number; particularly was I interested in the treatment of hypertrichosis, as I have been called upon to do a great deal of that work. I have used both the galvanic needle and the X-Rays. The X-Ray method is certainly the ideal way, as it is painless, leaves no scars and is not tedious, either to the patient or the physician. The same cannot be said of the galvanic needle. I have only used the X-Rays in two cases, with the following results:

Case No. 1, a treatment of five minutes' duration was given daily for three days, then I waited for three days to see how the skin would stand it; as there were no signs of a reaction, four more daily treatments were given. At the end of six days, after treatments were suspended, there was a slight redness over the cheek and the hairs were gone, where or when the patient did not know. I then lost sight of the lady for a month; then she returned and as there were a few hairs growing I gave her a treatment with the understanding that she would come back the next day, but she failed to come, and just two months after I had given the first course of treatments she returned with the hairs about as numerous and as long as on her first visit.

Three daily treatments were again given, and then, as the lady is a nurse, she again was called away, and she has just written that there was a slight burn, but the hairs were still growing.

Case No. 2 was a lady from out of town, and I only had two weeks in which to do the work. Six treatments were given and the hairs all came out in ten days' time. After the hairs came out there was a slight burn, which soon disappeared. At the end of two months she wrote me that the hairs had again appeared in about the same quantity that was there before treated.

So that so far I do not feel that I can recommend the X-Rays to my patients as a sure thing in the removal of superfluous hairs.

I feel that I can say positively that it will remove them. But I can't promise that they will not come back nor can I feel sure that other treatments will in time destroy the roots so that they will not return. But I have watched cases treated with the galvanic needle and have seen the hair grow, if not in the same place, in the same locality, until the patient doubts the success of the treatment. Case No. 1 of this report had been treated by the needle with apparently no success. The X-Ray treatment in these cases is certainly an interesting experiment, and I intend to use this method in every case that is willing to let me experiment.

I should like to know what success others are having in this work.

It would also be interesting to learn whether the X-Rays will have any effect on the so-called liver spots, on moles and other blemishes on the face or hands.



BOOK REVIEW.

A valuable treatise on electro-therapeutics is "The Medical and Surgical Uses of Electricity," by Dr. A. D. Rockwell, A. M., M. D. This book has passed through eight or nine editions, the present work bringing the matter down to date. A treatise on any subject should be conservative and should give results which have borne test of thorough and skillful applications. The general practitioner relies on a treatise more than on separate articles in the medical journals, because here he recognizes original work, which, though successful in a limited number of cases, may not be efficient in general practice. The book certainly fulfills these requirements.

Methods of the application of the faradic and galvanic currents are carefully described and the indications and counter-indications are given. The static machine and its applications are satisfactorily treated. The book is not afraid to

clearly indicate conditions in which the electrical current is not so uniformly successful as was first claimed. Books which are unduly optimistic should certainly be avoided, and we can heartily say that this book does not belong to that class. It will be a valuable book in the working library of the electro-therapist.

Six chapters are added on Roentgen Ray work, the Finsen light, vibratory therapeutics and the high frequency current. These subjects are not treated with as great detail as is electricity and the static machine. The treatment in these departments is not in the nature of a treatise, and in our judgment enhances very little the value of the work.

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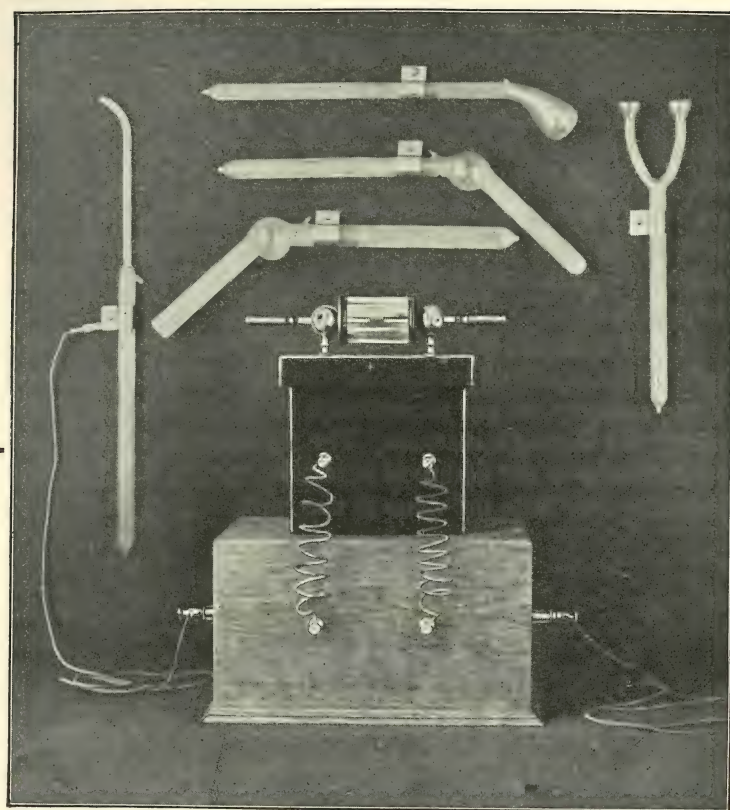
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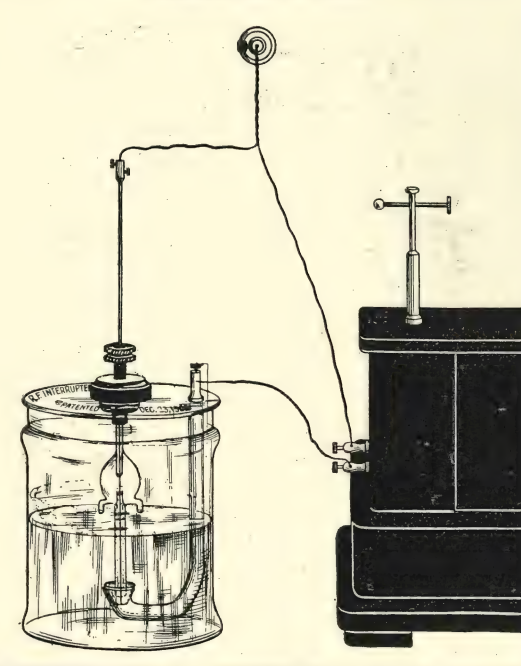
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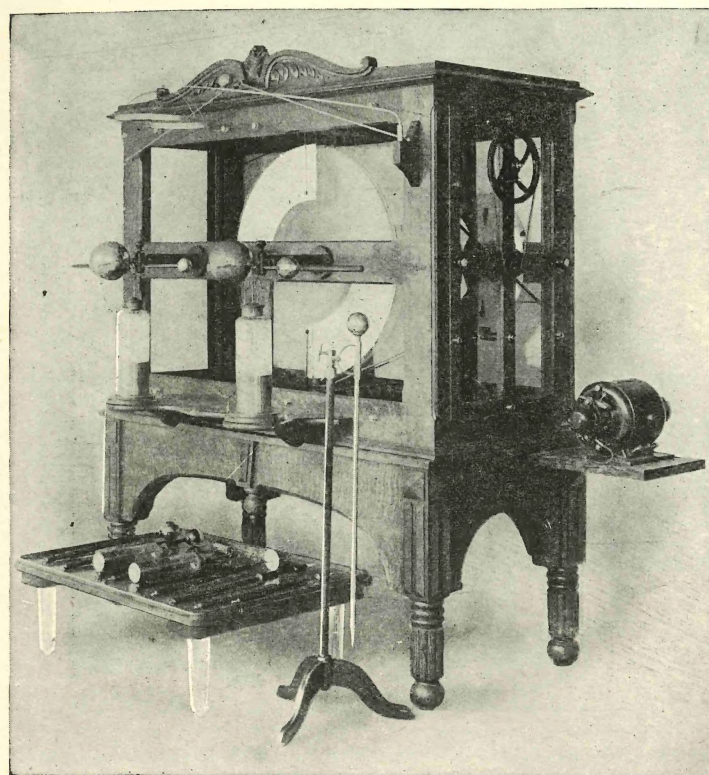
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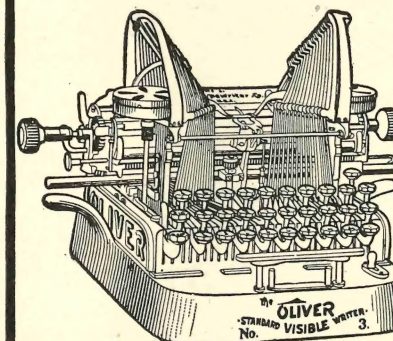
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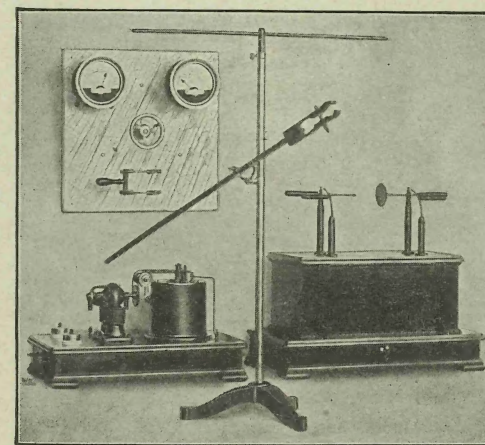
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