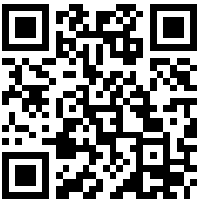

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AN INTERNATIONAL MONTHLY REVIEW.

(With which is incorporated "The Journal of Physical Therapeutics.")

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MEDICAL

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No. 1. JANUARY, 1906. Vol. VII.

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NOTICES.

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Advertisers are reminded that nearly every method of treatment dealt with in this Journal involves the use of apparatus in one form or another.

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MEDICAL

Electrology and Radiology.

No. 1. JANUARY, 1906. Vol. VII.

EDITORIAL.

Reviewing the work of the past year we find a general tendency to place electrotherapeutic treatment on a more scientific basis. As regards the use of X-rays we have had brought forward several types of instruments for measuring the current through the tube and thus leading to accuracy of dosage. Of these instruments the most important are the milliampèremeter and the oscillograph. The former seemed very disappointing in its results until Dr. Lewis Jones published his experiments; using the multiple of the alternative spark gap of the tube (which should not be less than 1½ inches) and the reading of the milliampèremeter, we get a very reliable index of the output of X-rays. The oscillograph, which was discussed in a paper by Dr. Morton in our last issue, is exceedingly interesting and appears to have a great future before it.

Much work has been done on the pathological effects of the rays emitted by an X-ray tube, and much has been written on their temporary or permanent action on the generative organs.

With regard to cancer, we stand much in the same position as last year. Surgeons, however, are daily recognising the benefit of raying patients as soon as possible after operation, with the idea of preventing recurrence, and though this method has not been adopted sufficiently long to obtain very useful statistics, the results are distinctly promising.

The treatment of ringworm has occupied much attention; the general opinion in England being somewhat against the use of Sabouraud's pastille as it varies in its effects with atmospheric conditions and the amount of heat produced in the tube, as well as amount of exposure to daylight. Excellent effects are, however, being obtained by the use of a tube with regulated vacuum and the passage of a current of uniformly regulated strength. It seems necessary to find the requisite factors experimentally with every different set of apparatus.

In the domain of electrical treatment there seems to be little that is really new. The use of the constant and interrupted currents of low potential seems to be returning to

favour in the treatment of many diseases which a year ago were referred for "high frequency." More attention is being paid to the ana- and cataphoretic effects of the galvanic current, and it is stated by some that similar effects can be produced with high frequency currents.

Unqualified practice is still our greatest enemy ; but we are glad to note indications that physicians and surgeons generally are finding out that their patients are more likely to benefit under the care of a professional brother than under that of an ex-barman.

* * *

We regret to announce the resignation of our American Editor, Dr. Margaret A. Cleaves, and take this opportunity of thanking her for the valuable contributions she has from time to time made to our Journal. A paper by Dr. Cleaves appears in this issue.

Radiotherapy of Ringworm.—Oram treats his patients four times a week. He has two masks made of fine-meshed wire gauze and covered with lead foil. In one of these the openings are back and front, while in the other they are at the sides. These masks are used on the alternate days, Monday and Thursday, Tuesday and Friday. In this way each area receives two exposures weekly of ten minutes' duration. By the end of the third week the scalp begins to show some erythema. The hair has as a rule entirely fallen off by the end of the fourth week, leaving the scalp bare and free from fungus. As to the position of the tube, the anti-cathode must be placed directly opposite the area to be treated, so that the rays fall perpendicularly on the skin. The tube must be placed not less than 6 inches from the skin. Oram uses 3 or 4 ampères on the primary of a 12-inch coil, interrupted by a Mackenzie-Davidson mercury motor break. Accumulators giving 24 volts are used. He thinks that a soft tube gives the best results. Now and then slight folliculitis develops ; this is superficial, and disappears on appropriate treatment. He has never treated a child less than four years old.—*The Dublin Journal of Medical Science.*

R.H.C.

THE ACTION OF X-RAYS ON THE TISSUES, WITH SPECIAL REFERENCE TO LEUKÆMIA.

By R. HIGHAM COOPER, L.S.A.,

Physician in charge of the Electrical Department at Tottenham Hospital; Assistant in the Electrotherapeutic Department at University College Hospital.

(Read before the British Electrotherapeutic Society, November, 1905.)

Mr. President and Gentlemen,—In March of this year I published in our Journal a collection of cases of leukæmia treated with X-rays, which I had abstracted from the various English and foreign publications, and ventured to discuss the probable action of the rays. Having observed the occurrence of toxic symptoms in patients submitted to large doses of X-rays, I suggested that their action might be to produce toxins in the blood, which destroyed the excess of leucocytes, remembering, however, that a large destruction of leucocytes would of itself produce such symptoms.

The recent researches of Werner (confirmed by Exner, Hoffmann, and Schulz) help us to place the question on a more precise foundation. He found that *lecithin*, after exposure to X-rays, undergoes "a kind of decomposition, manifested by changes in colour, taste, and smell." The character of this decomposition he does not define, but we know that in the metabolic process lecithin is split up into stearic and glycero-phosphoric acids and choline. Halliburton gives the following equation :—

$$\underset{\text{Lecithin.}}{C_{44}H_{90}NPO_9} + 3H_2O = 2\underset{\text{Stearic acid.}}{C_{18}H_{36}O_2} + \underset{\text{Glycero-phosphoric acid.}}{C_3H_9PO_6} + \underset{\text{Choline.}}{C_5H_{15}NO_2}$$

Now choline is an alkaloid with similar properties to muscarine though much weaker in its action, that is to say, it lowers blood pressure, both by direct action upon the heart and also by dilating the vessels of the splanchnic area. In patients who have had large doses of X-rays I have several times found marked lowering of the blood pressure and have also discovered the presence of choline in the urine, so that it seems more than likely that the X-rays cause a decomposition of lecithin in the body similar to that which takes place as a normal process. Lecithin *in-vacuo* does not appear to be affected in quite the same manner, degeneration does not take place, but it appears to be rendered less stable, and on gaining access to oxygen it rapidly splits up.*

* Since the above was written it appears that the curious smell produced when lecithin is treated in this manner is due to the formation of methyl-amine. R.H.C.

We find then that lecithin in the body is decomposed by the X-rays and it seems more than likely that other of the body constituents are split up in similar manner. It has long been recognised that the action of the X-ray upon a photographic plate is dissimilar from that of light, and I have wondered whether the gelatine emulsion played an active part in the process. With this idea I exposed collodion plates to X-rays, and found them to be practically unaffected. I then soaked some unsized paper in silver bromide and exposed it with a similar result, thus proving fairly conclusively that the presence of gelatine is essential. When we think of the large part that gelatine plays in its various forms as a constituent of animal tissues, the fact of its decomposition on exposure to X-rays would largely explain the action of these rays. But these are mere suggestions; I am at present working out this question and hope to publish my results before long.

It was formerly thought, from the so-called "burning" action of X-rays upon the skin, and from their beneficial effect upon epithelioma and other diseases of the skin, that they had a special selective action on epithelial structures. More recently, however, we have seen that glands, and all neoplasms of a glandular nature, are the structures affected to the most marked degree. May I not now go a step further and suggest the true cause of the "X-ray burn"? Let us look at its most prominent characters. The burn

(1) Starts three to eight days after exposure;
(2) Has its maximum effect three weeks after exposure;
(3) May resemble a local gangrene;
(4) Takes a very long while—often six to nine months—to heal;
(5) The skin ultimately formed is atrophic in nature.

To me all these signs point to inhibition or destruction of the trophic nerves and not to direct action upon the epithelium as is so commonly stated. And when we know that so large a constituent of nerve-tissue as lecithin actually is decomposed by the X-rays, we find material evidence for that suggestion.

Returning to our cases of leukæmia, we have now to consider the post-mortem changes found in those patients who succumbed after X-ray treatment. Most present, to a greater or lesser degree, the same remarkable features: fibrosis of the liver, spleen, and kidneys, with, in several instances, an extensive deposit of lime salts in the kidneys, especially on the left side; one case presenting calcification in the left kidney, while the right remained normal.

Some of the cases died not from advance of leukæmia, for the condition of spleen and blood has been found to be a—leukæmic, but from failure on the part of the kidneys to fulfil their proper function. In those patients who are still

living and of whom we have a later report, we find that the improvement from treatment was more slow, and that relapses (though of less severity than the original condition) have occurred. Unfortunately in most of the published cases we have no record of the dose of X-rays given, but I surmise from any data that are given that these patients had smaller doses of the rays than the others. We find then that the rays have the properties of destroying and possibly inhibiting the production of leucocytes (probably by producing changes in lecithin and other substances), and also of inducing fibrous degeneration in glandular structures, particularly in lymphoid tissues. My own observations tend to show that this fibrous tissue formation is greatest when doses of X-rays are given sufficiently large to produce what is commonly termed "marked reaction" in the patient.

We also find in some cases deposits of lime salts in the kidneys and, in one case, in the spleen. It has been suggested that this is due to the production of toxins in the blood from disintegration of numbers of leucocytes. While to some extent this may be the case, I cannot altogether agree with the theory, and for these reasons:

It has been customary, in cases of leukæmia, to give exposures which, when summed up, include the greater part of the body; for instance, the whole area of the enlarged spleen is commonly rayed, and of course this may include the greater part of the abdomen. Then treatment is also given to the sternum and the ends of the long bones, so that we get exposure of practically all the abdominal organs, except perhaps the right kidney and the generative organs. The right kidney must, however, always be more or less exposed to the more penetrative rays. Now in these autopsies we find no mention of changes occurring in the unexposed organs, and those found in the right kidney were less than in the left. This applies both to fibrosis and calcification. With regard to the latter phenomenon a case of my own presents points of interest: A woman was sent to me for X-ray treatment for recurrent carcinoma, the left breast having been removed four months previously. There were tiny nodules in the scar, and an enlarged supraclavicular gland. This gland, I was told, had enlarged during the past few weeks, and when I examined it was the size of a filbert. I exposed the whole of the left pectoral region, with a special application of the rays to this supraclavicular gland.

The tiny nodules in the scar soon disappeared, and treatment was continued at intervals for prophylactic reasons. The gland, however, although I pushed treatment until an erythema appeared, never diminished in size and remained hard. Eventually the patient died with recurrence in the liver. At the post-mortem the enlarged gland was examined

and found to be calcified. Calcification was not found elsewhere.

Although evidence is not sufficient to lead one to a definite conclusion, I am inclined to think that these extensive changes in the abdominal organs are due to direct exposure to the rays rather than to the transference of toxins or other agents produced in the blood; and in this supposition I am supported by the fact that, although patients suffering from schirrus and other intractable diseases may continue under X-ray treatment for years, one never hears of fibrous or calcareous changes occurring in the abdominal organs, which are, of course, not exposed in these patients.

It may be said that there is not this enormous excess of leucocytes in such cases, but to that I would say that it is quite usual to produce toxic effects, yet these toxins do not cause fibrosis in unexposed parts, although carcinomatous masses directly exposed frequently develop fibrous tissue, which to a great extent accounts for the decrease in size of the neoplasm.

It seems necessary then to modify somewhat the treatment of cases of leukæmia. Benefiting from the published results of this disease I have adopted a more cautious method in cases under my own observation. I first carefully protect all the abdominal organs. paying special attention to the right kidney and the liver; the left kidney, from its situation, must necessarily be more or less exposed. I then apply the rays to the splenic area, though do not consider it necessary to expose the whole of an enormously enlarged spleen. The tube should be of very high vacuum—5 inches alternative spark gap. I keep it 12 inches from the part exposed and give a ten-minute exposure, putting a current of about 50 colts at 10 to 12 ampères through the primary. A milliampèremeter in the secondary cannot be used with advantage under these conditions, as the current through the tube is too small for accurate registration. Exposures are given on alternate days. A blood count should be made weekly, and care must be taken that the ratio of whites to reds does not improve too rapidly. The temperature is also carefully watched, and a rise of a toxic nature demands omission of one or more treatments. It is somewhat difficult to distinguish between a rise in temperature due to toxin and one due to a fresh exacerbation of the disease, but, taken in conjunction, the blood count and the temperature form very reliable guides. I have noticed several times that on the third day after treatment has commenced (whether for the first time or after a "rest") there is a slight rise in temperature, which drops on or about the sixth day to a more normal level than previously, and this improvement continues until toxic symptoms appear and the treatment is stopped. For

example: In one patient the temperature before commencing treatment averaged daily a variation of 99·4 to 102, on the second day of treatment it was 99·6 to 101·8, third 99·2 to 102·4, and continued much the same until the sixth day when it was 98·6 to 100, and then remained low until, for two consecutive days, after five weeks' treatment it ran up to 102, and exposures were discontinued for a week. The temperature came down on the third day of the "rest."

I also give a similar exposure to the knees. In cases of leukæmia I have noticed an unusual tolerance of the skin for the X-ray, an erythema being rarely produced. Bronzing, however, is very marked; in one lady the skin over the spleen turned nearly black and desquamated, leaving normal white skin underneath, which again became bronzed on exposure to the rays. This lady, it is true, was taking arsenic at the time, but I have noticed the bronzing in cases where arsenic was not given.

One point which seems not to have attracted much attention is the great advantage of using, wherever possible, an unshielded tube, and this applies to all radiotherapy. The reason for so doing is, of course, that the secondary, tertiary, etc., rays, which are almost entirely cut off by a mask, are very useful for treatment, being probably more penetrative than the more direct rays.

CONSERVATIVE GYNÆCOLOGY: ITS RELATION TO THE CONTINUOUS CURRENT.

By MARGARET A. CLEAVES, M.D., New York.

(Read before the American Medical Association.)

By conservative gynæcology must be understood any measure or measures which will tend to a restoration of the pelvic organs of women to normal functional activity, if not normal anatomical conditions. The two are not necessarily the same. A malposed uterus need not be a barrier to pelvic health and function, nor does a uterine fibroid always menace health and demand a surgical operation. Curettement for sterility is begging the question, for the uterine mucosa and the pelvic organs in general, which are the subject of perverted nutritional conditions, do not demand a destructive measure to restore them to healthful function. On the contrary, such an expenditure of energy as will tend to the production of nutritive changes without such destructive action, is indicated. Gonorrhœal vaginitis, gonorrhœal salpingitis, prolapsed vaginal walls, forming cystocele and rectocele, retro-displacements, anterior flexions, uterine prolapse, pelvic exudates, do not necessarily require surgical interference.

Since the time of Apostoli the value of the continuous current in conservative gynæcology has been recognised. But, however skilfully used, his method possesses untoward features on account of the danger of exciting inflammatory conditions, pre-existing with their unfortunate sequelæ of exudates and adhesions. No matter what work is to be done, what obstacle to be overcome, there is no need of using a sledge-hammer blow when the flutter of a butterfly's wing or the tap of a feather, so to speak, will suffice. There are methods of using the continuous current, in the class of conditions enumerated, as well as others, which are as yet too little appreciated. The work of my fellow founder-member of this Association, Dr. G. Betton Massey, has made the use of mercury at the anode with massive doses of current classic, and to him belongs the greatest credit for his continued and persistent efforts in the mercuric cataphoric sterilisation of cancer.

In this instance, the applications are characterised by great current density and massive dosage.

The action of the current upon oxidisable electrodes at the anode with mild doses in the treatment of endometritis, of fibroids, of pyosalpinx, and of gonorrhœal vaginitis is to be preferred in every instance to the simple polar action of the current. With the latter, no matter whether anodal or cathodal, there is a destructive action at the anode by coagu-

lation, and at the cathode, by reason of chemical action, resulting in the production of scar tissue. With mild currents this scar tissue is slight, but it exists. Not so from the action of oxidisable electrodes at the anode and the transfer of the ions of a given metal; copper, silver, zinc, zinc-mercury amalgam.

Twelve years ago it was my pleasure to present this subject to the members of this Association. In all these years it has been my main reliance where an invasion of the uterine cavity became necessary. Experience has taught me that the maximum dose of 30 milliampères advised by Goutier need never be exceeded, while 20 milliampères is oftener used. By this method the nascent ions of copper, silver, zinc, or mercury are transferred deep into the uterine mucosa or of the urethra, and the action is much more energetic and profound than can be obtained either by polar action or by the topical application of medicaments. Two intra-uterine applications in a bleeding fibroid or endometritis, or uterine hyperplasm during a menstrual cycle can rarely be made. One is productive of greater good and should be made the middle of the month.

Careful technique is essential. That the method itself is strictly antiseptic is no reason for the neglect of strict antiseptic precautions. The introduction of the uterine electrode is, in my hands, accomplished ninety-nine times in a hundred without giving pain. Applications are from five to fifteen minutes in length. If copper or silver has been used, the electrode is lightly adherent to the uterine mucosa, and after turning the current gradually off, the poles are reversed in order to release it. Rest in the recumbent position is always insisted upon afterwards.

No matter what the condition, the cavity of the uterus is never invaded, until the patient's tolerance has been fully established by applications of the current, characterised by current-distribution. In gynæcological practice the vaginal hydro-electric applications of the continuous current are depended upon at first in every case. Where it is desirable to utilize the action of the ions of silver, copper, zinc, or mercury, silver and copper wires replace the platinum wire of the vaginal water electrode, or the medicaments are placed in solution and the ions of the fluid electrolyte are transformed directly into the vaginal mucous membrane, as well as all the pelvic tissue. Better results are obtained than by simply placing a metal electrode within the vagina, for by means of the fluid electrolyte of from 3 to 4 quarts the vagina is distended and every interstice unfolded, so that not only is there a complete lavage, but the action of the current alone or supplemented by the ions of mercury, zinc, silver, is brought to bear upon every part of the vaginal mucous membrane, the vaginal vault, and indirectly upon the uterine.

body and adnexæ. It is current distribution in the highest sense. Such are the methods which I described at the meeting of this Association eleven years ago as spinal hydro-electric applications and which have been in daily use ever since.

The profound effect of this gentle, well-distributed, and painless expenditure of energy is illustrated by the following cases:—

Case 1. Bleeding fibroid, been curetted twice, patient spent three weeks out of four in bed, treated by applications of the continuous current, vaginal hydro-electric anodal. Menorrhagia controlled. At suitable periods after menstruation intra-uterine applications anodal, with silver electrode were made at intervals of eight to ten days. Patient improved, gained strength and colour, disappearance of symptoms. Returned home a little after two months. Was she cured of her fibroid? No; but the distressing symptoms of pain and pressure and hemorrhage were controlled, with improvement in the general health.

Case 2. Similar to above, suffered from prolonged, excessive, and continuous hemorrhages. Entire uterus involved, and she was weak and breathless with disturbed heart action. Vaginal hydro-electric applications of continuous current anodal, used at first, later, twice in a month, intra-uterine silver applications, the inytmonily one in the middle of the month, with vaginal hydro-electric applications cathodal (hemorrhage under control) between times. After less than three months the patient is in rude health, the growth is smaller and better defined, and giving no signs of trouble.

When it is remembered that electrolysis chemically and cataphoresis mechanically alters the amount and distribution of salts necessary to the proper nutrition and function of the various parts of the living organism, these results are clearly explained. This effect may be carried to the extent of completely cutting off the blood supply, thereby causing immediate and actual destruction (electrolysis of a mole); or by interfering with it to such an extent that there is no channel left by which the inorganic constituents and proteid nutriment can be conveyed to the part, and death from starvation ensues (absorption of organised inflammatory exudate or an intramural uterine fibroid); or in a lesser degree, only the normal ionisation and osmotic action characteristic of living tissue. The one condition or the other will obtain according to the quantity of the current, and the manner of its use, that is, whether a strong or mild current is used and whether the application is characterised by current distribution or current density. The use of a strong current of short duration, return of former symptoms. Same result again secured, save pregnancy, to which patient strenuously objects. Aged 42. As to sterility, it has been my happy experience to overcome

characterised by a current density, has either an intense irritant or else a distinctive action, whereas the same current, if characterised by current distribution, will produce an entirely different effect, because by reason of the increased electrode contact—square inch area—the energy expended in each square inch is diminished in proportion to that increase.

A mild current, if long continued, will cause a profound change in the amount of fluids and salts in a part, and in this physical fact is to be found the therapeutic indication in pathological states.

M. R., widow, aged 59, domestic duties. Uterus retroverted, held back by exudates, right ovary prolapsed, enlarged and sensitive, vaginal mucous membrane red and congested. Twenty right continuous current hydro-electric applications were given, resulting in nutritional gain, *i.e.*, increased weight, improved colour, better circulation, less pain and congestion; right ovary smaller, less sensitive, less markedly prolapsed; absorption of exudates. An intolerable existence made tolerable, without restoring organs to correct anatomical position or to physiological condition.

Mrs. —, aged 40. Had a severe inflammation, involving all the pelvic tissues. Came under writer's care after several years of invalidism, during which time she was bedridden for at least three weeks out of four. Pelvis was literally roofed in, uterus immobile, ovaries bound down in exudative mass. The task demanded all the skill and experience possessed in this class of work as well as the most exact technique and knowledge of the properties, physical and physiological action of the energy used. After two or three months of most careful, gentle and persistent effort, the desired result was obtained and absorption established with the modification of all her symptoms and relief from some. Vaginal space much less encroached on and the pelvic organs mobile.

Mrs. C., aged 33. Intramural fibroid in right and anterior walls of uterus; ovaritis right; exudates right side, uterus immobile; canal tortuous; pelvic pain, soreness, sensitiveness to pressure, especially right iliac fossa; cruralgia; constipation; profuse and premature menstruation. Twenty continuous current treatments vaginal hydro-electric (polarity according to indications) were given, over a period of four and a half months. Result: Complete relief of all symptoms, disappearance of exudates, return of uterine mobility, regular bowels, regular normal menstruation, relief of crucial pain, and establishment of general health. Fibroid mass firmer, harder, and better defined, slightly diminished in size. A few months after cessation of treatment patient became pregnant, having been sterile for seven years; passed through normal pregnancy, and gave birth to well-developed child. Absolutely well since birth of child until last winter, ten years, when

this condition in retro-displacements, when complicated by fibroids, endometritis, a relaxed and atonic condition of all pelvic organs. Since I began the use of the oxidisable electrodes at the anode and vaginal hydro-electric applications, I have never curetted nor had a patient curetted, although that was my former custom.

Mrs. T., aged 35. Sterile from marriage, became pregnant after two months' treatment by vaginal hydro-electric applications. There was a complete relaxation and atonic condition of all the pelvic structures with slight catarrhal endometritis.

In a case of chronic gonorrhœal vaginitis, urethritis, and cystitis of two years' standing, presenting the classic symptoms, symptomatic relief was at once established and also physical conditions changed. The patient made a complete recovery after three months' treatment. A relapse; the subsequent reason, husband under care of genito-urinary specialist; same result again secured and has now been well for past three years.

In a case of gonorrhœal pyosalpinx, curettement had been advised but refused. Pain, severe and calicky in character, with burning sensation, intermittent flow of muco-purulent discharge (greenish in colour), menorrhagia and metrorrhagia, sterility, loss of flesh, very nervous, fever. Left tube was found to be actively involved, tender thickened, enlarged, and at times much distended. Oxtium internum permeable. Vaginal hydro-electric applications were made twice a week, and at suitable intervals once in eight or ten days; an intra-uterine application with copper electrode, with 10 to 20 milliampères of current, for ten minutes. Medicated tampons were used part of the time to maintain pressure over the diseased tube. After three months the patient was relieved of all her symptoms, subjective and objective. The following season there was a relapse, which was again relieved by similar treatment, and for the last five years patient has remained well.

A woman, aged 39. Multiple fibroid, menorrhagia, and metrorrhagia, pain and pressure symptoms. Small growth in cervix, another subperetoneal laterally and to the right, large as fœtal head. an intramural in the posterior wall filling the recto-vaginal space. Canal tortuous and would not admit passage of intra-uterine electrode.

Treatment by vaginal hydro-electric applications of the continuous current. From their use improvement was established, but the distressing symptoms still remained in evidence. I, therefore, made a series of three cupric punctures to the growth in the cervix, anodal, with current of 10 milliampères to each puncture, the indifferent electrode on the abdomen. The needle was carried in to the depth of

¼ to ½ inch, and the entire *séance* lasted but ten minutes. The deposition of the ions of copper into the cervical growth was very prettily shown by the characteristic apple green colouring. Three months later the cervix was absolutely free from fibroid and perfectly normal. Six months after these punctures, a series of four to six cupric punctures anodal were made per vaginam in the dependent portion of the posterior growth. A month later another series was made. There was no indications of an approaching menopause, nor was it to be expected from her age, 39 years; but she had but one menstruation for months after the last series of punctures and but one since then, one year later, in 1899. When last seen, the subperetoneal growth was not bigger than a hen's egg, the posterior growth markedly smaller, bowel function normal. This patient was under weekly surveillance for several years.

X-ray Treatment of Leprosy. — Dr. H. B. Wilkinson, physician in charge of the San Lazaro Leper Hospital, Manila, has been treating leprosy with X-rays since the end of 1903. The method adopted was that of approaching as nearly as possible to the "burning point" without actually causing a "burn." One or two cases, however, in which burning was accidentally produced resulted in a cure. Tabulated results of the thirteen cases treated show that three were cured, seven improved, and three not improved. He makes the following statements:

"1. The treatment of one leprous spot on a patient produces improvement in spots at a distance from the one actually treated.

"2. The cure in the distant spots seems to progress parallel to and to be just as complete as that in the one treated.

"3. The best results seem to be obtained only when treatment is pushed to the point of killing or beginning to kill the tissues, which would also probably be to the point of killing the organisms.

"4. Cases in which there are massive localised leprous deposits, as in case No. 5, are most rapidly improved, as in these cases we have an abundant culture on which to operate and thereby produce immunity more rapidly.

"5. In diffuse general involvement of slight degree or atrophic character where there are only a few scattered organisms we have had little success.

"6. In two well advanced cases where the amount of new leprous tissue was excessively great, the improvement was marked and rapid, but followed by loss of general health and rapid physical decline. This may be an over dosage, so to speak."—*Med. Record,* December 9th, 1905. R.H.C.

NOTES AND ABSTRACTS.

The Treatment of Dulness of Hearing and Subjective Noises in the Ears by High Frequency Currents.—In the *Glasgow Medical Journal* this subject was discussed by Drs. Galbraith, Connal, and James R. Riddell. The cases selected for electrisation were ones in which other methods of treatment had been used but found ineffectual. For instance, in chronic catarrh of the middle ear, catheterisation of the Eustachian tube or inflation of the middle ear had been tried. In nearly all, complaining of tinnitus aurium, drugs, such as bromides, hydrobromic acid or strychnine had been used ineffectually. In addition, any nasal defect which might have an influence on the aural condition was rectified. In all, forty patients were treated, but final results could not be obtained in eight of these, leaving thirty-two cases to report. Notes were taken of the hearing distance with the watch and the tuning-fork reactions. These were carefully checked after the treatment had been discontinued.

1. Chronic dry catarrh of the middle ear with labyrinthine involvement (six patients). No improvement in any of them, but two patients thought that the noise had decreased.

2. Chronic dry catarrh of the middle ear without marked labyrinthine involvement (fourteen cases). Ten of these had tinnitus, eight reported improvement. In one case the noise disappeared altogether. In two cases there was some improvement of hearing.

3. Post suppurative conditions (five cases). Five had tinnitus and four reported improvement.

4. Sclerosis of the middle ear (five cases). All showed improvement, markedly so in three and slight in two. In one of these, who had persistent and loud tinnitus for four years, there has been no noise for the last four months.

One case of primary disease of internal ear and one of tinnitus, without deafness, derived no benefit from treatment.

The treatment of diseases of the ear by high frequency currents may be carried out in various ways. The patient may be treated by general electrification or local application of the currents, but it must be remembered that local applications have a general effect.

Local applications may be applied as follows:

1. By means of the effluve taken from the resonator applied to the side of the head. The multiple electrode is held as near the patient as possible without producing sparking.

2. By means of condenser electrodes, which are attached to each end of the solenoid, and introduced into the external auditory canal.

3. By metal electrodes, placing one against another, that is applying the currents "by derivation." This method is apt to be painful unless carefully done.

It has been shown by d'Arsonval and others that high frequency currents have a profound effect on nutrition generally. Under their influence there is a great increase of the secretions, and in the output of heat. If the benefits derived depend on these properties, then the proper way of applying treatment would be by general methods. There may, however, be other explanations. There is a great alteration in the circulation produced by the currents, not only in the general arterial tension, which is first lowered, then raised, and remains above the normal for a considerable time, but there is a marked local effect, the capillaries being greatly dilated.

There is another possible explanation, namely, there may be a fine mechanical vibration set up by the passage of the current.

In connection with the supposed germicidal effect of this form of electricity it has been suggested that the cultures are rendered sterile by the mechanical vibration set up in the media. On account of these properties—alteration of local supply and mechanical vibration—local treatment may be expected to be more useful than general. R.H.C.

* * *

Death by Electricity.—A recent and interesting contribution to the subject of electrical death is contributed by Jellinek. It is well known that the effects of the electric current vary greatly in their manifestations. Death may be caused either by the direct or by the alternating type of current of either high or low tension. In most instances immediate unconsciousness results, although authentic cases are on record where the victims of the shock remained conscious for several minutes before death finally took place. In fatal cases there is an immediate relaxation of the muscular system, unless the individual remains in contact with the conductor; in the latter case a tonic spasm results. Respiration and heart action may cease at once or a gradual cessation of these functions occurs. Animal experiments and the observations made on the human subject show that there is no definite symptom, however, which characterises electrical death. The explanation of the wide variations which have been noted must be sought for on the one hand in the

electrical conditions, and on the other in the resistance of the individual affected.

In any given fatal case the current may be said to exert a double effect. When it enters the body it acts as an enormous irritant which manifests itself as shock. It has been found that this particular effect can be eliminated to a greater or less extent, as shown by the fact that it is reduced to a minimum or absent altogether when the current enters the system during narcosis or during sleep. In addition to the psychic phenomena just noted there is also manifested a dynamic effect on the various aggregations of body cells, which probably amounts only to a disturbance or at the most to an inhibition of one or more of the vital functions. In fact, experience has shown, and this has been confirmed by animal experiments, that the threatening and seemingly fatal symptoms of impending death due to the electric current are very often only transitory in character. Jellinek claims that in most instances death is merely apparent. If we are to act on the author's suggestion, a fatal issue should not be accepted as having occurred until energetic and prolonged efforts at resuscitation have been carried out in a systematic manner without result. And this raises again the question as to when death occurs in cases of so-called electrocution—whether it is while the subject is in the chair or while he is on the post-mortem table.—*Wiener klin. Woch.*, November 2nd, 1905.

R.H.C.

NOTICES OF BOOKS.

MANUEL D'ELECTROTHÉRAPIE ET D'ELECTRODIAGNOSTIC. By Dr. E. Albert Weil. 2nd edition. Published by Felix Alcan, Paris. Price 4 fr. 60.

The publication of a second edition of this hand-book so soon after the first is considerable evidence of its worth. The book has been entirely re-written and several chapters added, those on phototherapy and radiotherapy showing the most alterations. The chapter on radiotherapy describes very completely measures for protection and for accuracy in dosage. Although we do not find anything that is actually new we can recommend the work as being concise and up to date.

R.H.C.

CORRESPONDENCE.

The Effect of the High Frequency Currents on Arterial Tension.

To the Editor of the Medical Electrology and Radiology.

Sir,

In the November number of the Journal there is a paper by Dr. Bonnefoy, of Cannes, which I have read with great interest. It treats of the Effects of High Frequency Currents on Arterial Tension. As I had the honour at the Leicester Meeting of opening the discussion on this, to my mind, important subject, perhaps I may be allowed to claim your indulgence for a few remarks and to correct a few misapprehensions of the writer.

In speaking of my remarks at Leicester Dr. Bonnefoy says, in speaking of the effects of the high frequency currents in lowering the arterial tension, "But one must not confound the tension with the temperature, and it seems to me in this respect that the communication of Dr. McClure tends to error." Now, in point of fact, I never said one word of any influence the high frequency currents had on temperature. All my experiments in this direction on the healthy, or comparatively healthy, human organism were decided by negative. The remarks I made on influencing temperature were by means of the constant galvanic passed through the base of the brain.

With the other parts of Dr. Bonnefoy's excellent and suggestive remarks I am glad to find myself in hearty accord. I have always held that when we have abnormally high blood pressure it can be lowered by a judicious application of high frequency currents. In the case of Dr. Elliott's, with very low blood pressure, I do not think I said I would *fear* to apply these currents, but that I had no experience, and that I should treat such cases with static electricity, in which I had some experience of their utility. I can quite fully appreciate Dr. Bonnefoy's reasons in using hign frequency in such a case; I quite agree with him in regard to the danger of these applications, as far as my experience goes. In the warming effects he describes I quite agree.

In conclusion, I consider that Dr. Bonnefoy has made a most valuable contribution to the subject under discussion.

H. McClure.

Weymouth Street, W.

PART II.

PROCEEDINGS OF THE BRITISH ELECTROTHERAPEUTIC SOCIETY.

Edited by REGINALD MORTON, M.D., *Secretary.*

The Thirty-third Ordinary Meeting of this Society was held at 11, Chandos Street, W., on Friday, November 24th, 1905, at 8.30 p.m. The President, Dr. DONALD BAYNES, in the Chair.

Present:—Nineteen members and three visitors.

The minutes of the previous meeting were read and confirmed.

The following gentlemen were unanimously elected ordinary members of the Society:—William D'Oyly Grange, Harrogate; Edwin Harral Thos. Nash, Accrington; Arthur Gerald Welsford, Hemel-Hempstead.

Mr. CHISHOLM WILLIAMS showed a case of carcinoma of the breast, treated by X-rays.

Dr. R. MORTON read a paper entitled "A Contribution to the More Accurate Measurement of X-rays," illustrating his remarks with a demonstration on the use of the oscillograph vacuum tube. Drs. Lewis Jones, Reid, Batten, and Butcher took part in the discussion.

Mr. R. HIGHAM COOPER read a paper on "The Action of X-rays in Leukæmia." Dr. Ironside Bruce and others took part in this discussion.

A paper from Dr. E. BONNEFOY, of Cannes, was taken as read and ordered to be printed in the Journal of the Society.

The President announced that it had been decided in the Council to hold no meeting in December owing to the only available date coming so near Christmas.

The meeting then adjourned.

NOTICE.

Members taking part in discussions or making remarks on papers, etc., are earnestly requested to give their notes on same to the Secretary at the end of evening, so that the proceedings may be complete and not delay the prompt publication of the Journal.
