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Vol. 9. No. 1. July, 1901.

THE AMERICAN X-RAY JOURNAL.

DR. HEBER ROBARTS,
EDITOR,
Chemical Building, ST. LOUIS, U.S.A.

The Oncome of Age

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THE AMERICAN
X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

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HEBER ROBARTS, M. D., M. E., Editor.

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MR. H. WESTBURRY,
Member Roentgen Society of the United States.
Harrison, New Jersey.

THE AMERICAN
X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. 9. *ST. LOUIS, JULY, 1901.* *NO. 1.*

Roentgen Society of the United States.

Every member of the medical profession having pride in himself and the advancement of diagnostic medicine should join the Roentgen Society. This is the only body in all this land that has taken the initiative. The society has like all other undertakings come up from necessity; to congeal into a common whole the vast resources of the Roentgen discovery for the profession at large.

If you identify yourself by membership you are one of the great fraternity. You are then an integral part, limb and soul in sympathy with its work. If you are outside it is quite natural to become a critic and feel chilly towards the very means you need to employ. Inside we criticise for mutual advantage and weigh the logic of our course in the scales of justice. No one can safely deny the importance of this subject if he is a practitioner of medicine any more than he can lay aside the scalpel if he is a surgeon. See the vastness of the subject. Has any discovery in any age approached its revolutionizing tendency? The ease and certainty of diagnosis has advanced more in the past five years than any previous century. It is not every one that can avail themselves of these advantages in practice, but every doctor can avail himself of the knowledge of these facts. The Roentgen Society is making the effort, it is accomplishing what it intended to do from the first—unite the best element, the thinkers and unprejudiced minds of our profession into the necessity of the best uses of the x-rays. So much has been written, of spurious import, upon this subject by well meaning men, yet ignorant of the facts, that society work is the only mill through which we can hope to shift the chaff. It is impossible to be educated through journal reading alone. Editors are not responsible for the points of the contributors and the writers differ in their judgment according to their individual happenings. The reader is at sea, he has neither anchor nor keel and therefore is led whither he goes. It is difficult to dislodge false teaching and therefore the prime virtue of true learning. If you know the truth—the laws that govern a principle then discussion upon any of its attributes is intelligible. If the writer assumes false premises it is at once detected and the mass is unworthy of our time. It is for these and other reasons every fervent medical man should be with this society. Crystalize energy on permanency and on truth and thereby conserve forces for the just upbuilding of each and all. If you are with the society you get the truth, and truth is powerful and must prevail. One mind can not cull from the world of rot only that which is good for him. If you are with the society the strength of all is united in one. Seize now on to that which is known to be good so that we may, as professional men, be conscious of nearing the goal we seek.

Skiagraph in Oral and Dental Surgery.

BY WESTON A. PRICE, D.D.S., M. E.

elivered with Stereoptican Views before the Roentgen Society of the United States, Grand Central Palace, New York City, December 13, 1900.

Continued from page 915.

Sometimes these abscesses produce very extensive destruction of tissue, as for example in this case (Fig. 8) where the lighter area shows the extent of the abscess in the bone around the lateral incisor. There is no necessity for extraction in these cases. Of course, the abscess must have drainage and have the irritant removed and then the treatment is very simple. This case had been drained through the root canal which, as you see, left the abscess more than half full of pus all the time. The most dependent point is that marked X. The abscess was perforated at this point and thoroughly sterilized and stimulated and the root filled at once. The cure was rapid and perfect.

The location of the irritant producing these abscesses is often very hard to locate, as in this case (Fig. 9) where the light area shows the extent of the absorption of the bone caused by an abscess from diseased root. The abscess had its fistula beside the second bicuspid and was treated accordingly. The dentist in charge extracted the first bicuspid because it was tender to concussion, but finding it all right replaced it. This radiograph shows the trouble to come from absorption of the apex of the lateral and the case was treated accordingly by amputating the apex of the lateral root with excellent results. Of course, drainage was secured at the lowest point of the abscess. Nature soon fills in these large abscess cavities with new bone when the irritant is removed as you will see by a radiograph of this same case three months later.

The next (Fig. 11) shows a lower jaw more than half cut off by an abscess.

(Fig. 12) shows absorption of the apex of the central incisor, causing a chronic abscess about it which had resisted treatment. Now that the cause is known the treatment is simple.

The next (Fig. 13) is very remarkable, since it is a case of an abscess with a fistula externally upon the face, and while the abscess is quite large as you see, its cause is not apparent. It is probably a so-called pericemental abscess. The fistula leaves it at its superior point marked X. while its most dependent point is much lower marked A. A perforation or artificial fistula will be established at this point A, when the patient gets ready, unless it heals by absorption. The flow of pus has ceased since the last skiagraph was taken.

I have spoken of the operation of root amputation without extraction where irritant is a diseased apex of an otherwise good root. This operation is not difficult and is almost always attended with a perfect cure. This slide, (Fig. 14) shows a typical case. This tooth has been abscessed for 13 years and resisted treatment. The skiagraph shows the trouble to come from an imperfectly filled tooth. The apex was amputated at a point where the root-filling stopped, as seen by this same and the result was a perfect cure. Fig. 15 shows another case before and after root amputation The bone fills in around these amputated roots, making them very firm and serviceable.

2238 Euclid ave., Cleveland, O.

(See illustrations on next page.)

TO BE CONTINUED.

Roentgen Exhibition in Hamburg will take place during the meeting of the German "Naturforscher und Aerzte" from September 22 to 29.

Fatigued muscles give much denser shadows than when viewed or radiographed in rest.

FIG. 8.

FIG. 9.

FIG. 10

FIG. 11.

FIG. 12.

FIG. 13.

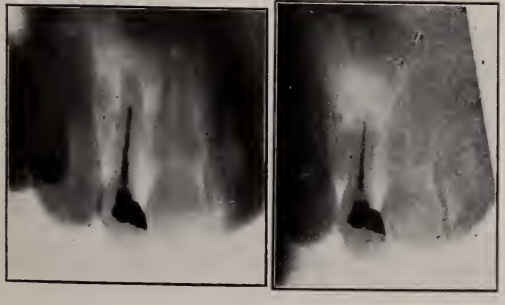


FIG. 14.

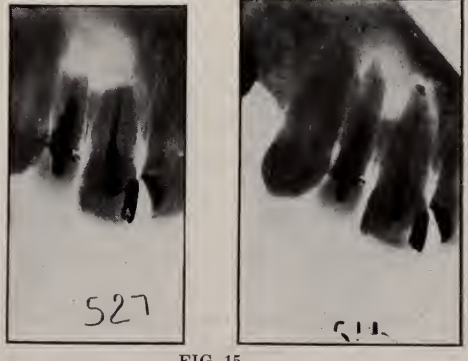


FIG. 15.

A Study of Static Electrical Apparatus.

BY JOHN TOWNSEND PITKIN, M. D.

ARTICLE NO. 3.

The bete noir of the operator of a Holtz static machine, is the frequent loss of charge during the warmer months of the year, when the atmosphere contains a high degree of fractional saturation of moisture, which renders the air more conductive of the high tension electrical currents.

This variety of static machine has no power to bring itself into primary action. It, therefore, requires charging, priming or exciting by some secondary apparatus. Usually a small Toepler or Wimshurst static machine is employed for the purpose. (An entirely new and original method of overcoming loss of charge, invented by the writer, will be demonstrated to the members of The Roentgen Ray Society when they meet in Buffalo next September.)

Some makers inclose the charger in the same case with the Holtz machine, placing it at one end thereof, where, by the employment of switches or other devices, it may be connected to the machine proper, and thus operated until all portions of the apparatus are brought into full functional activity.

The objections to this arrangement are manifold. Inclosing the machine and its charger, as above described, requires that the case shall be unduly large, hence it takes up too much space in a crowded office. Unsightly, because the essential portion of the apparatus is in a symmetrical position. To adjust a brush or other portion of the charger, the entire machine must be opened and exposed to the damp air of the apartment. The operator cannot predetermine which side of the machine will be of a desired polarity. To dry the case by chemical or electrical means will require more time than would be consumed in drying a charger inclosed in its individual case.

Inaccessibility precludes the employment of a Ruhmkorff coil or other high potential transformer to excite the charger when that instrument, for unknown reasons, refuses to functionate. To excite a Holtz machine into primary action, proceed as follows: Test the charger to determine whether it is in working order. Operate the machine until all of its members are brought into full electrical activity. Connect the prime conductors of the charger to the corresponding structure of the machine, which is to be excited, using short pieces of wire or metallic chains for the purpose. Have the discharging rods of both machines wide open. Bring the two instruments into mechanical activity. Allow the charger considerable speed, while the Holtz machine is run slowly. Nearly close the discharging rods of the latter instrument until feeble sparks commence to pass between the terminals, then very slowly open the rods in such a manner as to maintain them at the maximum sparking distance. The first feeble sparks are derived from the charger, while another portion of its current is passing through the inside of the Holtz machine to awaken its dormant structures. When the discharge suddenly becomes louder, longer, fatter and brighter, the charger may be disconnected, for the Holtz machine can then be operated independently. The polarity of the Holtz machine will correspond to that of the instrument with which it is excited, hence by observing the discharge at the collecting combs of the charger in a darkened apartment and making connections accordingly, a desired polarity may be obtained.

To insure electrical activity of the charger, it should be inclosed in a suitable case and kept dry by chemical absorbents or a small electrical heater. Perhaps the best electrical heater for a small machine is an eight or 16 candle-

power incandescent lamp, firmly secured by a lamp socket to the bottom of the inside of the case; the terminals of the lamp may be connected to binding posts, which pass through the woodwork and serve for attachment of lead wires from the commercial electrical service.

A charger which refuses to operate may be coerced into action by connecting its field brushes to the secondary of a small Ruhmkorff sparking coil, the primary of which is excited by the direct commercial current passed through a bank of lamps placed in simple series.

When a Holtz machine has many plates and the inside of the case is damp, it requires for its excitation an apparatus which generates a current of considerable volume. Under these circumstances, either the exciter itself must be a large machine or a small machine operated at high speed, may discharge its current through a pair of Leyden jars, the condensers acting as static transformers. To rid the inside of the case of a Holtz machine of moisture, two methods may be adopted, i. e., chemical absorption and electrical heating. The base of the machine can be provided with drying chambers communicating with the inside of the case by trap-doors placed in its floor. Other small doors should open outwards to allow the operator to replenish the chemicals and adjust or repair the heating coils without opening the instrument proper and exposing it to the moist atmosphere of the apartment. In one of the chambers are placed large, shallow, flat trays containing commercial calcium chloride, which, by absorbing moisture, turns from a white, dry, lumpy material into a soft, sticky mass, or may even become deliquescent.

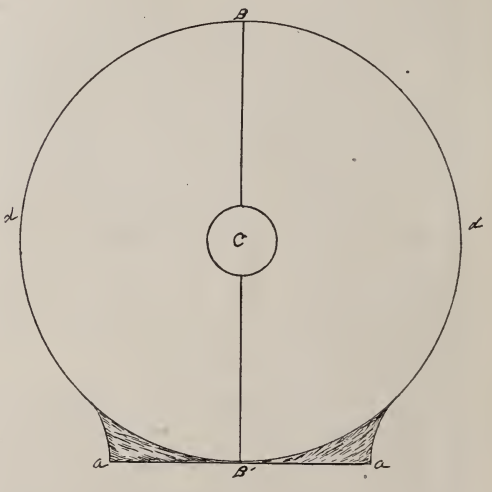
During the summer months, the chloride should be freed from water by heating it in flat, iron trays, preferably upon a gas range, every third or fourth day until it becomes anhydrous. Buffalo, N. Y.

Fruita, Colorado, June 29, 1901.

Dr. Heber Robarts.

Dear Sir: My design patent on stationary plate was officially allowed on the 20th inst., and patent will be issued on July 9.

I enclose drawing of same. It is made in two parts and is separable along lines BB. The line B and B instead of being carried round in a semi-circle is carried out and makes projection at A which serves as a base of support and



the plate is steadied as usual at top B. Hole C is for hub of revolving plates. It has all the appearances and advantages of a circular plate and can be easily removed, as well as being cheaper than regular plate and not the danger of breaking. I have the plates on my 4-20 inch rubber plate machine, which runs from 1,000 to 2,000 per minute and it is doing work equal to the larger machines also on one machine with 8-27 inch revolving plates and results are equal to the best for that size.

Will try and have some photos of the machine before long with description.

Yours truly,

J. M. G. Beard.

Pus is less translucent to the rays than serous fluids.

A Study of Static Electrical Apparatus.

BY JOHN TOWNSEND PITKIN, M. D.

ARTICLE NO. 4.

The Charge and the Charger Continued.

A well-constructed Holtz machine can be operated during all portions of the year without a dryer to absorb or heater to expel the moisture, providing a charger of adequate generating capacity is employed to bring it into primary action its plates will yield their full quota of current, but the damp air will dissipate a portion of the energy, and in consequence of the low point of magnetic saturation of the atmosphere the condenser action of the machine and its electrical output will be minimized. If, on the other hand, the case is thoroughly dried, a few turns of a small charger will suffice for its excitation and the electrical output will be at a maximum.

A small charger may be used to bring a larger exciter into action whenever the latter is required, but fails to operate. The polarity of the Holtz machine will correspond to that of the instrument from which it obtains its charge. Hence, by observing in the darkened apartment the nature of the discharge on the collecting combs of the charger, and making connections accordingly, a desired polarity may be given to the instrument that is to be excited.

When, as is usually the case, the mechanical propulsion of the static machine is effected by an electro-motor actuated by a direct commercial current, a rheostat for starting box and speed regulator is placed in a simple series.

The rheostat is essentially composed of resisting iron wire coils, varying lengths of which, by a selecting device, may be interposed in the circuit, causing a portion of the electrical energy to be dissipated in the form of heat. Other coils of similar composition are placed in a special chamber in the base of the static machine, where they are employed for drying purposes. Would it not be advisable from an economical standpoint to combine the two devices, using the heat of the rheostat to dry the interior of the apparatus? This may be accomplished in the following manner: Draw in your mind's eye two pictures of the face of a clock, one on the base and rear side of the static machine over the drying apartment, the other on the inside of the chamber against the front board, the two imaginary clock dials facing in the same direction and in perfect alinement.

A sixteen revolving plate, Holtz static machine.

Procure one bound of iron stove-pipe wire. Divide the wire into 12 pieces of equal length. Wind each of the wires over a large lead pencil, thus making as many coils. String the coils across the drying chamber, attaching their free ends to screw eyes, firmly secured in the woodwork at points corresponding to the numbers in the imaginary clock dial. Connect the alternating screw eyes at the front end of the chamber to their next neighbor, i. e., number one to number two, three to four, five to six, etc., not number two to three, or four to five, etc., by short pieces of wire. The twelve screw eyes at the rear end of the case must pass through the woodwork, each one terminating on the outside in a small metallic button.

The chamber should be lined throughout with asbestos and all connections of wires made perfect to avoid the danger of setting fire to the apparatus. Pivot from the center of the circular row of buttons, on the rear of the machine, a small metallic arm long enough to overlap the buttons, its outer end movable, provided with an insulated knob for a handle.

Through an intervening binding-post attach one of the lead wires from the electrical main to the fixed end of the arm. The other lead is to be made fast through another post to button number one. When the movable end of the selecting arm rests upon button number twelve, all of the resistance is in the circuit. The resistance can be decreased by gradual gradations by moving the arm towards the smaller numbers. Thus reduced, the machine will gain in speed and vice versa.

All of the electrical energy not employed to operate the motor will be converted into heat, which, no longer wasted, will be utilized to dry the interior of the apparatus.

In bringing the static machine into primary action, a very low rate of speed is desired; at the same time the load for the motor is very slight, hence all of the resistance may be placed in series and all the coils of the rheostat used for heating purposes. The object in having so many coils in the rheostat is to attain any desired rate of speed for the revolving discs or armature of our lightning generator.

Buffalo, N. Y.

X-Rays in the Bladder.

This case has been recently reported to us: A man forty years of age had suffered five years with a disease of the bladder. Some of the eminent surgeons of the east had treated him and for the past four months had been in the great Jefferson Hospital of Philadelphia. Tuberculous trouble of the prostate was one of the many diagnosis made and for which he was treated. Strange but true, neurasthenia was another diagnosis. Finally a good doctor "fell upon himself" and employed the x-rays. A stone was located. Operation revealed an encysted calculus of the phosphatic variety the size of a hen's egg weighing four ounces. This case may be one, and we hope it will escape the searching lash of the law. We will defend to the uttermost our lame profession, but with neglect similar to this case what can we expect? Sooner or later when the x-ray is available the people will demand its use or punish us for neglect of duty. The x-ray is one of the implements of the physician's armory and the law presumes negligence on our part, should we fail to use all the available means for making diagnosis.

Fissures and Fractures.

Dr. Beck teaches the advisability of beginning motion after 10 days, in fissure as well as in fracture of the radial head if the skiagraphic observation shows no tendency to displacement.

A Study of Static Electrical Apparatus.

BY JOHN TOWNSEND PITKIN, M. D.

ARTICLE NO 5.

The Neutralizing Circuit.

Forty-five degrees of a circle formed by the revolving plate of the static machine, computed in the direction that they turn from the two sets of collecting combs which gather the current from the prime conductors, extending a vareliable distance towards the axle, in the alternating interspaces of the revolving plates, firmly attached to metallic supports are placed secondary sets of rods and combs. These rods and combs, a superior and inferior set, are of similar construction, perfect in alinement with each other and the fellows of the opposite side, their function is to relieve the revolving discs of the electro-magnetic energy not employed for useful purposes, i. e., maintain the excitation of the field plates and sustain the external circuit. This residue they take up and discharge into a metallic structure, by which the superior and inferior set of rods communicate, named from the function that it performs, the neutralizing rod. When a static machine is brought into primary action, this circuit offers little resistance to the electrical flow, hence it is the first to be excited. It facilitates excitation.

Once the machine is in action, as already intimated, it constantly relieves the revolving discs of all surplus charge, thus they assist in keeping the two sides of the machine of opposite polarity. If resistance in the form of spark gaps, or a Crooke's tube is placed in the external circuit the amount of current in that circuit will be somewhat reduced while that of the neutralizing circuit will be proprotionately augmented.

As the potential of the neutralizing comb-holders d ffers from the comb-holders of the prime conductor circuit of the same side, they must not be within sparking distance of each other. Owing to the tendency of other structures to discharge onto the neutralizing rod it should be placed at the extreme rear of the case and inclosed throughout in half inch hard rubber tubing. The four sets of collecting rods and combs might be made adjustable, like the discharging rods, so that they could be slid in and out according to requirements. In when the Crooke's tube is of low vacuum, the inside of the case dry and the machine ran at low speed. Out when the tube is hard, the case damp or the apparatus operated with considerable speed.

With adjustable rods and combs we would be able to obtain the maximum external, and the minimum internal current, and dispense with noisy, wasteful interruptions in the form of spark gaps, which in turn cause diffusion of the x-radiance and a blurring of the pictures. Spark-gaps are wasteful because the structures which are insulators for a steady flow become conductors when it is intermitted. The interrupted current is a disperser of the electro-magnetic energy.

The metallic supporters of the collecting rods require perfect insulation, contact with the wood-work of the case is inadmissable.

Buffalo, N. Y.

Rodent Ulcers.

It is certainly impracticable to treat rodent ulcers with the knife either because of scar tissue resulting or the almost certainty of return of the disease. With the x-rays all these cases recover. Scar tissue does not form or disappear after raying.

The best picture of the heart is taken with the plate to the chest and the anode two inches to the left of the sixth dorsal vertebra 16 inches from the plate.

Insects and the X-Rays.

A box was made half of wood, and half of sheet lead. In the wooden half a number of larvae of flies, bees, beetles and other insects was placed and the box was then put in the field of the x-rays.

The insect colony at once became greatly excited and after crawling to and fro, finally emigrated, to a worm, to the leaden half of the box, where the rays could not penetrate.

The experiment was repeated many times and always with the same result.

A similar experiment was tried with the blind larvae of a certain species of beetle. A number of them was placed in an open cigar box, which also contained a metal box with an opening. No sooner were the rays turned on than the insects showed signs of distress. Their uneasiness increased and in a little while they all sought refuge in the metal box.

As the larvae in the second experiment were entirely sightless, their perception of the rays must take place through the nerves of the skin.

Toledo, Ohio, June 22, 1901.

Dr. Heber Robarts, St. Louis, Mo.

Dear Sir:—I have a Queen 15 inch x-ray outfit which I wish to sell. This is one of their latest coils (built last November). The only reason I have for selling it is that I am going abroad for six months and wish to have a 25 inch special coil built for some experiments which I wish to carry out. Outfit consists of a 15 inch coil, 7 cells D. 7 chloride accumulator, 2 queen tubes, 2 General Electric Company tubes, large Queen tube stand, 7x8 fluoroscope and x-ray cabinet mounted on castors. This is 24½ inches square, holds battery and has drawer 8 inches deep large enough to hold 4 tubes, wires, etc. (Cabinet of quarter sawed oak and a handsome piece of furniture). This outfit cost $400 and I will sell it complete for $300. If party does not want whole outfit will sell coil, battery and cabinet for $240. (list being $320.) I do not care to sell coil without battery but will sell battery separately, as I do not care to have same taken care of while I am away. This outfit is just like new and I will ship to any one you know to be responsible and if they do not find it to be as represented they need not take it. This is not a second-hand outfit to be sold at half price, but anyone wishing a first-class outfit of this kind can secure this and save some money.

Yours truly,

H. W. Dachtler.

Dr. Jose Gallegos of Retalhulen, Guatemala, C. A., has constructed a static machine which he claims to be many times greater in current power with same number of plates and diameter, than any static machine heretofore made. The secret of greater length of spark and fatness is due to his method of sector construction. The shape of sectors does not differ from those ordinarily made but he reverses the foldings of paper many times and between the layers of each is placed a layer of tin foil. It is thus the sectors are built up possibly one-eighth of an inch deep or more and the number of sheets of tin foil thus interposed seems to be the exciting centers of greater output of current.

The intestines should be emptied before radiographing for stone in the kidneys, gall stone, abdominal anurism, intestinal concretions, dilatation of the stomach, abscess, and for other searchings in the abdomen and pelvis. It is often with diagnosis that life depends. Twenty-four hours should be consumed in cleansing the bowels.

A heart after pericarditis is large and the entire muscle cast a denser shadow than a heart healthy.

New Process of Pelvimetry and Long Distance Radiography.

This is the title of an article in Scientific American Supplement, May 11 ult. The principle of the article is to show how we can sensibly cause parallel radiations imitating our own vision. The bulbs employed are bi-anodic and are placed at considerable distance from the object. A table is given by Dr. Varnier of a dry pelvis, showing the difference between the dimensions of the pelvis itself and the radiograph. The figures are estimated on shadows 80 to 90 feet distance, but it is alleged that in actual practice 16 feet would answer. If we had a tube that would give good views of an adult pelvis 16 feet away with 10 minutes exposure we would certainly be approaching superior radiance—the goal we seek, the entire scheme is a conception and only worthy of mention.

Roentgen Society of the United States.

ANNOUNCEMENT OF COMMITTEE ON ARRANGEMENTS.

The Committee on Arrangements for the next meeting of the Roentgen Society of America have secured, through the courtesy of the Dean and Faculty of the University of Buffalo, the use of as much of its building as we may require. The location is central, the room ample and on the ground floor. The date of the meetings will be Sept. 10 and 11 at the University of Buffalo, Buffalo, N. Y.

The following rules and regulations in regard to exhibits have been adopted by the committee: Applications for space should be sent as early as possible to R. C. Adams, Secretary, drawer No. 963, Buffalo, N. Y., with particulars as to character of exhibit and space needed.

Exhibits may be consigned to Louis Staffeldt, care University of Buffalo, and all express and freight charges must be pre-paid. Owners of goods sent by freight who wish them transferred to place of meeting on arrival, must notify the secretary and send him the pre-paid bills of lading. The cartage will be at expense of owners.

Exhibits are wholly at risk of owners, and should be unpacked and installed by them not later than Sept. 7.

Alternating current 104 volts, single phase, 60 cycles, and direct current 110 volts, will be available, also dark room for photographic purposes. All exhibits must be removed by Sept. 13.

EDGAR B. STEVENS, Chairman.
ROGER COOK ADAMS, Sec., Drawer 693.
DR. JAMES W. PUTNAM,
DR. ELMER E. STARR,
DR. RENNICK R. ROSS,
Committee.

X-Ray Burn in Paris.

Dr. Bronardel and M. Ogier were employed as expert witnesses in a case of suit brought for alleged x-ray burns. The doctors testified that no one knows the conditions which give rise to burns in some people, and not in others, and that, consequently, the radiographer was not responsible. The court, however, gave the full amount of the damages claimed 5,000 francs. It said: "We find that the radiographer had acted imprudently, more like a workman than a medical man, and that his apparatus was defective." The case was a woman whom the radiographer had treated for sciatica, exposing the parts in three sittings in three weeks 40, 45 and 75 minutes each.

If there is no food in the stomach and the intestines are thoroughly cleansed they are at rest. It is then that the best pictures are had of the organs of the abdomen and pelvis.

Bismuth in solution or dry in capsuls can be traced along the alimentary track.

Exact Localization.

Dr. Clarence A. Greenleaf, of Philadelphia, has recently reported through the *Philadelphia Medical Journal* some obscure cases under the old method of diagnosis. In cerebral localization, the doctor writes: "We do not get the exact location nor does this method of diagnosis give data from which we can absolutely determine the necessity for an operation. It gives no evidence of size or the nature of the foreign matter." He relates a very interesting case reported to him by Dr. E. M. Moore, Jr., which, for its completeness and interesting character, is worthy of reproduction. But we must protest against the statement of inexact location. Nothing is easier than locating anything in the head that can be seen with the fluoroscope with mathematical accuracy. As to the size being distorted—well, this is not a bugbear, either. When the location is established it is no trick to determine the size. Our previous knowledge of shadows instinctively acquaint us with these facts:

"The patient, a male, 37 years of age, shot himself in the head with a 22 caliber bulldog revolver, in 1889. He fired three shots, holding the revolver at the right side of his head behind the ear. The patient states that he held the revolver in the same position while firing the first two shots, but that when he fired the third he moved his head forward. He immediately became unconscious and was removed to St. Mary's Hospital and placed under the care of Dr. E. M. Moore, Jr. Examination at this time revealed one wound upon the right side of the head and a second one over the occipital protuberance. The first one penetrated the skull, while the second was a simple scalp wound. He remained unconscious for three weeks. He remained in the hospital for three months, although the external wounds were healed at the end of three weeks. At the time of his discharge from the hospital the patient had no symptoms except a paretic condition of the right leg and a left heminopia. In April of this year the patient consulted Dr. Moore again, hoping that something might be done to relieve him of his continued disability. A physical examination made at this time showed the following conditions: A depression upon the right side of the head about the size of a ten-cent piece 6.5 cm. posterior to the upper margin of the right ear and a linear scar about 1.5 cm. long just above the occipital protuberance. Neurological examination shows the gait of the right leg to be paretic, of the left leg normal. Station is good with eyes closed. There is no voluntary motion of the toes of the right foot. Flexion of foot, extension of leg and flexion of thigh are weakened. The muscles of the foot react to strong faradism. The grasp of the right hand is 50 pounds, of the left 48 pounds. The difference in the circumference between the right and left thigh is seven-eighths of an inch, while the circumference of the right and left calf are equal. The right kneejerk is exaggerated, while the plantar reflex is normal, but produces no movement of the toes. There is a slight ankle-clonus upon the right side. There is no disturbance of the sense of touch; the sense of taste is diminished, principally upon the right side of the tongue, which is protruded slightly to the right, although movement to both sides is possible. The sense of smell is somewhat diminished in both nostrils; the hearing is good in both ears. There is no disturbance of the sense of pain. Aphasia, word-blindness and word-deafness are absent and the memory and general intelligence are good. Ophthalmological examination reveals a lateral heminopia of the left side. Ophthalmoscopic examination is negative.

"X-ray Examination.—A lateral view shows a distinct shadow denoting the presence of a bullet in the brain. This shadow is 4.5 cm. from the upper surface of the skull and is 6 cm. from its posterior wall. There is also a fainter, irregular shadow which probably indicates an organized blood-clot, about 2.5 cm. in diameter, situated 0.5 cm. posterior to the bullet. A distorted shadow is seen in the lower posterior part of the head.

"This case presents a few points of special interest: 1. The question of the brain areas involved in the injury as shown by the symptoms and the result of the neurological and opthalmological examinations. 2. The value of the x-ray in determining not only the presence of the foreign bodies, but also their location. 3. The value of the x-ray in determining the feasibility or advisability of operative interference. In this case it is apparent that an operation for the removal of the foreign bodies is out of the question. It is a remarkable fact that during all these years the symptoms have remained practically stationary, and this fact is also an argument against operative interference, even if it were possible, as the result would be extremely doubtful. Another question to be considered is whether one or two bullets entered the brain, and whether, if one only entered, it divided as it passed through the bones, as in a case reported by Tuffier (La Presse Medicale, December 20, 1899). The patient states that he fired two shots, with his head and the revolver in the same relative positions. There was only one wound of entrance and this would seem to confirm the above statement. The radiographs, also, show one complete circular shadow and another flattened or crescent-shaped in an entirely different plane, from which we may conclude that there are two distinct bullets."

X-Ray Therapeutics.

Margaret M. Sharpe, L. R. C. P., recently read an article on the above subject before the Roentgen Society, London, full report of which is given in the "Archives" for May. Miss Sharpe retracts from her original belief that dermatitis is the result of the x-rays. She now inclines to the belief that this is due to violet rays such as we get from the sun or from arc lamps which are still richer in the production of violet rays. She found burns to be much more frequent when the tubes were new and soft and where the pencil of violet streamed across from one pole to the other. It is either these rays or the electric current that does the damage. She has noticed irritation in the skin to be greatest under the edges of metal masks where the electric current seems to accumulate. In a case of a woman with an exuberant growth at the end of the nose she used the electric high frequency spark upon one side and the x-rays upon the other. It was noticeable that the side treated with the spark the shrinkage was more rapid than where the raying was done. Miss Sharpe contends that injury to the tissues by raying is not only no help in the treatment of diseases and hair removal, but actually a hindrance. The only case in which she failed to permanently remove the hairs was the one in which dermatitis resulted. The use of the mask and impervious screens are not necessary except to protect the eyebrows and lashes. The electric discharge from the tube claimed by many, both home and abroad, she formerly treated with scorn but is now inclined to accept.

The paper elicits inquiry in the scientific aspect of the subject. Discussion on the paper was followed by Mr. Mausell—Moullin, Mr. Wilson Noble, Dr. Batten, Mr. Starten, Dr. Mills, Dr. Chisholm Williams, Dr. Sequeira, Mr. Payne and others.

Roentgen Society.

The following notice, made by Professor Monell, Chairman of Committee on Standards, appeals to all persons whomsoever that have any knowledge on this subject; and commends itself especially to medical men having interest in the attainment of more knowledge. Write to Dr. Monell and give expression on one or more of these subjects.

COMMITTEE ON STANDARDS.

DEAR SIR:

To promote uniformity in results and to secure accuracy and give legal value to the evidence of x-rays, it is necessary to standardize methods of doing the work. To this common benefit all x-ray experts are asked to contribute for the general good of the cause. You are therefore invited to write me your best suggestions on such of the following points as you can offer advice upon:

A standard uniform nomenclature for the principal terms required.

A standard form of record-blank for briefly filing reports aud indicating all essential details of the exposure.

Standard of efficiency for tubes.

Qualities which a standard x-ray photographic plate should possess.

Qualities which a standard x-ray fluoroscope screen should possess.

Standard handle for all x-ray tubes so they will fit a standard tube-holder.

Standard tube-holder to fit uniform standard tube-handle—adjustable, rigid, holding tube without vibration—and convenient for general use.

Standard position of tube for correct shadow.

Standard distance of anode from plate for standard x-ray exposures.

Standard exposure times for chief parts of the body with a standard radiance.

Standard measure of different degrees of x-radiance.

Standard "skiameter."

Standard x-ray examination table, adjustable for all parts of the body.

Standard method of posturing each part of the body for a standard picture.

Standard means of fixing parts immovably during a standard exposure.

Standard complete definition of what a "standard exposure" should be. (Of medico-legal value.)

Standard land-marks to be pictured in the negative as inherent proof that a standard exposure was made—(a medico-legal necessity).

Standard method of localization for both "skiagraphy" and "fluoroscopy," which shall be the most practical, quick and uncomplicated.

Standard technique for picturing correct relation of bones and joints.

Standard technique for picturing details of any kind sought.

Standard technique for picturing contrast for diagnosis of soft parts.

Standard technique for picturing the different calculi, vesical, renal and gall-stones.

Standard technique for x-ray dental diagnosis.

Standard technique for x-ray eye work.

Standard technique for x-ray heart and lung diagnosis.

Standard treatment of plates to develop uniform results.

A standard leaflet of brief directions which the physician who does not do his own developing can send with his plates to any fair photographer as a ready guide to proper treatment of an x-ray negative to secure the picture.

Standard technique for therapeutic administration of x-rays with proper precautions.

You are invited to supply any omitted detail which you believe should be standardized. Will be pleased also to have you select one or more features of the above list in which you have had special experience and make a careful report upon what you regard as the proper standard to officially adopt. A reply is desired in about two weeks. In offering suggestions about standard working methods, postures, special devices, apparatus, etc., it is desirable that you send explanatory camera-photographs illustrating the details for comparison. Thanking you for your professional co-operation in behalf of the committee, I remain, Fraternally yours,

S. H. MONELL, M. D.,
Chairman of Committee on Standards.
47 West Twenty-seventh street, New York City.

First Becquerel Burn.

Mr. Henri Becquerel started on a journey with a price of radium in his pocket. The radiation which bears his name attacked the skin through the cardboard in which the metal was placed and the cloth. It was about two weeks after that the burn marks appeared. These burns were also found to heal obstinately like x-ray dermatitis.

A heart beating rapidly will give a better picture that the same heart beating slowly.

Investigation of X-Ray Problems.

LISBON, June 26, 1901.

DR. HEBER ROBARTS:

Might I beg you kindly to put before the American Congress of Radiology (The Roentgen Society of the United States), the undermentioned list of problems, whose study is at present interesting me, but which I should also like to submit to the inspection and investigation of the renowned radiologists of your country.

Some of these problems have already been propounded and have undergone a certain amount of investigation, but, as yet, are not thoroughly solved:

1st. How, in a Crooke's tube at a certain degree of gaseous rarefaction to measure the influence exerts upon the quality of the x-rays (penetration and intensity*) conforming to a previously fixed standard by the following circumstances:

(*a*) The distance separating the kathode from the antikathode.

(*b*) The size of the kathode and antikathode.

(*c*) Their shape.

(*d*) The length of the spark measuring the discharge within the tube.

(*e*) The thickness of this spark.

(*f*) The number of interruptions in the primary circuit (or inductor), or the number of electric discharges within the tube at one and the same time.

(*g*) The relation between the length (or duration) of the closing (making) and that of the opening of the primary circuit.

(*h*) The total capacity of the tube in cubic centimetres in relation to the distance of the electrodes in line of centimetres.

2d. How, in a Crooke's tube, to estimate the effect produced by the degree of gaseous rarefaction upon the penetration and the intensity of the Roentgen rays?

3d. How, in a Crooke's tube, no matter the degree of rarefaction therein attained, to reduce to a single point the focus of emission of the x-rays placed at the antikathode, in order to attain the best definition?

4th. How to reduce the number of electric discharges within the Crooke's tube to the *minimum* necessary to give the steadiness and brilliancy in the skiascopic screen?

In any case enough time must be given to the closed period of the primary circuit for the thorough magnetic saturation of the core, or in other words, to saturate the electric capacity of the coil.

5th. How to construct a durable coil and one which would give the greatest produce, i. e., with a weak primary current to give a long and a thick spark?

6th. How to establish the standard of the strength of the penetration of the x-rays and its dependence on the qualities of the electrical discharge which produces them?

7th. How to establish the standard of intensity of the x-rays?

8th. How to determine the influence of the time exposure on the intensity of the skiogrammes in relation to the intensity of the utilized rays?

9th. How to create methods which allow of the regulation of the penetration of the x-rays without considerable interfering with their intensity?

10th. How to create methods allowing of regulation of intensity independent of their penetration?

11th. How to determine the absorbing power of the bodies for the x-rays, according to the qualities (penetration and intensity) of these rays?

With the best compliments,

Your faithful

VIRGILIO MACHADO.

*Measured by their effect upon the fluorescent screen, platino cyanide of baryum or upon sensitized photographic surfaces.

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A New Hospital.

We are glad to be able to present the following to the many readers of THE AMERICAN X-RAY JOURNAL. Dr. Lanphear very early recognized the diagnostic value of the x-rays and has persistently, with the greatest profit, used the x-rays in his practice. His letter speaks for itself:

July 11, 1901.

DEAR DOCTOR:

Having bought a home in Temple Place, I have fitted up my former residence and offices, at 3727 Finney avenue, as temporary quarters for the Woman's Hospital of the State of Missouri. I am, therefore, now in position to take care of those unfortunate, respectable women and girls who have not the money to pay the high prices of the other hospitals and sanatoria of the city, who yet require surgical treatment. There are also rooms for a limited number of patients who can afford to pay higher rates for care and special nursing.

The hospital will be in charge of Miss C. E. Jackson, a graduate of one of the best training schools in this country and formerly head nurse of the Woman's Hospital at Sixteenth and Pine streets.

Hoping for at least a word of encouragement for the institution, I am,

Sincerely yours,
EMORY LANPHEAR.

A Laboratory for Poison.

It's a wonderful laboratory, this human body. But it can't prevent the formation of deadly poisons within its very being.

Indeed, the alimentary tract may be regarded as one great laboratory for the manufacture of dangerous substances. "Biliousness" is a forcible illustration of the formation and absorption of poisons, due largely to an excessive proteid diet. The nervous symptoms of the dyspeptic are often but the physiological demonstrations of putrefactive alkaloids. Appreciating the importance of the command, "Keep the bowels open," the physician will find in "Laxative Antikamnia and Quinine Tablets" a convenient and reliable aid to nature in her efforts to remove poisonous substances from the body. Attention is particularly called to the therapeutics of this tablet. One of its ingredients acts especially by increasing intestinal secretion, another by increasing the flow of bile, another by stimulating peristaltic action, and still another by its special power to unload the colon.

Epithelioma.

Johnson & Merrill has recently reported several cases of epithelioma apparently cured by means of the x-rays. Pain in all the cases was relieved at the beginning of the treatment, the discharge diminished and offensive discharge ceased.

Professor Roentgen.

On the recommendation of the National Academy of Science the Bernard Medal was awarded to Professor Wilhelm Conrad Roentgen at the "Commencement" of Columbia University.

Purchasing Goods.

Prospective purchasers of the x-ray machines should consult the advertising pages of the THE AMERICAN X-RAY JOURNAL. The best manufacturing houses naturally seek the purest means to present their goods.

Phosphatic concretions are more translucent than urates and oxalates.

Iodoform injected into cavities shows remarkably distinct on plate and screen.

The differential diagnosis between congenital luxation and coxa vara is presented in an interesting manner by the x-rays.

A muscular person accustomed to labor and free from fat will give detail in a radiograph not possible to obtain in a fat subject.

Summer Diarrhœa.

In the large class of summer diarrhœas of children and adults, with griping in the bowels and flatulence, the use of LISTERINE, in doses varying from ten drops to a teaspoonful (with or without water), has a most salutary and pleasing effect.

It can be administered at short intervals after eating as soon as regurgitation, distension or acidity occurs. Its action in arresting excessive fermentation is prompt, besides it exercises a decided sedative influence on the mucous membranes of the stomach.

The thymol, menthol and boracic acid which, with the quota of alcohol necessary to their proper admixture, form the principal elements of LISTERINE, lend to this compound a special value in this class of cases.—*New York Medical Journal.*

Every Man Should Travel

As extensively as his circumstances will permit, The educational advantages secured by visiting the different parts of the United States, are likely to be of the greatest service to any physician. A doctor with a comprehensive knowledge of the affairs of the country at large has an immense advantage over his less fortunate fellow practitioners.

Not every one has the means to travel for travel's sake alone, but any bright young man of fair address and average ability has within himself a means to not only secure the educational benefits of a trip about the country, but to make such an excursion profitable as well, through the sale of medical publications.

For further particulars, address

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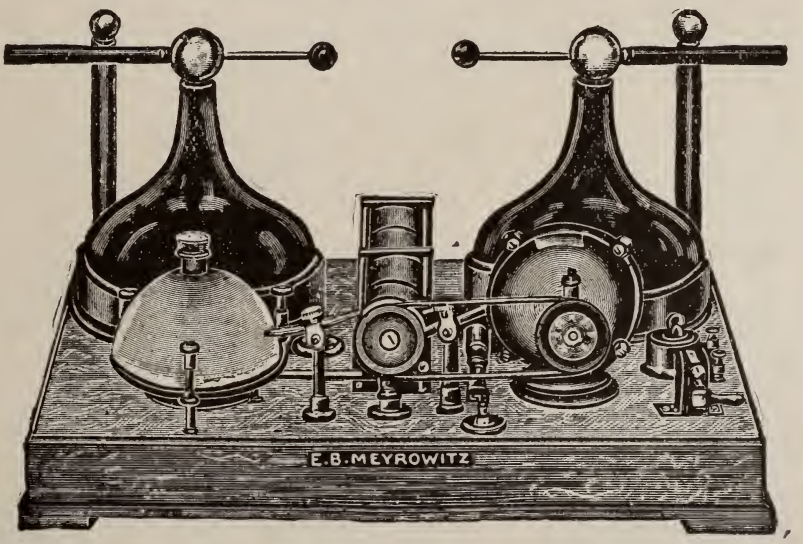

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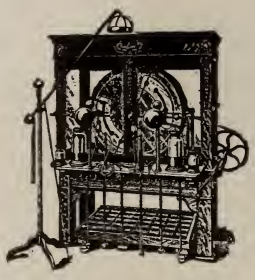

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Devoted to Practical X-Ray Work and Allied Arts and Sciences.

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DR. A C. BERNAYS,
Member of the Roentgen Society of the United States.
St. Louis, Mo.

THE AMERICAN
X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. 9. ST. LOUIS, AUGUST, 1901. NO. 2.

Skiagraph in Oral and Dental Surgery.

BY WESTON A. PRICE, D D.S , M. E.

Delivered with Stereoptican Views before the Roentgen Society of the United States, Grand Central Palace, New York City, December 13, 1900.

Continued from page 930.

This skiagraph (Fig. 16) shows a case of root amputation (which was made for a lady about sixty years old) more than three years after the operation and shows the bone filled in around stub perfectly.

I question if any operation upon the human body requires more mechanical skill than the perfect filling of some root canals, because they are often so small and crooked. Sometimes they can be drilled out larger, but this operation is attended with great danger of going through the sides of the root as this case shows (Fig. 17).

Sometimes it happens that an instrument breaks and in trying to get it out it is forced through the end as shown in this case (Fig. 19) where you will observe it has caused absorption of the apex of the root. Notice the imperfect root filling in the other bicuspid.

One of the most difficult operations is to make an artificial fistula to drain a small blind abscess at the apex of a root. The skiagraph is of great assistance, not only in locating the abscess, but also in showing whether you have struck it. This is shown by placing a lead wire in the fistula and skiagraphing. In this slide (Fig. 20) the lead wire in the picture marked 367 shows that the first attempt failed. The other shows that a second attempt was successful.

In orthodontia, which is the correcting of the positions of the teeth or correcting of the features by changing the positions of the teeth, the Roentgen Rays are of great value to determine the positions of the roots. For example, it is desirable to move all the upper anterior teeth and the bone around them forward to correct a depression of the upper lip. The difficulty is to carry the roots en masse and not to simply push the crowns apart. This case (Fig. 21*) shows the position of the roots at starting, and the view to the right shows the roots successfully carried apart without tipping the teeth.

You doubtless all know of the difficulties and complications attending the erupting of the third molars or wisdom teeth so called. This skiagraph (Fig. 22*) shows the position of a typical empacted one, which was entirely hidden in the flesh and bone, not having erupted yet and producing very serious trouble. You will see the mechanical difficulty of contracting it, since it is engaged or locked against the second molar. The dentist sending the case after seeing the skiagraph operated by extracting the second molar first and then the third and then replacing the second molar after removing its pulp and filling its roots. Result excellent.

The next (Fig. 23*) shows a case with an external fistula on the ramis of the

jaw, diagnosed by different surgeons as coming from an empacted third molar and was operated on accordingly for its removal, but unsuccessfully. The skiagraph was then secured, which shows not only that the third molar has never formed but an abscess at the root of the second molar, which has a putrescent pulp and which proves to be the cause of the whole trouble.

There is no difficulty whatever in locating unerupted teeth by means of rays. For example, this patient, a lady over thirty, presented without either permanent cuspids, and the bony process was receded, making it seem quite probable that they had never formed, but they are both clearly shown in (Fig. 24*), just beneath the surface, and will be speedily regulated to their proper positions.

(Fig. 25) is a similar case. Patient, age 17, and shows the case before and after regulating.

(Fig. 26) shows a delayed bicuspid. The distal root of the deciduous molar has not been absorbed.

(Fig. 27*) shows a bicuspid erupting towards the roof of the mouth.

(Fig. 28*) shows that but one bicuspid has formed where two should, and it is very badly malposed, having developed back against the molar and locked against it. The treatment was, after waiting three months and skiagraphing and finding nature was making no improvement, to extract the temporary molar and with a regulating appliance separate the molar and the cuspid, the latter having prematurely erupted. The next slide (Fig. 29), shows how much it has rotated and corrected its position in 60 days.

(Fig. 30) shows the teeth of a baby at 14 months, before any of the temporary teeth had erupted, and the same at 28 months. It not only shows the temporary set but also the centrals forming of the permanent set. The point of great interest is, that though this boy's father has not his permanent laterals, we know he will have them, for they are already forming.

Very unfortunately these lantern slides do not show the excellent detail of either the negatives or prints made from them. To illustrate this I have brought a variety of mounted prints that you may compare them. You may have observed how much more faithfully the teeth are portrayed in these than in skiagraphs taken of the whole head, in which case they are duplicated and blurred by the shadows of the teeth of both sides or the arch falling together. The detail necessary to bring out an abscess, for example, could not be secured in that way. Owing to the limited time, I can not go into the technique of making skiagraphs of these dental conditions of the teeth and adjacent parts, and the best I can do under the circumstances is to refer those desiring this information to my communication before the Third International Dental College held in Paris, 1900, or to a book on "The Application of Electricity in Dentistry," by the speaker, which is nearly ready for the publishers. I will be glad to answer any questions any one may desire to ask.

* Electros delayed.

2238 Euclid ave., Cleveland, O.

Leonard calls attention to the fact that many permanent injuries supposed to have been the result of traumatism or sprain are now known to have been fractures. All such accidents in diagnosis can now be avoided.

An oblique fracture might be in perfect apposition and the raying done at right angle to the brake which would hardly distinguish the injury. Shifting the position 90 degrees would show the fragments.

A case of carcinoma of the breast, too far advanced for surgical interference, which yielded to the x-rays, was recently reported by Andrew Clark, of London.

FIG. 16.

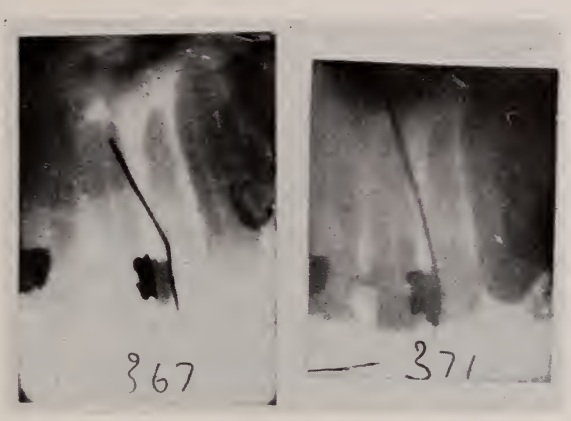

FIG. 20.

FIG 17.

FIG 19.

FIG. 25.

FIG. 26.

FIG. 30.

FIG. 29.

Constitution, Roentgen Society.

At the annual meeting of the Roentgen Society in New York City, Dec. 14, 1900, a committee was voted to be appointed by the President, to revise the Constitution. Herewith is the result of their careful deliberation. The report will be acted upon at the regular meeting in Buffalo, Sept. 10 and 11.

CONSTITUTION.

ARTICLE I.

NAME.—This Society shall be known as the American Roentgen Society.

ARTICLE II.

OBJECT.—The object of the Society shall be the study and practical application of the Roentgen Rays.

ARTICLE III.

SEC. 1.—Its members shall consist of active, corresponding and honorary. They shall be persons interested in the object of the Society, and commended by at least two members in writing, approved by the Executive Committee, who must have proof of their good ethical standing and elected by ballot.

SEC. 2.—Active members shall be residents of the United States or Canada, shall sign the Constitution and pay annual dues of five dollars ($5).

SEC. 3.—No member shall vote or hold office who is in arrears for annual dues. Any member in arrears for more than two years and duly notified by the Treasurer, shall forfeit his membership.

SEC. 4.—Corresponding members shall be residents of foreign countries.

SEC. 5.—Honorary members shall be persons who have distinguished themselves in Roentgen Ray research or practical work.

SEC. 6.—Corresponding and honorary members shall have all the privileges of active members, excepting voting and holding office.

ARTICLE IV.

OFFICERS.—The officers shall be a President, First and Second Vice-Presidents, Secretary, Treasurer and Executive Committee of three. The officers shall be elected annually by ballot.

ARTICLE V.

DUTIES OF OFFICERS;

SEC. 1—The President shall perform all the duties pertaining to that office. He shall deliver an address at the opening of the annual meeting.

SEC. 2.—In the absence of the President one of the Vice-Presidents shall preside.

SEC. 3.—The Secretary shall keep or cause to be kept a correct record of all the transactions of the Society in a permanent form. He shall send due notice of all meetings to each member, shall notify all members of committees of their appointment and of the duties assigned to them. He shall conduct the correspondence and perform all the duties usually pertaining to that office.

SEC. 4.—The Treasurer shall receive and be accountable for all money that shall come into his hands by virtue of his office. He shall give good and sufficient bonds to the Executive Committee for the safe keeping and disposal of his trust, and shall make a full report to the Society annually. He shall pay out money only on the written approval of the President and the Chairman of the Executive Committee.

SEC. 5.—An Executive Committee of three members shall be elected as follows: One for three years, one for two years and one for one year, and thereafter, one annually, to serve for three years. They shall hold the bond of the Treasurer and audit his accounts annually, arrange for annual meetings and have general supervision of the affairs of the Society not otherwise provided for.

ARTICLE VI.

MEETINGS.—The annual meetings shall be held on the Wednesday following the second Tuesday of December of each year.

ARTICLE VII.

COMMITTEES.

SEC. 1.—A Committee on Publication, consisting of five members, of which the President and Secretary shall be members, shall be appointed annually by the President.

SEC. 2.—(Special Committees).

ARTICLE VIII.

AMENDMENTS.—This Constitution may be amended by a three-fourths vote of all the members present at an annual meeting, providing that the proposed amendment has been read before the Society at least one day previously and the hour for action by the Society has been set by the Society as a special order of business, and announced in the open meetings for at least one day previous to the time of action.

Committee on Constitution:

WESTON A. PRICE.
DWIGHT M. CLAPP.
A. CLIFFORD MERCER.

Ammetropic eyes ill defines images at their marginal outlines and the x-rays imprint pictures at the margin with less contrast than photographs.

A womb menstruating is less translucent to the x-rays than when quiescent.

How to Find Fissure of Rolando.

J. RUDIS-JICINSKY, A. M., M D., M. E.

In cases of head injuries, whether we have to operate or trephine, we always have to find first the fissure of Rolando, and then may proceed. As far as yet we have assumed, as shown by Thane, that the fissure of Rolando runs downward and forward at an angle of 67 degrees with the middle line. But we know also that the angle varies with shape of the head, that is to say with the cranial index, the lower the angle, the lower is the index; the greater the cranial index, the greater the angle. Horsley assumes a standard for the cranial index of 75, as established by Broca; for the fissure of Rolando of 69, instead of 67, and for every two integers of variation in the cranial index he assumes one degree of variation in the angle of the Rolandic fissure. This variation we have nearly in every case, but the variation would not be so great if we could study the anatomical relations, having the sutures and the Meningeal grooves as a guide. This, having in mind, I have made few experiments lately, to show that by proper technique we are able to skiagraph the cranium more successfully, and see all the sutures and Meningeal grooves, especially on that side of the head which rests against the photographic plate. Now, if we can see these grooves and sutures in every case different, varying with the shape of the head, we can make up the angle of the fissure of Rolando much more easier, remembering the relation it has to the sutures and Meningeal arteries. The measurements were guesswork anyway, but to study each given case anatomically, and according to the relations of positive landmarks we can not only guess, but we may find what we are after and see.

In such cases the application of the x-rays has its value. If we wish, the negative will give us the internal structures of the bones of the cranium with wonderful depth and perspective, will show us plainly all the sutures and grooves of the Meningeal arteries, and we may have a picture of the substance, not only the shadow, of which still so many surgeons are afraid. To get such a picture well defined and sharp we have to use tungstate of calcium screen over the photographic plate, the tungstate being right against the film of the dry plate. The plate has to rest on some metallic support, as stanniol, etc. This way we will get shadows which are both shadow and substance, which, if we understand them and intelligently interpret them, will always bring us to the correct and most natural landmarks for the fissure of Rolando, and many times to proper diagnosis, especially in cases of bloodclots, etc. If you use fissure meter or any other device the skiagraph will give you a permanent record, and shows not only the instrument in place with the angle found—metallic instrument—but gives you the opportunity to study the possibility of deviation. If the cranial index is 77, instead of 75, the angle for the fissure would be 70 instead of 69, as we expect, but the sutures and the grooves of the Meningeal arteries might tell us an altogether different story, and will warn us in time, without any marks with the blue pencil, etc , on the shaved head that we have to trephine at some other point, at altogether different angle. The metallic cyrtometers, being provided with means for rotating the arm representing the fissure of Rolando may give proximate position of the fissure, but the natural landmarks given above may help us in some cases little better.

The difference, if we use the tungstate of calcium screen over our dry plate,

PELVIS, showing arteries. The light spot in right side is gas in cecum. (Property of St. Louis X-Ray Laboratory.)

SHOULDER, showing three axillary arteries. A very rare specimen.
[Property of X-Ray Laboratory, Chemical Building, 8th & Olive Sts.]

KIDNEY. One of Dr. Kassabian's radiographs.

resting on some metallic support instead of wood, is marvelous, and the results obtained are really beautiful. This way we do increase the sensitiveness of our plates, and, accumulating more rays over the same, reduce the time of exposure. This method is difficult to manipulate perhaps in the beginning, but later on gives more opportunity to study, and we may attain results and unexpected success. The screen must be in good order, and in immediate contact with the sensitive film, so that the x-rays had to pass through the subject, and then the screen before reaching the sensitive surface of the dry plate. I have only one screen, about 8x10 inches and use the same in all cases of bone injuries, bone diseases, foreign bodies imbedded deep in soft tissues, fractures, dislocations, skiagraphy of the head, hip, joint, etc. I will not deny that I have spoiled or fogged numberless plates before succeeding in this or other experiments since my pioneer work in 1896, but the results obtained are really gratifying, and most practical.

Cedar Rapids. Ia.

Never be content with a radiograph of a suspected fracture from one position. Make the second exposure at 90 degrees or at right angles to the first.

When the object sought can be seen with the fluoroscope the fluorometer is the most accurate and convenient instrument for correct localization.

In Austria, by a decree, an official license is required before one can publicly operate an x-ray machine, and none but physicians are licensed.

Idiosyncrasy is a factor and the reaction varies in intensity in the treatment of lupus vulgaris and rodent ulcer.

It is possible not to get a picture of a fracture in one position that would be clear in another.

Subsequent Outcome of Fractures.

Benjamin Duke in the *British Medical Journal* reports a case of oblique fracture of the tibia and fibula, in which at the time of the accident and during the subsequent treatment of the case up to the 80th day only a fracture of the fibula was suspected. A radiograph at this time showed the fragments of the tibia to be separated to a considerable degree. The leg seems to have all the function of one that had never been injured, and comment is made that the "case illustrates the fact that x-ray pictures are no indication as to the subsequent outcome of cases of fractures." We here protest against such rank teaching as this quotation implies. To the contrary, it is just this indication exactly that illustrates to an intelligent surgeon the subsequent outcome of cases of fractures. Upon the teaching of such stuff a separation of the lower end of the radius might be looked upon as of light consequence. What about the "subsequent outcome?" How about a fracture with the lower end of the humerus? Does it appear to any surgeon that separation of fragments here will result well for the patient?

Surgeons have always known the points mentioned in the quotation. It is not so much for the cases that will have good function, though there may be separation of fragments, that the x-rays are brought into requisition, but for those cases that will not have good function unless the bones are put in apposition that the x-rays are so important in the subsequent outcome of cases of fractures. A surgeon is supposed to know something of the anatomy of the living subject and the function of muscles and bones. The quotation cited is at least a travesty upon his profession.

The Ostrich Man and the X-Rays.

The title of this brief article is not quite correct, for we are more concerned in the defense of the radiographer than we are in the freak. *The Strand Magazine* for May on page 470, has a picture of the man who alleges to eat glass, nails, saws and knife blades, and also these words: "But several members of the profession were skeptical. Doubts on this point were soon allayed, however, by Dr. Mihram K. Kassabian, who requisitioned the x-ray apparatus to photograph the stomach of the human ostrich. Harrison has good cause to recollect this part of the proceedings, since he was so burned by the application of the rays that he was incapacitated for 19 months, and has since experienced a certain weakness"

Dr. Kassabian feels much agrieved that a high grade publication would permit such a statement, reflecting as it does, upon his professional acumen and using his name wrongfully to advertise the freak and add to that sort of yellow journalism.

It seems that Mr. Harrison, the human ostrich so-called, exhibited himself before the medical students of the Chirurgical Medical College, Philadelphia, April 9, 1900. He requested that a radiograph be made of his stomach to prove the existence of what he had alleged to have eaten. The clothing was removed and he was placed prone over a 14 by 17 plate. The tube was 36 inches from the body and glowed three minutes. The plate showed on development the presence of foreign bodies. At this time he told Dr. Kassabian that some doctor in New York City had attempted to radiograph his stomach but failed and had burned him. Dr. Kassabian could not find any trace of injury. About eight months after this he returned to the college, Nov. 27, and gave a demonstration by eating nails and tacks. No exposure was made for radiographic purposes at this time, but for about half of one minute the fluoroscope was used. Of course, from the dates it is impossible that the man could have been incapacitated for 19 months, for it had been but 13 months since the first exposure and but about seven months since the last. It is also absolutely physically impossible that injury could have resulted within the distance and in the time he was under the tube at either exposure. No skin was ever known to have been in the least influenced to the knowledge of the person under such conditions.

That Dr. Kassabian could have erred in this would be quite beyond conjecture. He is one of the most careful workers with the x-rays in this or any other country. He is a student, having mastered the grammar of several languages, he took up the study of medicine, and on the advent of the x-rays began its use for purely diagnostic purposes. No more cautious operator could be found and his statements are weighed with the latitude of a physicist. We take pleasure in presenting the matter briefly as it has come to us.

American Electro-Therapeutic and X-Ray Era, is out with its second number. This issue is an improvement over the first, although the first was a very creditable "starter." The journal is eleven by eight inches, a most attractive size, and will in the future, no doubt, serve for full size radiographs. The matter of the journal is well selected and contains much valuable information. Electro-Therapeutics is so closely woven into the practice of x-ray workers, that we feel certain they will kindly accept the combined art and science in one publication. We, therefore, hope and predict a brilliant future for the *American Electro-Therapeutic and X-Ray Era.*

Roentgen Society.

The following notice, made by Professor Monell, Chairman of Committee on Standards, appeals to all persons whomsoever that have any knowledge on this subject; and commends itself especially to medical men having interest in the attainment of more knowledge. Write to Dr. Monell and give expression on one or more of these subjects.

COMMITTEE ON STANDARDS.

DEAR SIR:

To promote uniformity in results and to secure accuracy and give legal value to the evidence of x-rays, it is necessary to standardize methods of doing the work. To this common benefit all x-ray experts are asked to contribute for the general good of the cause. You are therefore invited to write me your best suggestions on such of the following points as you can offer advice upon:

A standard uniform nomenclature for the principal terms required.

A standard form of record-blank for briefly filing reports aud indicating all essential details of the exposure.

Standard of efficiency for tubes.

Qualities which a standard x-ray photographic plate should possess.

Qualities which a standard x-ray fluoroscope screen should possess.

Standard handle for all x-ray tubes so they will fit a standard tube-holder.

Standard tube-holder to fit uniform standard tube-handle—adjustable, rigid, holding tube without vibration—and convenient for general use.

Standard position of tube for correct shadow.

Standard distance of anode from plate for standard x-ray exposures.

Standard exposure times for chief parts of the body with a standard radiance.

Standard measure of different degrees of x-radiance.

Standard "skiameter."

Standard x-ray examination table, adjustable for all parts of the body.

Standard method of posturing each part of the body for a standard picture.

Standard means of fixing parts immovably during a standard exposure.

Standard complete definition of what a "standard exposure" should be. (Of medico-legal value.)

Standard land-marks to be pictured in the negative as inherent proof that a standard exposure was made—(a medico-legal necessity).

Standard method of localization for both "skiagraphy" and "fluoroscopy," which shall be the most practical, quick and uncomplicated.

Standard technique for picturing correct relation of bones and joints.

Standard technique for picturing details of any kind sought.

Standard technique for picturing contrast for diagnosis of soft parts.

Standard technique for picturing the different calculi, vesical, renal and gall-stones.

Standard technique for x-ray dental diagnosis.

Standard technique for x-ray eye work.

Standard technique for x-ray heart and lung diagnosis.

Standard treatment of plates to develop uniform results.

A standard leaflet of brief directions which the physician who does not do his own developing can send with his plates to any fair photographer as a ready guide to proper treatment of an x-ray negative to secure the picture.

Standard technique for therapeutic administration of x-rays with proper precautions.

You are invited to supply any omitted detail which you believe should be standardized. Will be pleased also to have you select one or more features of the above list in which you have had special experience and make a careful report upon what you regard as the proper standard to officially adopt. A reply is desired in about two weeks. In offering suggestions about standard working methods, postures, special devices, apparatus, etc., it is desirable that you send explanatory camera-photographs illustrating the details for comparison. Thanking you for your professional co-operation in behalf of the committee, I remain, Fraternally yours,

S. H. MONELL, M. D.,
Chairman of Committee on Standards
47 West Twenty-seventh street, New York City.

If you want a fine coil made especially for high grade x-ray work, write to H. W. Dachtler, 1959 Superior St., Toledo, Ohio. His outfit is complete and he offers it very cheap because he is going abroad.

The oval light appearance in the right flank of a radiograph is due to gas in the cecum.

The Medico-Legal Journal of New York City contains many valuable articles in its June issue, but we are sorry to see some comment on the medico-legal aspect of the x-rays.

Investigation of X-Ray Problems.

LISBON, Portugal, June 26, 1901.

DR. HEBER ROBARTS:

Might I beg you kindly to put before the American Congress of Radiology (The Roentgen Society of the United States), the undermentioned list of problems, whose study is at present interesting me, but which I should also like to submit to the inspection and investigation of the renowned radiologists of your country.

Some of these problems have already been propounded and have undergone a certain amount of investigation, but, as yet, are not thoroughly solved:

1st. How, in a Crooke's tube at a certain degree of gaseous rarefaction to measure the influence exerts upon the quality of the x-rays (penetration and intensity*) conforming to a previously fixed standard by the following circumstances:

(*a*) The distance separating the kathode from the antikathode.

(*b*) The size of the kathode and antikathode.

(*c*) Their shape.

(*d*) The length of the spark measuring the discharge within the tube.

(*e*) The thickness of this spark.

(*f*) The number of interruptions in the primary circuit (or inductor), or the number of electric discharges within the tube at one and the same time.

(*g*) The relation between the length (or duration) of the closing (making) and that of the opening of the primary circuit.

(*h*) The total capacity of the tube in cubic centimetres in relation to the distance of the electrodes in line of centimetres.

2d. How, in a Crooke's tube, to estimate the effect produced by the degree of gaseous rarefaction upon the penetration and the intensity of the Roentgen rays?

3d. How, in a Crooke's tube, no matter the degree of rarefaction therein attained, to reduce to a single point the focus of emission of the x-rays placed at the antikathode, in order to attain the best definition?

4th. How to reduce the number of electric discharges within the Crooke's tube to the *minimum* necessary to give the steadiness and brilliancy in the skiascopic screen?

In any case enough time must be given to the closed period of the primary circuit for the thorough magnetic saturation of the core, or in other words, to saturate the electric capacity of the coil.

5th. How to construct a durable coil and one which would give the greatest produce, i. e., with a weak primary current to give a long and a thick spark?

6th. How to establish the standard of the strength of the penetration of the x-rays and its dependence on the qualities of the electrical discharge which produces them?

7th. How to establish the standard of intensity of the x-rays?

8th. How to determine the influence of the time exposure on the intensity of the skiogrammes in relation to the intensity of the utilized rays?

9th. How to create methods which allow of the regulation of the penetration of the x-rays without considerable interfering with their intensity?

10th. How to create methods allowing of regulation of intensity independent of their penetration?

11th. How to determine the absorbing power of the bodies for the x-rays, according to the qualities (penetration and intensity) of these rays?

With the best compliments,

Your faithful

VIRGILIO MACHADO.

*Measured by their effect upon the fluorescent screen, platino cyanide of baryium or upon sensitized photographic surfaces.

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Roentgen Society of the United States.

ANNOUNCEMENT OF COMMITTEE ON ARRANGEMENTS.

The Committee on Arrangements for the next meeting of the Roentgen Society of America have secured, through the courtesy of the Dean and Faculty of the University of Buffalo, the use of as much of its building as we may require. The location is central, the room ample and on the ground floor. The date of the meetings will be Sept. 10 and 11 at the University of Buffalo, Buffalo, N. Y.

The following rules and regulations in regard to exhibits have been adopted by the committee: Applications for space should be sent as early as possible to R. C. Adams, Secretary, drawer No. 963, Buffalo, N. Y., with particulars as to character of exhibit and space needed.

Exhibits may be consigned to Louis Staffeldt, care University of Buffalo, and all express and freight charges must be pre-paid. Owners of goods sent by freight who wish them transferred to place of meeting on arrival, must notify the secretary and send him the pre-paid bills of lading. The cartage will be at expense of owners.

Exhibits are wholly at risk of owners, and should be unpacked and installed by them not later than Sept. 7.

Alternating current 104 volts, single phase, 60 cycles, and direct current 110 volts, will be available, also dark room for photographic purposes. All exhibits must be removed by Sept. 13.

EDGAR B. STEVENS, Chairman.
ROGER COOK ADAMS, Sec., Drawer 693.
DR. JAMES W. PUTNAM,
DR. ELMER E. STARR,
DR. RENNICK R. ROSS,
Committee.

Pus casts a deeper shadow than brain substance and bones denser than pus, yet, paradoxical as this may seem, we can obtain good radiographs of pus in the brain.

Book Reviews.

System of Physiologic Therapeutics.—By Solomon Salis Cohen, A.M., M.D., Professor of Medicine and Therapeutics in the Philadelphia Polyclinic; Lecturer on Clinical Medicine at Jefferson Medical College; formerly Lecturer on Therapeutics at Dartmouth Medical College; Physician to the Philadelphia and Rush Hospitals, etc.; Fellow of the College of Physicians of Philadelphia; Member of the Association of American Physicians; former President of the Philadelphia County Medical Society, etc.

This is a practical exposition of the methods, other than drug-giving, useful in the treatment of the sick. Published by P. Plakiston's Son & Co., 1012 Walnut St., Philadelphia, Pa. Price, eleven volumes, $22 net.

Volume I is written by George W. Jacoby, M. D., Consulting Neurologist to the German Hospital, New York City; to the Infirmary for Women and Children, and to the Craig Colony for Epileptics, etc. *Electrotherapy* is the subject of this book, divided into Part I, Electrophysics and Part II, Apparatus Required for the Diagnostic Uses of Electricity. The first part exhaustively treats of the fundamental conceptions and the realm of electric uses. The second part takes up the uses of the various currents from the sources of their output to their physiologic application. The study of this volume is a systematic teaching of electricity in a phase never before offered. Methods are conceptions new in arrangements, new in manner of expression, and are on a higher plane of classical literature.

Vol. II, *Electrotherapy* (*continued*) is also written by Dr. Jacoby. This book is divided into *Diagnosis*, *Therapeutics*, including special articles, by Dr. J. C. Da Costa, Dr. William Scheppengrell, Dr. F. H. Martin, Dr. Edward Jackson and A. H. Ohmann-Dumesnil. The volumes are richly illustrated, the first containing 163 and the second volume has 80. This latter volume contains an addenda upon electrolysis, cataphoresis and x-ray therapy. The *Parts* into which the entire book is divided: III, Electrophysiology and Electropathology; IV, Electrotherapeutics and Electroprognosis; V, Electrotherapeutics. The chapters are numerous with voluminous headings,

These books deserve close study and invite the investigation of every medical man who values education as an essential to honest practice.

Dental Electricity.—By Levitt E. Custer, B. S., D. D. S. Lecturer upon Dental Electricity in Ohio College of Dental Surgery; member of National Dental Association; member Ohio State Dental Society; member of New York Institute of Stomatology: Honorary member of Kansas State

Dental Society; Corresponding member of Illinois State Dental Society; member of Roentgen Society of the United States, etc. U. B. Publishing House, Dayton, Ohio. More than 50 illustrations, 500 pages, cloth. Price, net $4.

This is the first systematic treatise upon the subject of Dental Electricity that we have had the pleasure of reading. Like all works upon medical electricity, the task explaining the meaning of electrical modes is here undertaken. To the credit of the author he has performed this work well. The modes of electrical application in dentistry is the full purpose of the book; and so far as one can judge, it seems as if a new vista had been opened up to the profession. The style of the writer is simple and plain, so that his meaning is readily understood. The chapter devoted to the x-rays is very good. More is said on the subject of apparatus than is necessary, for there are now so many makes of excellent type all can not be given proper attention. After all, the reader is not able to judge from the description the one he wants. The principles after all, is what he needs.

The book is full of rare and valuable matter. No dentist can consider himself informed that does not possess a knowledge of the facts related in this book. If he does not read the book we do not know where he can easily get the facts. As a physician I find many valuable suggestions.

How to Examine for Life Insurance.—By Frank Ring, M. D., medical examiner for John Hancock Mutual Life Insurance Company of Boston; Prudential Life Insurance Company, of Newark, N. J.; Security Trust & Life Insurance Company of New York. 12mo handsomely bound in silk cloth, over 100 pages, $1.00 net. Charles D. Wilcox, Publisher, 2313 Washington Ave., St. Louis, Mo. The signs of the times are well exemplified in this book. The rapid strides made toward improved methods for diagnosing in the past few years makes it incumbent upon the life insurance examiner to know something more than is found in the text-books and in college teachings. Life insurance companies require of their examiners that they shall be inquisitorial and categorical without betrayal and without giving offense. To propound questions is an art and it is an equal art to weigh their meaning. This aspect of the subject Mr. Ring has briefly covered with a comprehension that can nowhere else be found. The book is a ready reference upon clinical signs and physical diagnosis valuable to all practictioners whether in or out of the insurance examining service. It is a guide in urinary analysis, valuable to all. The author touches upon the uses of the x-rays as a means to assist in arriving at conclusions. In this particular department much more should have been said. The doctor is a member of the Roentgen Society

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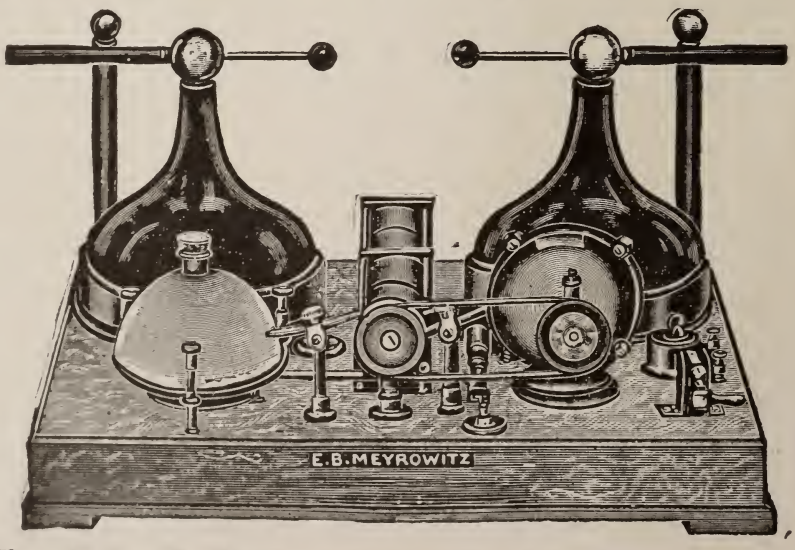

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of the United States and employs the Roentgen rays as suggested on page 105 in his Examiner for Life Insurance.

Etidorhpa.—By John Uri Lloyd, author of Stringtown on the Pike. Dodd, Mead & Company, Publishers, New York City. Richly illustrated by J. August Knapp. Cloth, postpaid, $1.50.

The reader of Etidorhpa is improved in mental vision and in the certitudes that are so mysterious to the untutored who do not read or study or take interest in the realm of ecstatic wonders. The uses of thought and vision so beautifully brought out in this book can not be denied. The clearness of insight in things strange and apparently beyond our grasp, are here clearly traced in a way that the key can be used to broaden our vision. The story is fascinating. It is of high culture and appeals to the cleaner sympathies of man and lives in the truth of science in all its imaginaries. Everybody should read Etidorhpa.

Doctor:

We are successfully treating that class of patients known as **Drug Habitues, Inebriates, etc.** If you have among your patrons those who are using either Opium, Morphine, Laudanum, Codein, Chloral or other pain-alleviating or sleep producing drugs or alcoholic stimulants to excess, and you are not prepared to successfully treat or manage such cases, we would be pleased to have you send them to us. We immediately destroy the demand, the desire and the necessity for these baneful drugs and alcoholic stimulants. The treatment is antidotal, eliminative and supportive. There is no delirium or painful gradual reduction. All patients remain at Sanatorium at least one week without drugs or alcoholics of every description, and are eating and sleeping well, and regain self-confidence before leaving for home. Treatment conducted within ethical lines. Insane not admitted. We have cured cases in nearly every city and state in the union, and can furnish you medical references in or near your locality. We also take pleasure in referring you to leading members of the Memphis Medical Profession. Sanatorium large, light and well ventilated. Situated on beautiful lawn. Electric lights and city sewerage. Massage, electric and vapor baths. First class cuisine. All correspondence regarded as strictly professional and confidential. Address: **Old Homestead Sanatorium, Memphis, Tenn.**

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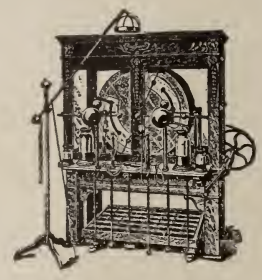

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PUBLISHED MONTHLY BY THE AMERICAN X-RAY PUBLISHING COMPANY.

HEBER ROBARTS, M. D., M. E., Editor.

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CONTENTS OF VOL 9, NO 3

DR. G. P. GIRDWOOD,
Montreal, Canada.
President Roentgen Ray Society of America.

THE AMERICAN
X-RAY JOURNAL.

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VOL. 9. ST. LOUIS. SEPTEMBER. 1901. NO. 3.

DR. HEBER ROBARTS,
St. Louis, Mo.
First President Roentgen Ray Society of America.

The Roentgen Ray Society of America.

It will be noticed that the name of the Roentgen Society of the United States is changed so as to read The Roentgen Ray Society of America. This was made necessary to comply with the Constitution, which admits active members from the continent and especially from Canada, where the society has a healthy contingency.

This society was organized in February, 1900, in Dr. Robarts' office, St. Louis, in response to 100 invitations sent out to physicians by Dr. J. Rudis-Jicinsky, of Cedar Rapids, Ia. A president and secretary were chosen for the temporary organization and a regular meeting fixed for December 13 and 14, in New York City, in the Grand Central Palace. Announcement was made through THE AMERICAN X-RAY JOURNAL and the medical and electrical press everywhere. Voluntary papers were sent to the secretary and a most excellent program prepared. Manufacturers of x-ray apparatus and accessories applied for space and occupied one of the beautiful rooms shown in the cut herewith. The local arrangements were perfected by a committee of which Dr. S. H. Monell, of New York City, was chairman.

At the time this society was launched there seemed to have come over the x-ray world a settling down to quietude and actual work, since but little was then being said or printed on the subject. Many thought the x-ray followers were getting what Napoleon called "real punishment"—a let-alone policy. Subsequent events, however, have proven that the x-ray influence of that time was in a state of incubation. Many professional men had likened the advent of the Roentgen Society, as also they had THE AMERICAN X-RAY JOURNAL, to a dissertation upon the Will-o'-the-wisp. When once said it was all said. Ignis fatuus has mysterious wonders wreathed about its graveyard light, but to repeat the story was punching Judy in the face. The x-rays had crowned the period with astonishment and brought light where no vision hoped to dwell, but the story once told, relief and relaxation would follow with dreamy repose. Time has again shown that the complainer and wrecker fall together,

while the enthusiast and builder go on forever. The New York City meeting was a surprise. It was largely attended with 150 x-ray workers. The papers and proceedings were printed in THE AMERICAN X-RAY JOURNAL, extracts from which have been made in American and European journals.

The officers elected at that regular meeting were: President, Dr. Heber Robarts, St. Louis, Mo.; Secretary, Dr. J. Rudis-Jicinsky, Cedar Rapids, Ia.; Treasurer, Dr. E. A. Florentine, Saginaw, Mich. The president appointed on special committees: Standards, Dr. S. H. Monell, New York City, chairman; Research, Dr. J. B. Murphy, Chicago, chairman; Ways and Means, Dr. J. Rudis-Jicinsky, Cedar Rapids, Ia., chairman; Medico-Legal, Dr. Mihran K. Kassabian, Philadelphia, chairman. Time and place of next meeting was left with the president, who selected Buffalo, and September 10-11 the time. Edgar B. Stevens, E.E., of Buffalo, was made chairman of the Committee of Arrangements, who expended every energy to to furnish the necessities that made the Buffalo meeting so agreeable. Although Mr. Stevens had only recently returned from Europe, the perfect plans effected showed the deep interest he had in the society. The amphitheater and reception rooms of the Buffalo University were given over to us. Notices sent out brought voluntary papers to the secretary in abundance. A program was arranged 15 days prior to the meeting, as follows:

PROGRAM.

Tuesday, September 10, 2 p. m.

The Diagnostic value of the Roentgen Rays with special reference to their application in Medico-legal cases,
DR. MIHRAN K. KASSABIAN, Philadelphia, Pa.

An Examining Frame and "One Minute" Localizer, with demonstrations,
DR. S. H. MONELL, New York City.

How the induction Static Machine can be excited without a separate charger,
DR. JOHN T. PITKIN, Buffalo, N. Y.

The X-Ray in country practice,
DR. JOSEPH C. CLARK, Olean, N. Y.

What the X-Rays show in Actinomycosis,
DR. G. E. FOSBERG, Cedar Rapids, Ia.

X-Ray work in Great Britain, results of a trip,
DR. G. P. GIRDWOOD, Montreal, Canada.

Voluntary Papers, practical demonstrations and inspection of the Exhibits.

Tuesday, September 10, 8 p. m.

President's Address,
DR. HEBER ROBARTS, St. Louis, Mo.

The discovery of the Bacilli in Cancer, Prof. Max Sueller, of Berlin, German University.—Electrotherapy, the safest cure of Lupus Vulgaris—The most recent inventions and improvements in Tubes, Coils, Static Machines, etc. (Illustrated)
JULIUS SILVERSMITH, Chicago, Ill.

Researches in the direction of obtaining Shadowgraphs of the Muscles and ligaments of the body,
H. WESTBURY, Harrison, N. J.

Brief remarks on the therapeutic value of the X-Ray and suggestion on a universal co-operation,
DR. CONSTANTIN V. S. BOETTGER, Ottawa, Canada.

"Some Medico-legal X-Rays," illustrated,
DR. F. WESLEY SELLS, Murray, Iowa.

Investigation of X-Ray problems,
VIRGILIO MACHADO, Lisbon, Portugal

Skiagraphy of the concretions in urine, especially cystine,
M. U. DR. R. JEDLICKA, Chirurgical Clinic, Prague, Bohemia.

Wednesday, September 11, 10 a. m.

Why some mistakes are made in Radiography,
DR. J. N. SCOTT, Kansas City, Mo.

Description of a simple and efficient form of Electrolytic Interruptor,
DR. ELMER G. STARR, Buffalo, N. Y.

The treatment of Cutaneous Cancer by the X-Rays,
DR. G. E. PFAHLER, Philadelphia, Pa.

Use of the X-Ray as a Therapeutic Agent. Illustrated. Demonstration.
DR. H. P. PRATT, Chicago, Ill.

Some Light Rays in Tuberculosis,
DR. J. MOUNT BLEYER, New York City.

X-Ray, an absolute necessity in Dental Surgery,
DR. FRANK AUSTIN ROY, New York City.

Wednesday, September 11, 2 p. m.

The X-Ray Tube,
DR. EMIL H. GRUBBE, Chicago, Ill.

Development in Crooke's Tubes in 1901,
H. WESTBURY, Harrison, N. J.

X-Ray Machinery,
W. C FUCHS, Chicago, Ill.

The Relative Efficiency of X-Ray Generators,
DR. W. A. PRICE, Cleveland, O.

Position in Skiagraphy,
M. E. PARBERRY, St. Louis, Mo.

Turck's Gyromele and the X-Rays in diagnosis of the diseases of the Stomach. Demonstration. Illustrated.
DR. J. RUDIS-JICINSKY, Cedar Rapids, Ia.

Voluntary Papers, practical demonstrations and inspection of the Exhibit.

Committee on Arrangements in Buffalo have plans for entertaining members.

This was strictly adhered to, with slight exceptions. The matter these papers contain is most valuable, and, with some extractions, will be printed in THE AMERICAN X-RAY JOURNAL fast as possible. No one can hope to be acquainted with the recent evolutions of this science and art unless they read and study these papers. Much is lost in not being present at the meeting. The writings were illustrated in many instances and elicited inquiry and an-

swers that writing alone fails to express. Those who attended this meeting were many times repaid for their time and expense. The therapeutics of the x-rays was gone into very fully. The facts brought out must attract wide interest. Methods of using the x-rays for curing malignant disease differed only in technic, but in every instance reports of cures were effected or improvement followed.

This Buffalo meeting was another surprise. The meeting was more largely attended than the most sanguine had hoped. One hundred and five new names were registered and money paid for membership. These, of course, went before the censors. Dr. Roswell Park, one of our older members and one of President McKinley's surgeons, addressed the meeting. Owing to reporters bombarding members and gleaning from dropped words here and there at the interum of sessions, and publishing the same as official, Dr. Heber Robarts introduced the following resolution, which was unanimously adopted:

Resolved: That this society assembled express its deepest sense of sorrow for the recent affliction inflicted upon William McKinley, our President of the United States; that our society has profound confidence in the wisdom and ability of the great surgeons in charge, and condemn any and all unkindly remarks that have, unfortunately, been publicly or privately expressed concerning the uses of the Roentgen rays, relying, as we do, on mitigating circumstances, known to the surgeons only.

Resolved: That a copy of this resolution be stricken off and sent to Dr. Roswell Park, a member of the society.

The new officers elected for the ensuing year are:—President, Dr. G. P. Girdwood, Montreal, Que.: Secretary, Dr. James Bell Bullitt, Louisville, Ky.; Treasurer, Dr. E. A. Florentine, Saginaw, Mich. An Executive Committee, having quite plenary scope, was organized, with Dr. Weston A. Price, of Cleveland, Ohio, as chairman, and Dr. Marsh, of Troy, N. Y., and Dr. Johnson, of Rochester, N. Y., associates. The closing scenes of the Roentgen Society was a veritable panegyric of mental rejoicing.

Can anybody refrain from applauding, yea, more, to sound and herald the merits of this body? To whom is it due? More advance has been made in diagnostic medicine through the x-rays than any previous hundred years. The Roentgen ray has done more to remove the fright of cancer, the dread of lupus and the shame of eczema than the influence of all previous knowledge. Truly, more is in store: excepting the extinct scourges of medieval times, raying is destined to wipe out a wider range of disease by invading the body. Its action is already proven benignly in phthisis, tuberculous joints, kidney diseases—in fact, all affections where bacteria is causative.

The Roentgen Ray Society of America is expected to spread these truths through the medium of its members. But let us continuously look for light—more light, remembering again that it is the builder that constructs—not the wrecker. Our mission is onward, while the destroyers sleep by the wayside. We follow beacon lights in science and forget maledictions. We are reaching out, not blindly into the siftings, but into clearer domains, where the flight of man aspires. We reach for the stars, and our ambition is not fulfilled. The most distant twinklings allure us, and, solving the wonders there, we plunge into the abyss beyond, seeking the unknown. If we are a fraternity, then in union there is strength. Each member is strengthened by the strength of the whole. Then we can better seek the realm of diagnostic medicine—the physicians' goal. So we are seeking the waywardness of man's anatomy, not so much his mentality. We are looking for the cause of man's suffering, quite content with the remedies at hand. We

These cuts show the rooms in which the Roentgen Society of the United States met in first annual meeting, Grand Central Palace, New York City, December 13 and 14, 1900. One room was well filled with exhibits and the other seated for 230 members and spectators.

are already proud of our achievements, of its revolutionizing influences, of the conquering x-rays. Conscious, however, of this reward, we behold a new vista and turn from the proud sense of victories won to the labors that await us. Like receding from the small end of the funnel, the working plane expands. We take up the taper of accumulated past and with the searching light seek untrodden paths. Then, approaching the consummation of our ambition, we can proclaim--

With visions clearer than e'en tears could make
The eyes, whose limit was the violet rays,
We now may see, and things that lie beyond—
Life's mysteries long screened are ours today.

The following is a running clipping from an editorial in the great New York Medical Record. It was written at the time Dr. Shrady, the venerable and accomplished editor, believed the lamented President would recover. He writes:

"The only trouble now from the latter view centers in the present uncertainty as to the location of the bullet. Although believed to be lodged in the muscles of the back somewhere in the lower dorsal or upper lumbar region, there has been no means as yet of proving such a point. Of course, every hope now rests in the probability of the missile becoming safely encysted and consequently harmless. *It is somewhat difficult to understand why, up to this writing, the x-ray, so easily and effectually applied, has not been brought into service.* It would hardly be so much a matter of gratifying curiosity—as remarked by one of the eminent surgeons in the case—as of being absolutely sure of the terminal track of the missile. It is to be hoped that the bullet course behind and beyond the stomach is in a safely closed and aseptic condition. *This would seemingly be the only absolute guarantee against any future trouble from secondary suppurating processes.*"

The italics are our own. Another reference to these lines might benefit surgeons. Is it possible that the last sentence was a prophesy? May it be possible for secondary suppurating processes to have occurred about the bullet, the removal of which at the time of injury would have prevented.

In a recent monogram or reprint, if we remember correctly, Dr. Beck has some radiographs made from clinical cases exemplifying "Possible Error in Skiagraphy." Four pictures are shown, three of which are radiographs taken at different angles and one of which fails utterly to show a fracture, while the other two show plainly that it is oblique. In the December, 1899, issue of THE AMERICAN X-RAY JOURNAL, pages 671 to 674, we argued this point editorially quite fully and diagramatically showed exactly what would occur under certain conditions. Means were pointed out to avoid all possible error. The caption of this article is "Photographs and Radiographs, Proof of Accuracy Essential to Admission as Evidence." We are glad to see that Dr. Beck has had an opportunity to prove this in practice. In this particular case irradiation proved a fracture, without which it would have been accepted as a bruise. Accuracy in diagnosis—positive knowledge, not collateral and circumstantial—is what every doctor needs.

We hope that discussion of the uses of the x-rays in the lamented President's case will not occur. No good can come out of such disputes. As the only x-ray journal in this country we feel it is our duty to mention this since also we are the most deeply interested.

Localization methods were numerous at the Roentgen Society meeting. However, nothing has yet taken the place of the fluorometer for simplicity and accuracy.

STATIC ELECTRICITY.

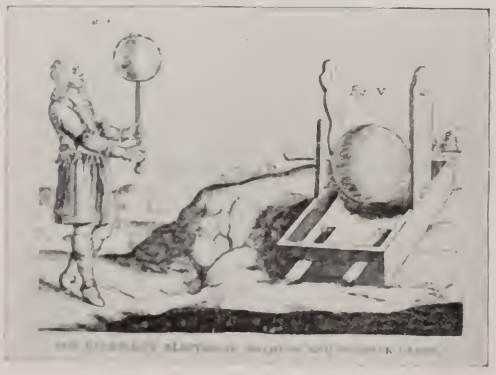
What It Really Is—A Plain Statement Divested of Technical Terms and Misleading Matter.

BY HENRY E. WAITE, M. D.

The claims made by some recent writers on static electricity in regard to their alleged wonderful discoveries are misleading and unauthentic. The discovery of static electricity was made

Inventor of the First Electric Machine, 1671.

over three centuries ago by Otto Guericke, a Burgomaster in Magdensburg, Holland, who invented and manufac-



First Electric Machine, 1671 A. D.

tured the first static machine in 1671. He discovered the principles of attraction and repulsion, also conduction and a spark, his machine being a sulphur ball revolving in trunions. In inventing this machine Guericke discovered all of the currents which have been called by many names since.

The next inventor was Newton, who substituted a glass ball in place of the sulphur one. Later Hawksby discovered the electric glow or electric light and he brought it prominently before the public. Subsequently there were a series of balls used together, and in 1731 Gray made extensive experiments in producing electricity by rubbing a glass rod, and charging bodies suspended by silk ropes.

From that time on various styles were introduced one of which had a glass cylinder, another a glass plate

First Electro-Therapeut in the U. S. 1740.

and these were used until Holtz made his celebrated induction or influence machine in 1856. This remains today the most powerful machine for generating static electricity.

The old writers call attention particularly to their methods of treatment; they will be found to mention a spark treatment, Leyden jar shock, and a brush discharge from points, either metal or wood. Attention is especially called to the method of treating with Leyden jars or a Leyden jar modification mentioned by these old writers, which is called the Lane Electrometer, but which has been claimed by one of

our recent writers as *his induced current* and as having been discovered by him in 1881. These methods were fully described by Cavello, Franklin, Watson, Priestly, Cuthburtson, and by Adams over a hundred years ago.

When the history of the subject is looked into are not the statements of a very prolific writer of the present time, who claims to be the discoverer of induced and wave currents of statical electricity, ridiculously wide of the truth? Subjoined is a quotation from one of the old writers referred to who had this to say over two centuries ago and I quote the following from

ADAMS' ESSAY ON ELECTRICITY, 1792.

By the Electric Friction.—"Cover the part to be rubbed with woolen cloth or flannel. The patient may be seated in an insulated chair, and rubbed with the ball of a director that is in contact with the conductor; or one may be connected with the conductor, and rubbed with a brass ball which communicates with the ground. The friction thus produced is evidently more penetrating, more active and more powerful than that which is communicated with the flesh brush; and there is, I apprehend, very little fear of being thought too sanguine, if I assert, that this, when used but for a few minutes, will be found more efficacious than the other, after several hours' application. Electricity applies here with peculiar propriety to spasm, pleurisy, and some stages of the palsy, and in every case answers the end of blistering where discharge is not wanted, being the most safe and powerful stimulent we know."

By causing a current of the electric fluid to pass from one part of the body, and thus confining and concentrating its operation without communicating the shock.—"Place the patient in an insulated chair, and touch one part of the body with a director, joined to a positive conductor; then with a brass ball communicating with the ground, touch another part, and when the machine is in action the fluid will pass through the required part, from the conductor to the ball; the force of the stream will be different according to the strength of the machine, etc. Or connect one director with the cushion and the other with the positive conductor, and apply these to the part through which the fluid is to pass, and when the machine is in action the electricity will pass from one ball to the other. It is not necessary to insulate the patient in this case."

By the Shock.—"Which may be given to any part of the human body, by introducing that part of the body into the circuit which is made between the outside and inside of the bottle. This is conveniently effected, by connecting one director by a piece of wire with the electrometer, and the other with the outside of the bottle; then hold the directors by their glass handles, and apply the balls of them to the extremity of the parts through which the shocks are to be passed. The force of the shock, as we have already observed, is augmented or diminished by increasing or lessening the distance between the two balls, which must be regulated by the operator to the strength and sensibility of the patient. When the little bottle with the glass tube is used as a common bottle, both wires are to be left there, and the shock is communicated by two directors, one connected with the bottom, the other with the top by means of the electrometer. The operator will often find himself embarrassed in giving small shocks, the fluid passing from the conductor to the ball of the electrometer, instead of going through the circuit he desires; when this happens, which may be known by the chattering noise of the spark in passing to the electrometer, the resistance formed to the discharge is so great, that the fluid can not force its

way through the circuit; to remedy this, and lessen the resistance, pass two metallic pins through the clothing, so that they may be in contact with the skin, which will lessen the resistance, and conduct the fluid." *This is the induced current claimed as a recent discovery.*

By a sensation between a shock and the spark, which does not communicate that disagreeable feeling attending the common shock —"This is effected by taking out the long wire from the small medical bottle, and leaving the shorter one which is connected with the tube in its place, the directors to be connected and used as before. In lessening this vibratory shock the electrometer may be drawn to a much greater distance; for the rapidity with which the charge of the bottle sends forward the charge of the tube, is sufficient to overcome the resistance of a large body of air. The effect of this species of shock, if it may be called one, is to produce a great vibration in the muscular fibres, without inducing that pungent sensation which the shock effects. It is therefore applicable to some stages of palsy and rheumatism; it may also serve as an artificial means of exercise." *This is the wave current claimed as a new discovery.*

By the Bottle Director.—"Insulate the patient, and place the ball in contact with him, by which means this director is charged. Now if the wire is conveyed from the bottom of this to the top of another director, the bottle director will be discharged whenever the ball is brought in contact with the patient, so that by bringing it down with rapidity any number of small shocks may be procured in a minute. Or connect the insulated patient with the top or inside of a large charged jar, and then this apparatus used in the foregoing manner will discharge from the jar, at each spark, its own contents, and by repetition discharge the whole jar; thus a number of shocks may be given without continually turning the machine, or employing an assistant."

By passing the whole fluid contained in the Leyden Phial through a diseased part without giving a shock.—"Connect a director by means of a wire, with the ball of a Leyden jar; charge the jar either completely or partially, and then apply the ball or point of the conductor to the part intended to be electrified, and the fluid which was condensed in the phial will be thrown on the part in a dense flow stream, attended with a pungent sensation, which produces a considerable degree of warmth. If a wire that communicates with the ground is placed opposite to the end of the director, the passage of the fluid will be rendered more rapid, and the sensation stronger. Or insulate the patient, connect him with the top of the jar, charge this, and then apply a metal wire or piece of wood to the part through which you mean to make the fluid pass. It is obvious, that in this case the circuit between the inside and outside of the jar is not completed, therefore the shock will not be felt. The condensed fluid passes in a dense flow stream through the required part, while the outside acquires a sufficient quantity from substances near it to restore the equilibrium."

We shall now analyze the static current and see what it really is. There are only three conditions or rather three states of static electricity: The first one a condition of strain (this is when the apparatus is charging), the second induction, the third a spark. We first fill up something, it may be a Leyden jar, or an insulated patient, and when voltage is of sufficient force to overcome the resistance of the dielectric air, which is between the pole pieces, the spark jumps and it is discharged; and this goes on repeatedly and with a rapidity which depends upon the generating power of the apparatus.

We insulate a patient on a platform which has glass legs; then connect the positive prime conductor of the machine to the insulated platform on which the patient is placed, dropping the other chain on the floor or grounding it to a water pipe, it matters little which. We start the machine in operation, the patient becomes the extended prime conductor and practically that patient becomes the inner coating of the Leyden jar, the glass legs take the place of the glass jar, and a chain dropping from a negative prime conductor to the floor makes the floor the outer coating of the Leyden jar. The sliding pole pieces may now be separated to any desired distance according to the case about to be treated. The operator should always remember that the nearer the balls of the sliding pole pieces approximate the more rapid will be the discharge, there being less resistance to overcome in the shortened air space. As soon as sufficient voltage accumulates to overcome the air space a spark jumps, and with such great rapidity, that it seems almost a continuous spark producing an oscillatory condition in the entire body. It is practically a strain and a release; a push and a pull; filling up and emptying; as, taking a glass of water and pouring it from one glass to the other; charge and discharge.

It may be that only the patient's feet are on the electrode; or his joints may be wrapped in any suitable conductor such as lead, tin, tinsel, or moistened cloth, the whole body is under the influence of the current. Now separate the poles widely and the patient is in a condition of positive strain, which is called static insulation. If we approch the patient on the insulated platform with an electrode held in one hand, we form a spark gap between the electrode and the patient. If we use a pointed electrode we have what is termed a brush discharge; if it is a ball electrode we have a disruptive discharge called the static spark. This may be of greater or less intensity according to the size and material of the ball and the distance from the patient. If the connecting chain is dropped on the floor the current will be mild; if connected directly to the machine it will be very strong; if held in the hand of the operator, so that his body becomes part of the circuit you have a very mild method of application, which allows you to treat the case from any side. This form of treatment is very pleasant to the patient and the one that should be used when beginning static treatment.

By this explanation it will be seen that to have a current there must be a spark gap, which, in this case is air. There is no action excepting that of strain until the spark passes. You must have a spark or else you have nothing but insulation, and this spark depends upon the kind of electrode you use, as to whether severity or mildness of treatment is desired. If you have a conductor in contact with the patient, and a spark gap between the patient and the machine you have a mild effect which does not irritate the skin.

Whether the spark gap is in one place or another the result is the same; it is the make and break of the strain. This was described by Mouduyt in 1784.

I have found that the static machine should be run at a speed varying from fifty to six hundred and fifty revolutions in therapeutics and for x-rays.

The test of a static machine is the length of its spark, the radius, one-half of the diameter of the revolving plates being the theoretical limit that a static machine should give under its best conditions. A few words in reference to leakage of a static machine: A static machine that does not leak will not give a current of any quantity.

Static electricity, so called, or static

Priority, Radio-Therapeutics.

At the Roentgen Ray Society meeting in Buffalo an attempt was made to start a discussion on priority of the therapeutic uses of the x-rays, Dr. Pratt, of Chicago, read a paper in which he alleges to have used the rays as early as April 13, 1896, for the cure of lupus. This certainly was the first effort to so apply the new radiation. In July, 1898, Dr. Hahn, of Hamburg, used it successfully in eczema. Freund and Schiff, of Vienna, used it in lupus in 1897. Dr. Kummell, of Hamburg, used it in lupus and in 1899, same year, published an article upon the subject in the Annals of Electro-Biology. Professor Rieder, of Munich, published his researches on bactericidal properties of the x-rays in 1898 in Medicinische Wochenschrift. He proved its curative properties in lupus, eczema, favus, sycosis and psoriasis. Freund, Hahn and Holland June 15, 1900, published the treatment of 13 cases of lupus in Gesellschaft der Aertze in Mien. Miss Sharp read her experience at the Roentgen Society of London, which was published in Vol. V, Nos. 2 and 4 of the Archives of the Roentgen Rays.

Becquerel Rays.

The preparations styled radio-active barium and radio-active bismuth refer to polonium and radium, respectively, compounds discovered by Madame Curie. By elimination and selection she isolated these from uranium and thorium ores, particularly the Bohemian pitch-blende. It requires several hundred pounds of this to obtain a few grains of the highest efficiency of radio-activity. When put in a small glass tube and covered, one end, with paraffined paper, they would emit invisible rays, behaving like the x-rays. Four inches from a plate, after 30 minutes' exposure, the shadow of the hand was observable, but not the bones. However, a piece of metal could be seen through the hand. The screen fluoresces with Becquerel rays but too feeble for practical irradiations. F. Giesel, of Brunswick, has recently obtained in very small quantities slightly superior radio-activity.

One feature of the x-rays was well shown at the Buffalo meeting of the Roentgen Society in that we are in a condition of evolution. The science is not fixed, but with all its marvelous strides already made useful to man, it is fast growing. Apparatus exhibited at the New York meeting show at the Buffalo meeting great changes. This is especially the case in simplicity of working parts and the controlling machinery.

The October issue of THE AMERICAN X-RAY JOURNAL will contain some illustrations of the therapeutics of the x-rays especially as it pertains to malignant growths. Clear description of the method of using the x-rays in these cases will be given. The importance of this matter is so great the editor will answer personal inquiry assisting others in raying.

There are now several women members of the Roentgen Society of America.

Antikamnia and Heroin Tablets.

This is a new combination tablet containing five grains of antikamnia and one-twelfth grain of heroin hydrochloride (muriate) and the medical profession is so well acquainted with the two drugs composing it that it is needless to go into their respective histories. These tablets, aside from their use as a respiratory stimulent, sedative, analgesic and expectorant have been found an excellent remedy for the relief of pain and also a valuable anti-spasmodic in whooping cough. They are an efficient analgesic in the neuralgias, especially in sciatica, trigeminal and intercostal neuralgia. In the treatment of the morphine habit they are said to be of highest value. They constitute the safest and most efficient remedy in the treatment of cough, dyspnoea, phthsis, bronchial and laryngeal affections, emphysema and pneumonia. They have also been employed with very great success in hay fever, coryza, etc.

Administered for the *severe pains* of rheumatism, gout and lumbago, as well as for the light-

ning pains of locomotor ataxia, there is no quicker and more lasting remedy.

To adults they should be administered in one tablet doses, repeated every two, three or four hours, as indications warrant. Children according to age. A method which is preferred by many practitioners, particularly in respiratory ailments, is to direct patients to allow the tablet to slowly dissolve on the tongue, swallowing the saliva as the solution of the tablet progresses.

Book Review.

Webster's International Dictionary, of the English Language with a *Supplément* of 95,000 words and phrases by W. T. Harris, Ph. D., LL. D., Editor in Chief, Springfield, Mass. Published by G. & C. Merriam Company, 1900.

This is certainly the most nearly perfect lexicon of the English language. The book now comprises more than 2,200 pages. In addition to the usual lexicographic contents, there are nearly 400 pages devoted to a Dictionary of Noted Names in Fiction; A Pronouncing Gazetteer; A Pronouncing Biographical Dictionary; Pronunciation of Scripture Proper Names, of Greek and Latin Proper Names; A Vocabulary of Common English Christian Names; Quotations, Words, Phrases, Proverbs and Colloquial Expressions; Signs used in Writing and Printing; Selection of Pictorial Illustrations embodying the flora, fauna, science and art; Guide to Pronunciation; List of Words Spelled in Two or More Ways; List of Amended Spellings, and Abbreviations, together with other information.

This dictionary is an improvement upon all former editions. The newer words and phrases brought about by the recent intermingling of dissimilar races, due to war and unprecedented commercial energy throughout the world, is herein found. Nowhere else can these be found. The definitions of words are ample, clear and concise. Every person who regards knowledge must appreciate the superiority of the International Dictionary.

The cheaper books styled Webster's Dictionary are makeshifts and must disappoint and chagrin the buyer, for the definitions are often defective, many words absent and type and binding cheap. It is more difficult to purge the mind of false teaching than to learn correctly. Webster's International Dictionary will not burden the mind with unloading.

Mr. Puffer, manager of the Rochester Fluorometer Co., has reduced the price of the fluorometer from $100 to $50, which includes their fine operating table. They have also an improved apparatus, with which the fluorometer can be used with any table or on the floor, and is now sold at a very reasonable price.

The Kinraide High-Frequency Coil.

The best apparatus for use with the direct or alternating current.

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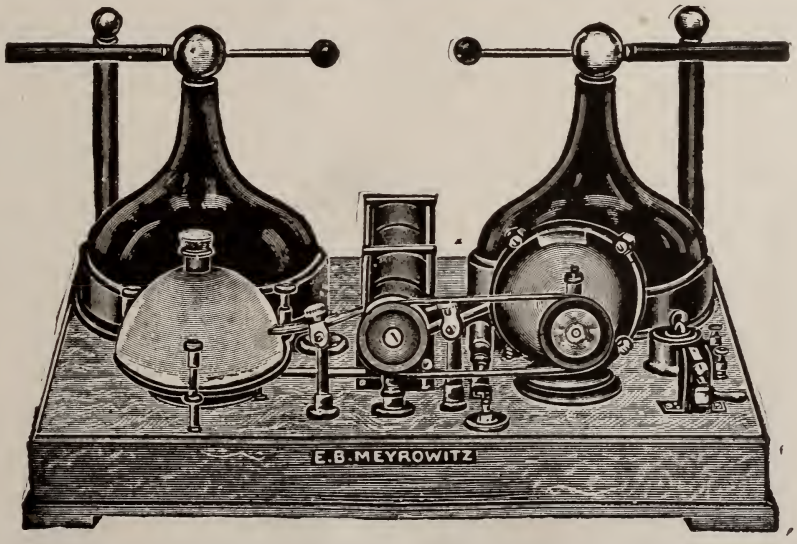

E. B. Meyrowitz,

Maker of Ophthalmological Apparatus, Complete Standard Electro-Therapeutic Equipments. X-Ray Apparatus and High Grade Eye, Ear, Nose and Throat Instruments.

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Chemical Building.

THE AMERICAN X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

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J. RUDIS-JICINSKY, M. D.

Cedar Rapids, Iowa.

Retiring Secretary of Roentgen Society of America,

Whose potent service made this organization a success.

THE AMERICAN
X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. 9. ST. LOUIS, OCTOBER, 1901. NO. 4.

A Letter.

We are in receipt of a letter from Dr. Carl Beck, of New York City, dated September 23, 1901, in which he writes:

"DEAR FRIEND DR. ROBARTS:

"I received the JOURNAL this morning and hasten to congratulate you on the successful meeting at Buffalo. It is especially gratifying to me to see that you have elected a splendid set of officers and whatever I can do to encourage others to enter the society, shall be done. The only feature I do not like at all is that you did not accept the presidency again. The best men of the society have not done one-tenth as much as you did to build the society up under the most difficult circumstances. If I would have been able to follow my intention to be present I would have given expression to these feelings of mine. But I still had to be in the White Mountains at the time and had to take care of my burned hands. I experimented with new tubes of great power and am quite sure that it was my own fault that I was injured."

Constant readers of THE AMERICAN X-RAY JOURNAL will recall the studious effort of the editor to suppress all flattery of himself or personal mention where it could be avoided. But there is a far-reaching motive in this reference that will be understood by many now and by all a little later. Of course, all publishers and editors have received praiseworthy notes and compensating ones containing the venom of the culprit. With us it matters personally but little, for praise and calumny strike us about alike. Mr. Lincoln said that "When you come to rub up against men you find them about alike." If there is any break in this rule it is in consanguinity.

Dr. Beck writes from the heart, believes what he says and writes what he thinks. He is an enthusiast and a builder. He has written inductively upon the x-rays and done more to spread its correct teachings than any doctor at home or abroad. His book upon "Fractures" is classic and is the first effort of the kind by any surgeon. A doctor can not hope to be familiar with the modern practice of setting fractures without this book for reference. He has written scores of articles on surgical procedure with the x-rays as the surgical impliment for accurate diagnosis. It is no flattery to him in particular, but to the great domain of the sciences, to say that he has done more to arrive at a correct method of surgical diagnosis than any living man. Of course, from the first issue he has always been a close reader of THE AMERICAN X-RAY JOURNAL. The many egregious errors and recoiling mistakes made by men that have grown strong in other departments is due to lack of proper reading and the pratice of its precepts. Dr. Beck has evaded these mistakes. His counsel at the meetings of the Roentgen Ray Society will be most valuable.

The newly elected president of the society is one of its most enthusiastic workers. Dr. Girdwood cut short his European trip to be present at the Buffalo meeting. When asked to give expression concerning the treatment of Mr. McKinley, by newspaper reporters, he instantly replied: "See the doctors in the case. I am not in the gossip

business." His discussion of papers always drew closest attention. He is scholary, dignified, and kind and was the best material for president. He need not, and it is now not necessary to write letters every day in the year, neither will he need to question himself: "Am I a missionary or a financier?"

Going back to Dr. Beck's letter, he adds:—"I trust you will appreciate the spirit of admiration for the great strides of the profession in this country, in which to participate, I believe, is one of the greatest privileges of mankind. In a decade men will wonder why the x-rays had to beg for admission into the hearts of the profession—what fools those mortals be! And among the best your name will shine in the foreground then."

In The American X-Ray Journal for September, page 967, we referred to Dr. Beck's reprint, "Possible Error in Skiagraphy" and called his attention to an editorial on pages 671-674, the title of which is "Photographs and Radiographs, Proof of Accuracy Essential to Admission as Evidence." The doctor reminds us that two months previous to this editorial he had advanced the same points before the German Medical Society of New York City, October 2, 1899, a record of which is made in New Yorker Medicinische Wochenschrift. We diagramatically showed methods for correcting distortions and reasons inaccuracies accompanied x-ray operators. Subsequently a Western New York doctor claimed priority, but he has shown nothing in evidence.

In this connection it is interesting to note that Dr. Kean, who was formerly frowning on the x-rays, is now one of its most enthusiastic supporters. So it is seen again that the devotee has encouragement. As we have before said: "The complainer and wrecker fall together while the enthusiast and builder go on forever."

Recovered Case of Lupus.

The electro herewith shows a condition of a patient after being cured of Lupus by the x-rays. The young lady gave a history of malignancy in mother and grandmother. The disease had been of 18 months' origin and spread rapidly over nose, inner canthus of both eyes and considerably over both cheeks. She had been treated with "paste," which denuded the parts and left scar tissue and prominent blood vessels. The disease rapidly recurred and at the

time she went under x-ray treatment could not sleep on account of pain. She was greatly emaciated.

A large German tube with a large static machine was employed, and 49 exposures were made. The tube was made to show articulations of the joints of the hand four feet away. Exposures were made daily of 12 minutes' duration, 10 inches from the face, the healthy tissue being protected with ½-inch surgeon's felt and a lead-zinc screen. Pain entirely ceased on the 10th day and never returned. The entire wound healed on the 40th treatment. The prominent blood vessels and scar tissue had greatly diminished on the 49th exposure, when the patient left for her home, 300 miles away. One year after, she wrote: "I am entirely well. The veins and scars

are gone and no one can tell that I ever had a disease. My health was never better than now." In treating this case no local nor constitutional medication was used. The picture was taken at the time she wrote the above lines. No picture was made when treatment began. Dr. Wm. Mayfield, of this city, sent the patient to the St. Louis X-Ray Laboratory for treatment.

Diagnosis of Renal Calculi.

A paper upon this subject was read by Dr. F. D. Carpenter, before the San Francisco Medical Society and is printed in full in the September issue of *American Journal of Surgery and Gynecology*. It is worth reading. Dr. Carpenter has not had much experience with the x-rays in these cases and frankly says so, but concludes his paper: "The abdomen is the most difficult portion of the body to x-ray, yet I believe that sooner or later this will be one of the established means of confirming the diagnosis." It is possibly not strange, that all writers referring to the rays, whose work with it has been limited, invariably speak hopefully of its future. If all readers would rightfully understand that the author of an article only expresses his personal judgment, then less confusion and false opinions would gain ground. Dr. Carpenter writes: "I believe sooner or later this will be one of the established means of confirming the diagnosis." It is a fact if this had been written early in 1896 it would have been timely and optimistic. But it was read before the society in April, 1901, four years at least, after the facts "I believe," were established beyond controversy throughout the civilized world. Nobody acquainted with the facts has, for several years, questioned that the x-rays has "established means of confirming the diagnosis" of stone in the kidneys.

Roentgen Rays in Military Surgery.

This is the title to a paper read by Dr. J. Hall Edwards, of Birmingham, England, before the British Medical Association, August 1, 1901. Dr. Edwards has been in South Africa as Surgeon Radiographer to the Imperial Yeomanry Hospital, throughout the entire Kingdom, and wherever the x-rays are used, Dr. Edwards' name is classic. He has done more to harmonize the surgical classes with uses of the x-rays than any other one surgeon in England. It is interesting to note that, though so much was written concerning his ingenious bicycle for charging the accumulators he pronounces it a complete failure. He says: "The Kaffirs took great interest in the proceedings, so I let them have a turn, but they soon gave in and lost all further interest in the object which had so bewildered them. I have no hesitation in saying that the bicycle arrangement is a failure, and that the machine I had so carefully designed is a monument of misplaced confidence."

He applauds the electrolytic interrupter above all other designs. The doctor, in one sentence, says a good deal, which must be very offensive to the American writers on the "inaccuracies" of the x-rays. It is this: "Professor Roentgen's discovery has placed in the hands of military surgeons an 'accurate' method of diagnosing of inestimable value."

Among the interesting cases cited the one of Mr. A. D. Fripp is exceptional. A Mauser bullet was located in the spinal column; a laminectomy was performed and a bullet removed with the greatest possible success. On admission the patient was paralyzed in both legs and had lost control over bladder and rectum. The removal of bullet alleviated the symptoms. "I am pleased to say," Dr. Edwards writes, "that at the

present time the patient can move about with the aid of sticks and has a fair chance of complete recovery." This case had been brought to the hospital from Mafeking after the relief, where the x-rays had been used for the purpose of locating the bullet with complete failure. Localizing instruments were used in all cases. This is most important. Strange, an ex-president of our American Medical Association was not able to use accurate localizers. A case is in point. We quote from the words of Dr. Edwards: "In no case was a bullet missed after a localization had been made; although in one case I think it would have occurred had I not been present at the time of the operation. In this case a man was brought in with a suppurating wound over the patella of the knee, and a history of having been operated upon for the purpose of finding a bullet, the presence of which had been demonstrated by the x-rays. Several weeks were allowed to elapse before anything could be done. When the wound was quite healed a localization was made, and as it was thought advisable to remove the bullet, an operation was arranged for. The surgeon cut down under the localizing marks until the surface of the femur was reached, and no signs of the bullet being visible, he arrived at the conclusion that some mistake had been made in the localization. A careful inspection of the bone led to the discovery of a minute crack immediately under my marks, and upon my advice the surgeon removed a small piece of bone with a chisel, when the nose of the bullet at once became visible and the missile was removed. Had I not been present at this operation, the search might have been once more abandoned and the case might have been handed down to posterity as a glaring example of the uselessness of the x-rays. The failure to find the bullet on the first occasion was undoubtedly due to a want of knowledge of, and sufficient confidence in the possibility of the x-rays."

I desire to quote again from Dr. Edwards. This case has points of interest that may help some surgeons where they are pinched for adequate reasons for not removing a bullet at the time of the operation. I have been exactly in this situation:

"Another exceedingly interesting case, and one which points to a moral, was one which came under the care of my friend, Mr. H. A. Ballance, of Norwich; and it is with his kind permission that I mention it here. It occurred in the case of a man who had an entrance wound three-quarters of an inch in length, situated half an inch to the right of the middle line of the back, on a level with the sixth Dorsal Spine. There was a tender spot in front, about the middle of the second right Costal Cartilage. An examination with the fluorescent screen showed the presence of a shrapnel bullet. This was localized with some difficulty, owing to the movements of the chest wall, at a depth of one-and-a-quarter inches. As the man was exceedingly well nourished, and was very muscular into the bargain, a discussion took place as to the whereabouts of the missile. A re-examination with the fluorescent screen showed that the bullet moved very slightly during the acts of inspiration and respiration, and that the movements coincided with those of the chest wall and not with those of the lung. It was thought, and in all probability the bullet had just penetrated the lung, and that an inflammatory area had been set up, causing adhesions. At the operation, Mr. Ballance resected portions of two ribs, when, after a slight dissection, the presence of the bullet could be detected with the finger. During the examination, however, the lung suddenly collapsed, carrying the bullet with it. On inserting the finger into the chest, the bullet could be distinctly felt on the

surface of the lung; but could not, for obvious reasons, be removed. The wound was stitched up, and dressed, and the patient sent back to his bed. In ten days' time it was found that the lung had again assumed its normal condition, and it was decided to once more operate. The wound was reopened, and the bullet was removed without the slightest difficulty—new adhesions holding the lung in position. In this interesting case, I very much doubt if the use of Wheatstone's Stereoscope would have helped us very much, as the bullet, although embedded in the lung, was situated at such a short distance from the ribs, that even under these conditions its exact locale would have been to a great extent a matter of speculation."

Prior to the commencement of the war, Dr. Edwards writes: "Few members of the Royal Army Medical Corps had received any training in this most important branch of military medical work; and most of those who had undergone a course, freely admitted that it was inadequate to give them a complete knowledge of the subject."

Becquerel Ray Burning.

THE AMERICAN X-RAY JOURNAL has previously alluded to the burn Becquerel accidentally received from radium. The *Electrical World and Engineer*, N. Y., Sept. 14, observes on this subject: "In addition to the ordinary sunburning which is prevalent in the northern hemisphere about this time of year, and is sought by giddy girls or callow boys, we have arc light burns, x-ray burns and Becquerel ray burns. It seems likely that the action in each of these cases is similar, but a careful comparative investigation into the differences of action would probably be both useful and interesting. While the sun burns at a distance of ninety-odd millions of miles, the arc light and Crooke's tube act at a few centimeters, and radium at a few millimeters."

Reasons Not Facts Altogether.

At the Roentgen Ray Society at Buffalo, a manufacturer of x-ray machines and a member of the society, complained that THE AMERICAN X-RAY JOURNAL published a radiograph of the arteries of the pelvis and failed to give ways for making such an x-ray picture. He contended that nothing should go into THE JOURNAL without an adequate explanation. The point is well taken. In this particular instance of the hip we prejudged possibly too much, for it seemed at the time that everybody would know it was an injected subject. Occasionally light shadows of normal arteries are shown, but no one has thus far been able to control radiance to the degree of repeating the picture in the manner and certainty of showing bones. Some newspaper articles have appeared exploiting such a discovery, but the truth is not apparent. A case in point in the Sept. 21 number of the *Philadelphia Medical Journal*, "On the treatment of Women's Diseases by Electricity," extracted from a paper read before the Society of Gynecologists, St. Petersburg, by Dr. A. N. Alexandroff. The extraction relates 14 cases of oophoritis, 6 cured; 10 of salpingitis and 3 were cured; 12 cases of parametritis and 11 cured; 5 cases of perisalpingitis and 4 cured, and several other diseases mentioned, but not a word on nature of the current or method of application. Of course, such tables are practically worthless without the details for imitation and judgment. Distance lends some credit to the report, for wise men are far and divine. The same sort of a report from a home doctor would hardly find room in an American journal.

The Treatment of Cutaneous Cancer with the X-Rays.

Read before the Roentgen Society of America, University Building, Buffalo, N. Y., Sept. 10, 11, 1901,

BY GEORGE E. PFAHLER, M.D.,
Assistant Chief Resident Physician and Skiagrapher to the Philadelphia Hospital.

The following cases came under my observation in the Phialdelphia Hospital, and the results obtained from the use of the x-rays have been sufficiently encouraging to justify me in placing them on record. I take this method of doing it, trusting that the society will be interested.

Case No. 1 was a white woman, age 70, admitted to the hospital July 5, 1900, for senile dementia. Her family history was negative. Twelve years ago a small sore developed upon the nose beneath the bridge of the spectacles. A crust soon covered it, but as fast as it formed it was removed, each time leaving the ulcer a little larger. The ulcer had increased in size more rapidly during the past year. This was specially noticeable during her stay in the hospital. Her mental condition improved and she was transferred from the detention ward to the skin ward. The growth upon her nose was diagnosed as cancer by the visiting surgeons and dermatologists, and was considered inoperable. After consultation with Dr. Stellwagon, the dermatologist on duty, we decided to expose the growth to the x-rays.

At this time the ulcer involved the entire base of the nose, was 3.5 c. m. in diameter, and extended into the inner canthus of each eye, as is shown in the photograph.

Treatment was begun Febuary 12, 1901. A leaden mask was made to cover the entire face except that portion which was involved by the cancer. Exposures were made on alternate days, for ten minutes each day, at a distance of about 25 c. m. from the tube, and with a current strength of ten amperes. A soft light was used from a tube with a vacuum corresponding to a parallel sparkgap of about 4 c. m.

The first effect produced was a drying of the secretions, which was noticed after two days. Then a crust formed, and the edges assumed a healthy appearance. After two weeks the ulcer began to heal from the edges toward the centre, and in three weeks was 1 c. m. less in diameter. In three months the ulcer was reduced to .5 c. m. in diameter and was replaced by healthy scar tissue, excepting the right inner canthus which was much improved, but not yet healed. I regret that a photograph was not made at this time. She then had an outbreak of insanity, and treatment had to be suspended. This condition of affairs has been recurring since, and her general health has failed, so that at the present time the ulcer has again reached its original size.

Case No. 2. W. S., male, age 57,

white, was brought to the hospital October 29, 1900, suffering from general paresis. One sister died of carcinoma and one of phthisis. Otherwise the family history was negative.

Four years ago a small warty growth developed at the inner canthus of the left eye. This increased progressively in size and soon ulcerated. A diagnosis of epithelioma was made and treatment begun March 8, 1901. At this time, as his photograph will show, the cancer had

involved the inner canthus of the left eye and both lids, to the extent of two-thirds of the palpebral fissure. It extended downward to one half the extent of the nose. One of the left submaxillary glands was involved. The same technique was used in the treatment of this case as in the former one.

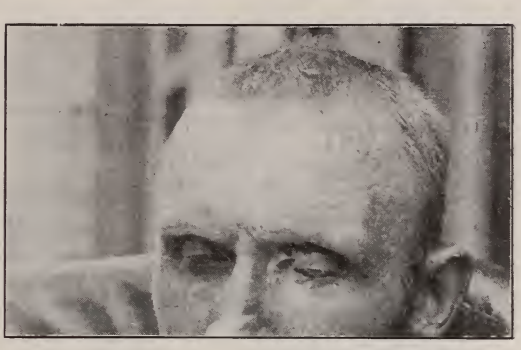
After the first two exposures a diminution in secretion was noted, and after one month the lower portion of the growth had been replaced by apparently healthy skin. There was a gradual improvement, despite the fact that the patient's general condition was growing progressively worse. On account of the difficulty in handling him, the intervals had to be increased, but by July 11, the open surface was reduced to .5 c. m., and this was granulating. The epithelioma had been replaced by what appeared to be healthy skin, except the margin of the open surface, which was thickened. The indurated submaxillary gland had disappeared. I expected him to be well of the cancer in a week or two, when he died of one of the episodes of general paresis on July 17. The accompanying photograph will show the condition at this time.

I would like to add that in this case it was impossible to shield the eye completely, but no bad results followed, not even a conjunctivitis. This patient had in all 34 exposures.

Case No. 3. D. H., male, age 70, white, one of our workmen. One sister died with a growth about the knee which had existed five years. Otherwise the family history was negative.

Four years ago a small papule appeared upon the right lower eyelid. This never disappeared, but as fast as a crust would form it would be torn off, each time leaving the growth a little larger. During the past year it has increased more rapidly in size. A diagnosis of epithelioma was made by one of our surgeons, a dermatologist, and an opthmologist, and treatment was begun April 26, 1901.

At this time an elevated growth with an ulcerating surface occupied one-half



of the central portion of the lower eyelid. In this case the same technique was used as before, except that I allowed the interval to be governed by the effect produced, and varied from one to nine days. In each instance I allowed the inflammatory reaction to disappear before renewing the exposure. It was completely healed in two months, after nineteen exposures, and has remained healthy during the past two and one-half months. The epithelioma has been replaced by healthy skin, and a scar not more than 1 mm in width, which is freely movable. This covers a groove which indicates the site of previous destruction of the deeper tissues. The result obtained in this case is shown by the photograph taken two months after beginning treatment.

I have treated three other cases all of which show improvement, but are not yet well.

I regret that owing to the fact that the sections made from the cases reported above were poorly preserved, the pathologist was unable to make a satisfactory examination. The cases were shown, however, to the Dermatological Society of Philadelphia, on May 21, when no question was raised as to the diagnosis. Dr. Kascher, one of the resident physicians, very kindly made the photograph for me.

I am not the first to use this method of

treatment, but began independently, before I had read the only report already made.

The literature on the subject is very meager, and consists of a few isolated preliminary reports from men who have begun the treatment at about the same time, and apparently worked independently.

The first report that I find on record is that by Johnson and Merrill, of Wash-

ington D. C., published in the Philadelphia Medical Journal, December 8, 1900. They began treatment September 6, 1899, upon a man who had a recurrent epithelioma of the left cheek. Exposures were made every other day until fifteen were given.

The first result of the treatment was a diminution in the secretion and a firmer crust. Six months later a healthy scar had replaced the ulcer. Their second case was an epithelial cancer of the nose, the diagnosis being confirmed by microscopical examinations. Treatment was begun February 17, 1900. Exposures were made on alternate days of ten minutes each. Treatment had to be interrupted twice on account of dermatitis, but in six weeks nearly the entire growth had been replaced by healthy tissue. Since this report has been published I learn that they have treated an epithelioma of the lower lip, a recurrent carcinoma of the breast in which they noticed lessening in pain and slight diminution of the size of the tumor, also two cancerous growths on the nose, with success.

In The British Medical Journal, February 9, 1901, we find a preliminary report of twelve cases of rodent ulcer treated by Dr. James H. Sequira, of London. A patient was sent to him for the Finsen Treatment, but not being able to stand the pressure of the apparatus, treatment was begun by the x-rays, August 9, 1900.

The ulcer had been in progress eight years, had been operated on four times, and four years ago had been deemed unfit for further operation. The ulcer extended from the posterior surface of the auricle to within a short distance of the external occipital protuberance. At the junction of the scalp with the posterior aspect of the ear, the ulceration was very deep, and the ear itself was invaded, so that there appeared to be every probability of these parts separating should the disease extend further. Microscopical examination proved it to be rodent ulcer. At the end of one week the discharge was less, and the ulcer cleaner and somewhat shallower. At the end of thirteen weeks the ulcer was practically healed.

His second case was a rodent ulcer

involving the inner canthus of the right eye, and part of the nose and cheek. This was completely healed in about two months, and at the time of the report, two months later, the scar was perfectly sound. Of the twelve cases treated by Sequira, eight were still under treatment, and four under observation, the ulcer having been entirely healed. The treatment consisted of daily exposures of ten minutes each, with the tube at a

distance of 15 c.m. from the ulcer, with a 10-inch coil, and a current of 3-4 amperes.

Dr. Stenbeck, of Stockholm (1) reports a case upon which he began treatment September 15, 1900. His case required thirty-five daily sittings, of ten minutes each, at a distance of 10 c. m. The scar was still healthy one month after treatment.

In the Boston Medical and Surgical Journal of January 17, 1901, Dr. Williams expresses himself favorable to this form of treatment of cancer, and reports improvement in cases under his care.

Dr. Andrew Clark reports in the British Medical Journal of June 9, 1901, a remarkable improvement in a case of chronic carcinoma of the breast. The induration as gradually fading, and the auxiliary glands decreasing in size, the pain diminishing, and the general condition of the patient improving. Exposures were made five days in the week, and continued from ten to fifteen minutes. In all the cases treated the pain has been diminished or relieved, the growth diminished or removed, and the general condition of the patient improved. In no case now on record did any serious x-ray burn result. No other treatment was used in any of these cases.

The medical profession today recognizes that cancer can be cured when localized in a region favorable for operation. Many patients, however, even in favorable cases, on account of fear of the knife, or painful caustics, postpone operation until glandular involvement has taken place and all hope for cure is lost. Having now at hand an agent that is not painful, but soothing and yet effectual, we have removed the most cause for delay, and can recommend its use in all such, and in all inoperable cases. Let us then add our little mite toward bringing this common, insidious, and most loathsome disease under control.

Philadelphia, Pa.

The Treatment of Congenital Club Foot.

Dr. James K. Young, Professor of Orthopedic Surgery, Philadelphia Polyclinic, in the *International Medical Magazine* for September, writes:

"(5) *Astragalectomy*. The removal of the astraglus is the best operation where it is necessary to correct very severe cases, but it should not be undertaken if the patient is under seven years of age, unless the bone is very greatly deformed. If the patient is treated from birth as recommended, and if multiple tenotomy with manual correction is performed early, it will seldom be necessary to resort to astragalectomy, unless the astraglus is very greatly deformed. Skiagraphs are of great value in determining whether the astraglus will fit in between the two malleoli. If this bone is so much deformed that it can not be replaced after the soft tissues have been divided, it will be necessary to remove it, and this may now be frequently dererminded before the operation is begun by means of x-ray photography. After the astragalus has been removed it is always necessary to cut the tendo achilles."

Every doctor and every scholar taking pride in knowledge of the Roentgen Rays reads THE AMERICAN X-RAY JOURNAL. It is for this reason Elihu Thomson, Wm. Meadowcraft, Nikola Tesla, Carl Beck, J. B. Murphy, Roswell Park and the class that make history read THE JOURNAL.

Dr. Cummings, in *Practice and Review* for July, voices the teachings of THE AMERICAN X-RAY JOURNAL long ago expressed, that error in determining urinary calculi is due to "faulty technique and inability to correctly interpret the skiagraph and not to the method itself."

Inconsistencies.

It is most gratifying to note that the firm stand taken by THE AMERICAN X-RAY JOURNAL many months ago against the inconsistencies of writers upon the "Inaccuracies of the X-Rays," has silenced all such pretenders. Writers are now appearing in the assumed garb of originality, disclaiming the possibility of inaccuracies of the x-rays. Continue to write, brothers; it is possible everybody has not read THE AMERICAN X-RAY JOURNAL.

Dr. George G. Hopkins, in the *Philadelphia Medical Journal*, is writing a most interesting series of articles entitled, "Light and Radiance in the Treatment of Disease." There is one paragraph we wish to refer to: "The x-rays has been and is being tried; but as it has so much bony substance to pass through before reaching the diseased structure within the chest, there is great danger of doing damage to the superimposed tissue of the chest, if sufficiently hard tubes are used to penetrate the diseased lung." The records do not show damage done to the chest when sufficiently hard tubes are used to penetrate diseased lungs. The rays do not kill the germ in the manner of germicides. There is a reaction established by the rays, which empowers nature to do the work of establishing health when there was disease. The vis medicatrix nature is the power brought out and enthroned. The phagocytes are here in evidence.

Book Review.

A Treatise on the Acute Infectious Exanthemata, including Variola, Rubiola, Scarlatina, Rubella, Varicella and Vaccinia, with Especial Reference to Diagnosis and Treatment, by William Thomas Corlett, M. D., L. R. C. P., London. Professor of Dermatology and Syphilology in Western Reserve University; Physician for Diseases of the

METHOD OF CUTTING OFF UNNECESSARY RAYS WHILE TREATING CANCER.
St. Louis X-Ray Laboratory.

Skin to Lakeside Hospital; Consulting Dermatalogist to charity Hospital, St. Alexis Hospital, and the City Hospital, Cleveland; Member of the American Dermatological Association, and the Dermatological Society of great Britain and Ireland; Illustrated by 12 Colored Plates, 28 Half tone Plates from life, and two Engravings, Philadelphia. F. A. Davis Company, Publisher, 1901.

For the young practitioner of medicine and for the older, whose experience has been interrupted from constant clinical experience with the infectious exanthemata, this book is especially needed. At the outset there is a brief history of the original source of these diseases, covering nearly 30 pages. It is a most interesting account, dating from the earliest period in all nations of the earth.

Definitions, Varieties, Symptomatology, Etiology, Diagnosis. Prognosis and Treatment are each subdivided into distinct head-lines giving a variety of catch-attention that betrays an essential feature, The subjects are illustrated with colored and half tone plates in constant evidence of description. The book is richly printed and substantially bound, covering about 400 pages. Infectious diseases are lessening in the civilized races, and the type is somewhat modified, probably due to sanitation, disinfection and isolation, making diagnosis the more difficult. The writer only recently saw a case that had been diagnosed smallpox, and was confirmed by two older practitioners. The patient was quarantined and his residence displayed a red flag. The patient defied the authorities and his doctors and sought additional advice. The case was a simple form of impetigo. A perusal of this book would have negatived variola at the beginning.

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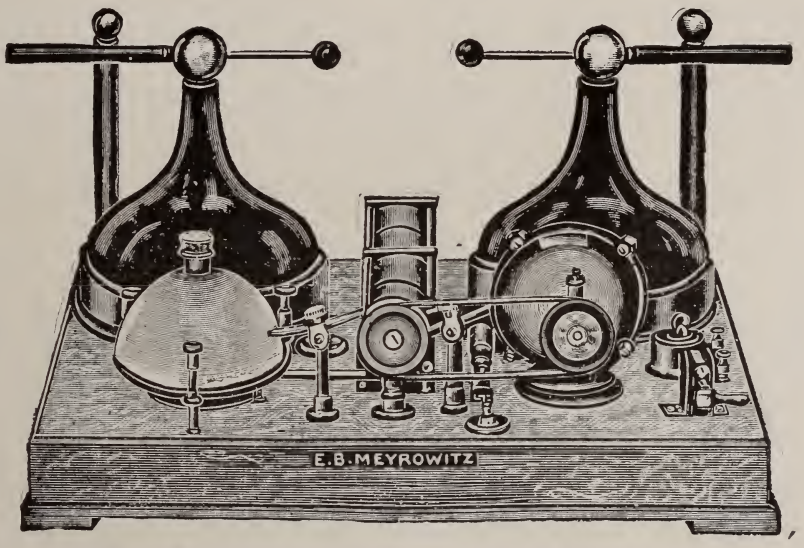

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sociation; Member of the American Medical Association; Author of Conservative Gynecology and Electro-Therapeutics, etc. Thoroughly illustrated. F. A. Davis Company, Publishers, Philadelphia.

This book is somewhat voluminous, covering about 1200 pages. It is full of good matter. Verbosity has no place in the book. Every sentence seems to have been framed to express a thought pertaining to the direct purpose of the subject. There are seven grand divisions, which includes the entire matter, denominated sections. Each of these sections are subdivided, and an author chosen exclusively for that subject. The carefully prepared composition betrays direction of thought, of experienced and capable teachers. Section A, is the "Introductory," and it is a beautifully written historic sketch of electricity. Section B, Electro-Physics and Electro-Physiology, is subdivided into nine parts, each of which is written by different authors. This subject covers 328 pages. Section C, Gynecology and Obstetrics has ten subdivisions with a different writer for each. Section D, Diseases of the Nervous System. Section E, Disorders of the Abdominal and Thoracic Viscera. Section F, Diseases of Childhood. Section G, Electro-Surgery. Those writing upon this subject are, Drs. L. A. W. Alleman, Charles E. de M. Lajous, D. D. Stewart, Robert Newman, J. Inglis Parsons, G. Belton Masey, John Byrne, Henrietta P. Johnson, Plym. S. Hayes. The book is made up by many of the best practitioners and writers in America. The student and doctor will make no mistake in using this book as his guide in practice.

Flugel-Schmidt-Tanger. A Dictionary of the English and German Language for Home and School. In two parts. With Special Reference to Dr. Felix Flugel Universal English-German and German-English Dictionary. Edited by Professor Im Schmidt, Ph., D. and G. Tanger, Ph. D. Fifth Edition. Lencke & Buechner, 812 Broadway, New York City. Price for two Vol. $5.50.

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HEBER ROBARTS, M. D., M. E., Editor.

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Visual Localization with Fluorometer.

St. Louis X-Ray Laboratory, 300 Chemical Building, St. Louis, Mo.

THE AMERICAN
X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. 9. ST. LOUIS, NOVEMBER, 1901. NO. 5.

Cancer.

So much is being written of late upon the care of cancer, that it is interesting to note what Dr. N. Senn, of Chicago, has recently said upon the origin and source of this disease. It is of special interest now because of the claims made by x-ray operators that malignant diseases are cured by the Roentgen ray, provided the disease is an open one and accessible.

Dr. Senn says—(*American Surgery and Gynecology*): "Carcinoma is due to a typical proliferation of the epithelial cells from the matrix of embryonic cells of congenital or post-natal origin. The law of legitimate succession of cells holds true in the origin and growth of tumors, both benign and malignant, as well as in the production of normal and inflammatory tissue. Being primarily epithelial, carcinoma in the mesoblastic tissue is impossible except by displaced inclusions of epithelial tissue. The histology and histogenesis of carcinoma are against the parasitic origin of the disorder. The stroma of carcinoma consists of pre-existing connective tissue fibers and their descendants. Carcinomatous cells usually multiply by irregular atypical karyokinesis, and this pathologic segmentation is an important indication of malignancy and of considerable diagnostic value. The progressive extension of tumors to adjacent tissues and organs, regardless of their structure, is strong proof of carcinomatous character. Regional metastasis takes place exclusively through the lymphatic channels and the pre-existing lymphatic structures take no active part in the origin and growth of secondary tumors. The general dissemination of carcinoma usually takes place by direct implication of veins in the primary or secondary tumors. The carcinomatous cells reach the venous circulation through the formation of an intra-venous tumor thrombosis or carcinomatous endophlebitis or through perforation of the vein walls by carcinomatous cells. Retrograde intravenous extension is due to the transportation of minute emboli of carcinoma cells against the current surrounded by a mantle of blood corpuscles which move step by step on the intima. Retrograde extension through lymphatics may take place in the same manner, but is more frequently the result of carcinomatous endolymphangitis. The increase of carcinoma is more apparent than real and heredity is a generally recognized predisposing cause. As a rule it occurs in elderly persons, but occasionally is met with in individuals under 25, and then is specially malignant. It seldom follows a single injury, but generally follows repeated or prolonged irritation. Among the predisposing causes must be numerated racial, climatic, and topographical influences. Chronic inflammatory products, cicatrices, and benign epithelial tumors are favorable local conditions. The positive results of implantation and inoculation

experiments have thus far failed in establishing the parasitic theory and a careful study of the experimental researches and the bacteriologic and histologic investigations do not warrant us

Cancer of the Breast, after Primary Operation.
Case of Dr. I. N. Scott, Kansas City, Mo.

at present in claiming a parasitic origin for carcinoma. The experience of centuries with medication has demonstrated that thus far carcinoma is not materially bettered in this way. Direct medication of carcinomatous tissue by parenchymatous injections has no influence, while the injection of sclerogenic substances into the surrounding connective tissue appears to restrain the local extension by impairing the blood supply. Local applications of any kind for ulcerative carcinoma can be only palliative at best. The actual cautery and chemical caustics have only a limited field of usefulness in open inoperable carcinoma and should never be used in treatment of closed carcinoma in place of the knife. The serum treatment has yielded only negative results. The early and radical operative treatment offers the only prospect for permanently eliminating the disease, which can be determined only after a lapse of 10 years or more after operation. Radical operation should never be attempted unless local conditions and the general health are such as to warrant it. Admitting carcinoma to be the product of erratic, planless cell growth, not governed, by the influence of the regular normal tissue change, it appears logical to make experiments and observations to find the remedy which will destroy the tumor by causing early and steady degeneration of its parenchyma, or which possesses the property of converting embryonic into mature epithelial cells, thus converting a carcinoma into a benign epithelioma."

Dr. G. Wiley Broome, in the *St. Louis Medical Review*, holds to the view that carcinoma is a parasitic disease. He, however, acknowledges that laboratory researches are not yet conclusive. He says: "The distinctive character of malignant tumors in the rapidity of their development, the extension of metastasis, which so strongly resemble those of diseases known to be due to bacteria, the cachexia out of proportion to the extent of the local disease, and suggesting the formation of a toxic substance, the fact that a spontaneous cure never takes place, the disease moving onward relentlessly to the fatal issue, and finally the liability of recurrence even after operation, are so many clinical evidences pointing to a parasitic origin. Laboratory researches are not yet conclu-

Cured by X-Rays after 100 Treatments.
Case of Dr. I. N. Scott, Kansas City, Mo.

sive, but point to this origin. Plimmer examined microscopically 1,298 cases of carcinoma, in 1,130 of which he found parasitic organisms, while ninety of the entire number were unfit for examination. He states positively that those bodies are constantly present in cancer and constantly absent in other diseases or degenerative conditions. The author believes the outlook to be very hopeful as regards the discovery of the cause and the cure of cancer."

In a paper read before the American Dermatological Association, May, 1901, Dr. William Allen Pussey, of Chicago, says: "As Oudin, Berthelemy and Darier have shown, the effect of the x-rays upon the epithelial structures of the skin is to increase the vitality of the least differentiated skin elements, while the differentiated elements—hair, nails and glands—undergo retrogressive changes and atrophy."

Dr. Senn holds that carcinoma is due to atypical proliferation of the epithelial cells, from the matrix of embryonic cells of congenital or post-natal origin. Now, if it is true, as Dr. Pussey says, that the effect of the x-rays upon the epithelial structures of the skin is to increase the vitality of the least differentiated skin elements, is not this a safe explanation for the curative effect of the x-rays in cancer? It is certain that the rays have but little bactericidal effect in the rays themselves, but it is equally certain that they have a peculiar stimulating effect, favorable to healthy restoration.

Prospect of Cure in Cancer.

Horace Manders thinks that the great point in the treatment of cancer is to fix one's attention on the natural forces inherent within the body. We have in electricity, for instance, an agent capable of directly and profoundly affecting the molecular changes that go on within cells, increasing metabolism and resistance to adverse influences. In cancer we may not have to deal with an invading microbe, yet it is evident that some malign source is at work, whose influence the natural defensive powers of the body have become unable to resist, and it is only reasonable to infer from analogy that if these inherent powers could be revitalized to the extent that generally obtains in the equilibrium of health, as has been done in tuberculosis, then there is a definite prospect of a cure for that even more intractable disease—cancer. If these inherent powers did not exist, we should all fall victims, as it is unreasonable to suppose that we are not constantly exposed to the source of cancer, just as we are to that of tuberculosis, of which we are now well aware. It is quite possible that the ultra-violet rays of the spectrum have a distinct value in this condition. Yeast treatment is unreliable. The author closes with the statement that in currents of high potential and exceeding frequency we have a means, hitherto unknown, of stimulating the vital energy of cells and of enabling them to utilize, by taking into their protoplasm auxiliary remedies; and that sometimes one and sometimes another, when used in conjunction with these currents, will be found to be the particular one needed.

Diagnosis of Cancer of the Stomach.

J. C. Hemmeter says that the nature and concept of an early diagnosis of cancer of the stomach are intimately associated with a knowledge of the duration of the disease, which can be approximately ascertained by three methods: (1) By observing the rate of growth in cancers that are open to direct inspection, *e. g.* those of the uterus, mammæ, rectum, etc.; (2) by noting the size and rate of growth after the first beginning of subjective and objective complaints

in tumors capable of palpation; and (3) by noting the rate of growth in visible or palpable metastasis. Cancer of the stomach often occurs in relatively young patients. There is nothing characteristic in the early dyspeptic symptoms. Hæmatemesis occurs in 50 per cent of cases, and constipation in 75 per cent. Hydrochloric acid disappears from the gastric juice, absorption is lessened, lactic acid is generally absent (but this is a later symptom), the peptic and rennet ferments are decreased *pari passu* with the HCl. In the examination of the stomach contents only two structural elements have a possible diagnostic value, viz., fragments of the neoplasm and the Oppler-Boas bacilli. The urine contains albumin in about 40 per cent of cases, while indican occurs in excess in about 90 per cent. Demonstration of a tumor is the infallible sign, but it often comes very late in the course of the disease. The author would recommend exploratory laparotomy in all cases of gastric disease associated with rapid emaciation, absence of HCl, reduction of proteid digestion under 30 per cent, and the presence of lactic acid, shown by Uffelman's test, or of numerous long base ball-bat shaped Oppler-Boas bacilli. He thinks little can be hoped for from operation in the case of cancer of the stomach, and looks forward to the possible discovery of a cure through the methods of research now being pursued.

Treatment of Inoperable Cancer.

The conclusions arrived at by Alfred Cooper, F. R. C. S., and expressed in *The Lancet*, October 12, with regard to the remedies recommended in the treatment of inoperable cancer are as follows: (1) That in cases of inoperable sarcoma, more especially the spindle-cell variety, the patient should have the option of Coley's fluid given to him, since a certain number of cases have been cured; (2) That in cases of inoperable cancer of the breast, in women of about forty years of age, in whom the menopause has not occurred, the operation of oophorectomy should be proposed, and this treatment may be combined with thyroid feeding; (3) That in cases of inoperable rodent ulcer, and the superficial malignant ulceration in other parts, the Roetgen rays give a good hope of improvement; (4) That in cases where these other methods are declined, or are inapplicable, the internal administration of celandine is worthy of trial, and when the case appears quite hopeless, morphine should be pushed without hesitation; (5) Finally, Mr. Cooper would suggest that, before trying any of these remedies, the risk should be fully pointed out to the patient that the faint hope, that most of them afford, should not be magnified, and that the discomfort of treatment should be fully discussed; in fact, the surgeon should not do more than offer the treatment, and leave the patient to accept or refuse it.

BUFFALO, N. Y., Oct. 29, 1901.

HEBER ROBARTS, M. D.

DEAR DOCTOR:—The Pan-American Exposition now about to close, although in many ways replete in electrical manifestations was nevertheless woefully short on x-ray apparatus and radiography.

Inasmuch as St. Louis is the home of our X-Ray Journal and its enthusiastic promoter, I most respectfully suggest that in your World's Exposition, a suitable building be set apart under your management for the proper display of the wonderful achievements in this most progressive and humanitarian of modern sciences. Yours most sincerely,

JOHN T. PITKIN.

True to the newspaper announcement, Dr. Wriggle has an x-ray society. The doctor is elected president.

Turck's Gyromele,

And the X-Rays in the Diagnosis of Diseases of the Stomach.

BY J. RUDIS-JICINSKY, A. M.,M. D., M. E.,

Read by title before the Roentgen Society of America, University Building, Buffalo, N. Y., Sept. 10, 1901.

The frequent opportunities I have had since the valuable discovery of the x-ray in correct and absolutely reliable diagnosis seemed to impress me, as well as others, of the practicability and usefulness of these mysterious rays, rather than the records of a lot of theoretical uncertainties. We may now reproduce renal, biliary, vesical and other calculi on the photographic plate, diagnose positively the beginning of tuberculosis pulmonalis, other diseases of the lungs, aneurisms, arterio sclerosis, intestinal obstructions, diseases of the bones, make out the tumors in the brain, diagnose and see the adjustment of the fragments in fractures, reduce dislocations properly, observe the growth of the bones, movements of the joints in normal state or altered by trauma, find foreign bodies without the dreadful probe and do such and other delicate work in radiology that seems to give a wonderful range of usefulness to the x-rays not only in surgery, but medicine also.

I do not say that the x-rays are the only means of diagnosis, I do not state and would not like to state that they are the only reliable way to make a diagnosis, but I would positively and most emphatically pronounce the application of the x-rays in popular hands or sufficiently skilled and experienced surgeons and x-ray workers, as the best, rapid and practical method by means of which in combination with all other methods a correct diagnosis, based on the history of certain cases, their symptoms as observed and exact clinical behavior may be made, when all other methods alone have failed. And that means very much.

Just to show how much it means, for instance, in the diagnosis of certain conditions of the stomach, allow me to demonstrate to you Turck's gyromele which in combination with fluoroscopic examination or a proper skiagraph, may reveal to us the real condition of the diseased stomach.*

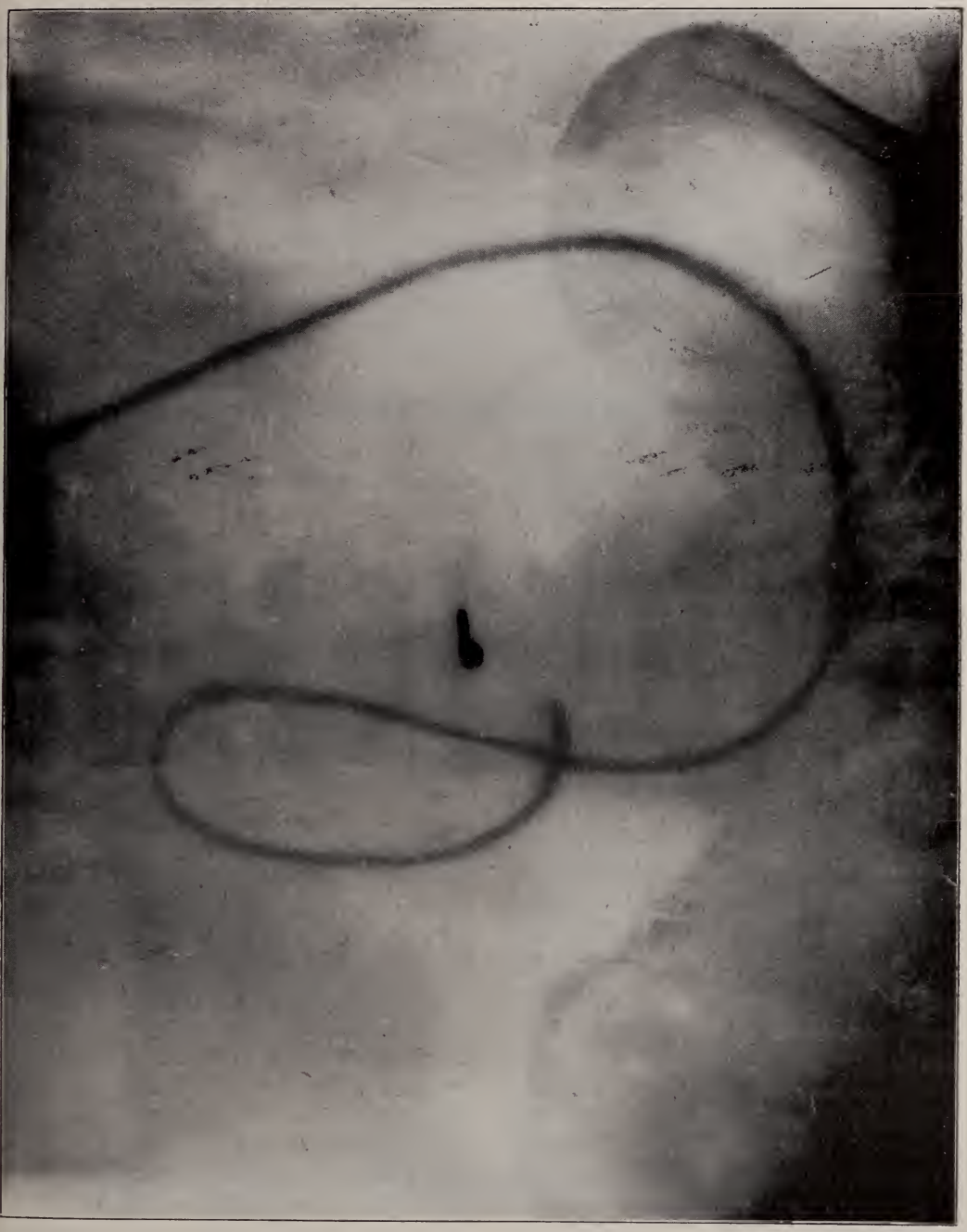
It is not necessary to fill up the stomach with albumen or subnitrate of bismuth to make out the exact outline of the stomach, to see the greater curvature or observe the lesser curvature, the fundus, and the pylorus with the help of our x-ray, and we need no more to do the same in trying to diagnose a dilatation of the stomach or any obstruction existing at the pylorus. If we introduce Turck's gyromele or the revolving sound—a flexible wire cable—with a sponge attached to the cable and observe the same with the fluoroscope under the x-ray, we can easily follow the cable along the oesophagus, examine its condition and go down to the stomach and along the walls of the same. The gyromele will give us the character of the stomach walls, show any thickening, the distensibility of the stomach, the flexibility of the same and beside this, proofs of the physical condition will help us to diagnose atrophy better than any test meal can, with the help of the sponge on the end of the cable. To make out any obstruction or the extent of a tumor or carcinoma we need only to introduce the gyromele and see with the fluoroscope how far the cable goes, where about it struck and may sometimes get some blood stains on the end of the cable or plenty of the stomach contents, which easily can be examined H C L. The main part that the whole procedure of this new method of combined diagnosis does not take more than fifteen minutes, counting the introduc-

*The use of the x-rays for translumination of the body with gyromele in site was demonstrated by Fentor B. Turck, M. D., in the spring of 1896, and diagnosis made. See the skiagraph, journal A. M. A., May 4, 1901.

tion of the gyromele, fluoroscopic examination and making a skiagraph, if necessary. It is a rapid work, positive and correct.

Penzoldt's modification of Piorr's method of determining gastric dilatation was, for instance, to withdraw the contents of the stomach by means of the oesophagal tube and then refilling the stomach with fluid. By noting the lower limit of percussion dullness then produced, the lower border of the stomach was determined. This diagnosis might be accurate in some cases, but not a positive one in every case. In dilatation with obstruction this method could not

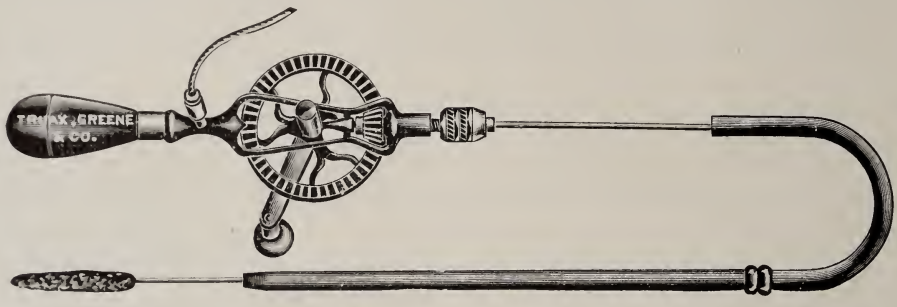
be used as readily but the gyromele with a smaller cable may diagnose the obstruction first and be pushed slowly along the walls of the dilated stomach, tient, no danger of displacement, any marked feeling of distress and the whole opportunity of positive diagnosis, when all other methods failed. In making the



by the assistant, and we may follow the cable from outside through the abdominal walls, see how it goes and where. There is absolutely no danger to the pa- skiagraph of the stomach containing the gyromele cable it is always well to have not only all the methods of diagnosis in mind, but the picture to be made must

have some stamp of truth on its surface. For this reason I always cover the umbilicus with some metallic button which will appear on the photo to give us a guide for measurements and proper estimation of the dilatation, etc.

A. M. The patient, a laboring man, aged 45 years. More or less prominent symptoms of indigestion about a year ago. Pain constant at the "pit of the stomach," increased by taking food, especially of an irritating character. Tenderness at one or more points, extending from the front to the back. Vomiting is almost constant as pain, coming on soon after eating, but sometimes an hour or more later. Rejected matter undigested or partly digested food or acrid mucus, no blood. Gastralgia frequent. The general condition of the patient not significant, the nutrition is but little deranged. The bowels are constipated, the stools hard and dry. Offensive regurgitation. The patient being excessive beer drinker, drank twenty or more glasses of beer habitually, every day. On inspection no tumor in the pyloric region, on percussion tympanic note extending below the umbilicus, but how far, it could not be made out positively. On ascultation a rumbling sound, but not always and not distinct when the body was shaken. Diagnosis: Gastric dilatation. If from the result of pyloric stenosis could not be made out. Turck's gyromele applied and skiagraph made. The gyromele shows plainly under the X-Ray that the dilitation is greater than expected and there is no obstruction at the pyloric end of the stomach. The ease with which the whole viscus can be pushed by the use of different cables of different flexibility, indicates the presence of gastroptosis and the thick walls at some places giving slight shadow show hypertrophy. As you see the diagnosis by means of the gyromele cable combined with palpitation and the application of the x-ray in this case was made certain and easy. The treatment itself was ordered accordingly.



Cedar Rapids, Iowa.

The genial and able editor the *American Electro-Therapeutic and X Ray Era*, checks the claim of THE AMERICAN X-RAY JOURNAL as the only x-ray journal in this country. Editorially we have always refrained from self praise or boasting and have even left out this same character of matter written by others unless there was associated with it an educational point. But to the present date this is the only publication exclusively devoted to x-ray work. *The American Electro-Therapeutic and X-Ray Era* justly combines electro-therapeutics with x-ray matter and one or two other publications in the East have added x-rays. Of the personality of the others we know not, but our personal knowledge of Mr. R. Friedlander is most favorable. He is not alone a genial and courteous gentleman but a good writer and earnestly engaged in x-ray work. He will succeed with his journal because integrity and worth will win.

X-Ray Tubes.

BY EMIL H. GRUBBE, B. S., M. D.,
Professor of Electro-Physics, Radiography and X-ray Diagnosis, Illinois School of Electro-Therapeutics. Lecturer on Electro-Therapeutics Hah. Medical College and Hospital. Chief Radiographer Illinois X-Ray and Electro-Therapeutic Laboratory. Member of Roentgen Society of United States, also Electro-Medical Society of Chicago, etc.

Read before the Roentgen Society of America, University Building, Buffalo, N. Y., Sept. 10, 1901.

The constant investigations of the past year with the Roentgen phenomena have developed immense improvements in x-ray apparatus. But great as has been our progress as regards apparatus and methods, comparatively slow progress seems to have been made in developing that most important part of an x-ray outfit, the Crooke's vacuum tube.

I wish, in this paper, to give a short review of the principles applied in the construction of tubes and incidently to throw out a few ideas as pertains the methods involved and the kind of tube necessary in order that we may get good, powerful x-rays. This standard, I believe, as far as we now know, is the only one which gives us any conception of the variability of x-rays.

From the great variety of tubes now upon the market we must consider that many attempts have been made to improve the Crooke's tube. At present the so-called standard tubes are made upon a general plan which consists of a vacuum bulb of thin glass, having two tapering ends, from one of which enters a highly polished concave aluminum disk, called the cathode, and from the other projects, almost to the centre of the tube, and usually from three to four inches from the aluminum disk, a thin sheet of platinum x-rays are sent out of the tube.

In order that I may not be misunderstood later on, I wish now to make a general statement including my opinion of x-ray excitation and partially its origin.

The x-ray is the result, primarily, of electrified particles of gaseous matter propelled or pushed by high voltage from the cathode disk of a vacuum tube, directly opposite this manifestation has been called the cathode ray. When cathode rays are stopped in their terrific speed through the bulb of a tube, by the interposition of a very dense body, as for instance platinum, a transformation occurs, resulting in a peculiar manifestation which we recognize as x-rays. The x-rays then are the result of the reflection or convergence of electrified discharges from the concave aluminum disk to the platinum sheet which is placed in a direct path. Now, when the currents discharged into a vacuum tube are heavy or long continued the platinum sheet becomes red or even white hot, indicating the transformation of these cathodic electric waves into heat waves. We know that in the ordinary x-ray tube the vacuum is never a constant, but always varies and that this variability increases as we use the tube. The cathode rays depend for their generation upon a certain degree of vacuum, and if this vacuum is constantly varying, of course the cathode rays vary in quantity and quality and consequently the resulting x-rays vary accordingly.

It behooves us then in order that we may have a constant x-ray value, to provide tubes which will keep, as near as possible, a stationary vacuum and in addition will at all times be under perfect control of the operator. The all desirable qualities which a tube should have, depend largely upon the purpose or use to which we expect to make the tube. I believe it is impossible to construct a tube which will be ideal for all varieties of exciters and also for all varieties of uses, viz.: Radiographic,

Fluoroscopic and Radio-Therapeutic.

Today the best type of tube for radiographic work is, no doubt, the so called "focus tube." A focus tube has its internal electrodes so shaped and placed that the cathode rays emanating from the negative concave disk will be collected and concentrated upon the positive platinum sheet at a very small area or spot.

When a tube is of such vacuum that it just begins to permit the production of x-rays we say we have a low vacuum or a soft tube. By the aid of a fluoroscope we can always determine relatively the vacuum of a tube. In general, we may say, that if the hand is placed before the fluoroscope five inches from the tube and the bone outlines are not clearly distinguishable we have a low vacuum tube. If now the vacuum is raised we shall have more and clearer bone outlines and finally in using a high vacuum tube the x-rays pass through the bones so that they appear only faint in outline.

Under ordinary conditions of low or medium vacuum we can usually make out two separate and distinct hemispheres in the tube bulb, one dark, emitting no fluorescent light and one luminous, emitting a greenish light, but when we excite a very high vacuum tube using a very high voltage current not only does the platinum disk and the luminous hemisphere give off x-rays but, in fact, the whole tube gives off appreciable rays.

Before making a radiograph a fluoroscopic view should always be made to determine the vacuum of the tube. I believe at present we know of no other method which may be used as a standard. Of course, even as simple as it may seem, it nevertheless is an exceedingly variable standard and therefore a great amount of experience is necessary to apply it. The method is this: We must bring our vacuum to such a degree that we can generate x-rays powerful enough to penetrate the tissue which we wish to radiograph. If we do not penetrate the tissue we certainly can not determine its internal make-up. It is impossible to show the structure of a bone unless you can apply rays powerful enough to penetrate the bone. In this connection I might say that if this method is applied before the plate is exposed it will be found to materially shorten the time of exposure and above all, the proportion of under-exposed and under-developed negatives; in short, useless plates, will decrease as we become more and more familiar and adept in the use of the fluoroscopic method. I may also add that the tube must not be too high, as then we lose all detail of structure. The nearer a body is brought to a screen, and the farther away from the tube, the more normal the fluoroscopic outline. For instance, to get sharp bone outlines of the chest in fluoroscopic work the vacuum must not be too high and the fluoroscope must be in direct contact with the body, chest or back.

In order to get a normal shadow of the heart it is necessary to place the body a short distance away from the tube (ten to fifteen inches) as otherwise the shadow may be magnified and at the same time will not show clear in outline. Here the tube vacuum should be just high enough to give a black outline to the heart, anything higher will blur the shadow and make it irregular.

It is a well known fact that a tube which may at one time be considered of low or medium vacuum will gradually become raised to a higher and higher vacuum. As it is ordinarily used, this is sometimes detrimental. It is also a well known fact that as the vacuum constantly becomes higher the voltage necessary to push the current through at first, becomes ultimately inadequate because of

the inability of the apparatus to furnish same.

The first drawback is overcome, if deemed necessary, as for instance, in radio-therapeutic work, by the use of a tube which has a valuable vacuum attachment. The second drawback, that of low voltage current, is overcome by the use of more powerful apparatus, which develops enormous voltage and is therefore able to overcome the high resistance of the tube due to its high vacuum. In this connection it may be mentioned that it seems out of order to label a tube for a certain voltage, as for instance–40 cm. to 50 cm. spark length, when the vacuum, which determines the ability of the tube to stand certain voltage goes up and down. In other words, varies constantly as the tube is used.

Scientific research of any kind can be of really little importance if it does not lead to practical results. The endeavor to improve the x-ray tube has been general, but I believe some very important mechanical and electrical facts have been omitted in the construction of this instrument. First, I find the greatest difficulty of getting a tube which has its external electrodes far enough apart to prevent sparking or short circuiting on the outside.

We know the greatest estimation in x-ray work is maximum radiance. Up to the present time we have not been able to secure radiance approaching the maximum, because of the inefficiency of the Crooke's tubes. Personally, I find, in order that we may use high voltage currents (an absolute necessity to the derivation of maximum or penetrating radiance), that the internal parts of the tube including the vacuum are not so much at fault as the external parts. We must separate the external electrodes much farther than we have been doing.

The more we study the x-ray the more we find it necessary to have special apparatus to meet certain conditions. For instance, it has been found desirable for radio-therapeutic work to operate a coil, which, by the use of from 3 to 5 amperes of current in the primary, generates a low voltage and high amperage current from the secondary—a short but thick spark. On the other hand, to make radiographs we need a current of high voltage as well as high amperage. In making this statement I am aware that I am discussing only one-half of the question, as the tube vacuum at which it is worked is, of course, a very important consideration also.

Greatest difficulty is experienced in getting tubes which can dissipate more than a certain limited amount of energy in a certain period of time without danger of breaking or burning out. First, then, in order to get a tube high in vacuum, it is necessary to place the external electrodes far enough apart so that high voltage currents can be utilized without danger of breaking the tube or of the spark passing or jumping around the outside of the bulb. Next, we need tubes so constructed that the anode will readily radiate the heat which is developed whenever large volume currents are used. Since the ideal has not yet been reached as regards the above two factors, I believe it is in order to mention a few ideas and give a few designs on this subject. In the following considerations I need not mention specifically the kind of exciting apparatus to which these tubes are especially suited, suffice it to say that the tubes for use on the static machine need not be made with as much metal or heat absorbing materials as is necessary when a coil is the exciting agent.

We will now consider tubes from the fluoroscopic standpoint, ignoring as far as possible, the use of the tube from the radiographic or radio-therapeutic standpoint. Good fluoroscopic views are only obtainable from the very highest vacuum tubes, and indeed in general

it may be said, that for fluoroscopic work a much higher vacuum, relatively is needed than for radiography. Steadiness of the illumination or fluorescence is a most desirable function in connection with penetration. The former is brought about by using rapid interruptions, if an induction coil is used (1600 to 2500 per minute), the latter is developed by the use of a high vacuum and also very high voltage and is independent of the quantity of current. Because of these conditions we are able to get better fluoroscopic views from a large rapidly speeding static machine that we can possibly obtain from a coil. Fluorescence is steady and voltage is very high.

Since glass is an obstructor to x-rays it is necessary that the bulb through which the rays pass be exceedingly thin and not only thin, but uniformly thin. In the average tube sold today the bulb part of the tube is so thick that I doubt if we get more than 50 per cent of the actual x-ray value for use on the outside. Another valuable factor to be observed in choosing a good tube for fluoroscopic work is that of a large-sized tube. A large tube will stand both higher voltage and amperage for a given vacuum. Also the larger volume of gaseous space tends to keep such a tube more stable as regards its vacuum and therefore it may be used for a much longer period of time (time being sometimes a very necessary consideration in matters pertaining to diagnosis), without any appreciable change in the vacuum. Finally we can say that the larger the bulb the longer the life of the tube.

From our study of the cathode rays in their relation to x-rays we must come to the conclusion that, generally speaking, the more cathode rays we have in a tube, the more x-rays are generated.

I wish to refer to diagram No. 1 which illustrates a special tube which I shall call the "Fluoroscopic tube," because it is designed specially to show to the best advantage all the factors prominent in an ideal fluoroscopic tube, as far as I am able to judge. I recommend a very large bulb, 10 to 14 inches in diameter (if it is possible for high vacuum bulbs of that size composed of glass $\frac{1}{64}$ inch in thickness to stand up against atmospheric pressure), because of reasons previously mentioned. The large size of the bulb allows of placing larger electrodes in the tube and therefore we naturally get more x-rays than is possible from a smaller tube having small electrodes.

In an excited Crooke's tube the whole luminous hemisphere gives off x-rays. For fluoroscopic use a tube should not focus the cathode rays at a point upon the platinum sheet and the anode is best placed so that it strikes the cathode rays before they come to a focus. In this manner the anode becomes uniformly red hot and we get a large quantity of illumination upon the screen, i. e., x-rays spread over a large area. This is especially appreciated when we wish to use a large screen in examining the chest or abdominal cavities. This spreading of the cathode stream may be brought about by placing the anode at the angle of 45 degrees to the path of the cathode rays and within the focal point of these rays. Now, by moving the cathode end of the tube away from the active hemisphere, and placing the aluminum disk within the bulb, we present a glass surface of even thickness and since the aluminum disk is insignificant as an absorber of x-rays it, of course, need hardly be considered from the standpoint of resistance. In the usual tube the cathode disk is placed so near the glass that in conjunction with the great heat generated upon its surface a deposit of metalic aluminum soon occurs upon the glass surface in the neighborhood of the cathode disk. Placing the cathode disk within the bulb

also does away with the stray x-rays resulting when the cathode stream strikes the sides of the tube immediately surrounding the disk, usually recognized by the formation of a light green ring on the glass surface just above the aluminum disk.

The presence of the metallic ball, preferably made of aluminum, at the cathode electrode on the outside of the tube is for the purpose of farther intensifying the volume of current. In this position its action is that of a condenser. The value of this attachment becomes obvious, because in using very high vacuum tubes we have learned that heaping up current at the cathode gives us more efficient x-rays (internal resisance being thereby lessened); ultimately this is also a means to steady the fluorescence. This condenser is made globular and is to be kept highly polished, in order that the current radiation may be insignificant. Condensers of other shape have been found to be impractical because of the extensive radiation usually present during high resistance.

Further consideration of this tube must be left to an examination of the diagram which, I believe, is self-explanatory.

Next let us consider a tube especially designed for radiographic work. I refer you to diagram No. 2.

This tube, as is indicated, is especially constructed for radiographic work; that is, it is able to stand up against both high voltage and high amperage currents.

To be able to use currents of large volume as derived when the various types of electrolytic or mercury interrupters are in circuit, is has been found best to cool the heated platinum disk by having a continuous flow of water near the anode to absorb the heat generated. By this method we may pass powerful currents through the tube for a few minutes without noticing any material deterioration of the vacuum. According to the diagram we do away with the continuous water stream, and substitute a very large steel jacket extending almost the full length of the anodal electrode in the bulb of the tube, and in addition to this we fill this metal jacket with a large quantity of heat absorbing oil, (even water may be used). This does away with water bags or bottles and rubber tubing for conveying the water to the tube, a very inconvenient arrangement.

Since it is a well known fact that if we wish to attain the best definition on a plate exposed to the x-rays we must bring the cathode stream to a very fine focus at the anode and the smaller the focal area the better the definition. The platinum anode in this tube has a small but very heavy projection upon which the cathode rays are brought to a focus. This tends to confine the heating to a small area and also sends away x-rays sooner than any other part of the disk. In order to still farther favor the focusing of the cathode rays the anode should be placed at angle of from 60 - 65 degrees to the cathode stream. This arrangement gives sharp or clean and contrasty picture and the exposure can be made very short. We get not only a shadow picture of the gross outlines of parts exposed, especially bones, but also an idea of the inner structure. This we call definition and it depends primarily upon our ability to place the cathode rays at a small area upon the platinum disk.

The bulb of a radiographic tube need not be as large as for a tube used if fluoroscopic work. Indeed, in order to prevent blurring of the picture we wish to avoid all radiation except that originating at the focal point upon the anode. A small tube gives off few stray rays, there is very little spreading, and consequently such a tube is desirable for pro-

ducing pelvic and chest pictures. It is well established that the more we increase the amperage of the current applied to a Crooke's tube, provided the voltage is high enough to overcome the resistance, the more x-rays we get. No doubt the degree of fluorescence determines largely the photographic power of the tube, but if it is possible to measure, the quantity of current passing through the tube at any period of time we are always in position to know accurately the radiographic effect of a tube. It may be stated that the higher our amperage for a given vacuum the more rapid our ability to make radiographs. It is the large quantity current which causes chemical changes upon the photographic plate.

A properly constructed x-ray tube to give clear definition and prevent diffusion to any great extent, must have its cathode disk so placed and shaped (very concave) that cathode rays coming from this disk do not strike anything before reaching the anode. This cathode disk, in order that it may stand the large quantity of heat developed upon its surface, should also be large in area, as shown in the diagram, so that heat radiation may be good. Finally, in order that we may use high voltage currents and thereby get penetrating x-rays, all the electrode containing parts of the tube are placed far apart; about twice the distance which is observed in the common tube.

In conclusion let me say that no apologies are offered for anything presented in this paper, because I believe it is only through digestion of speculative ideas that we can hope to proceed in our investigations of so powerful a force as the x-ray has proven itself to be.

819 Champlain Bldg. Chicago, Ill.

When this paragraph is marked with a red and blue cross it shows our friends that their time has expired, and we shall be happy to receive a renewal of their subscription soon.

Some Problems of Radiology.

BY VIRGILIO MACHADO.

The Rhumkorf coils have lately been subject to numerous improvements such as:

a—To divide the secondary circuit into segments or partial coils, being capable of spreading singly or in twos, threes, etc.

b—The use of a thick wire in the secondary circuit to diminish its resistance, while thus augmenting the amperage of the current circulating therein.

c—The use of an adjustable condenser so as to be able to regulate the capacity, in relation to the intensity of the primary current.

d—The use of interrupters which give the maximum length to the time the circuit is closed, in relation to the time it is open.

e—The use of a special inductor, without a condenser when employing the Wehnelt interrupter.

f—The method of fabrication that guarantees to keep the coils in a good state of preservation, without becoming treated while operating, etc.

In spite of all these improvements, the coils perhaps may be able to produce even greater results.

Before giving any problems on this subject, I take the liberty to propose the following considerations: At present it is generally admitted that the intensity of the x-rays, estimated by the intensity of the fluroscopic light, or by the effect produced upon the photographic plate, depends chiefly upon the volume of the originating discharge.

This volume is roughly estimated by the depth of the spark. If two discharges, *a* and *b* are compared whose sparks are of the same length, but of different depth, it will be found that the deeper spark, *a* will produce the more intense x-rays.

The potential of the discharge judged

by the length of the spark, seems principally to influence the penetrating force of the x-rays.

If two electric discharges *a* and *b* are compared, whose sparks are of equal depth, but of different length, then the longer one *a* will give the more penetrating x-rays.

It is very probable that the potential of the electric discharge does not exclusively influence the penetration of the x-rays, but also exerts its power, though in a minor degree, upon the intensity of these rays.

It is also likely that the volume of the discharge does not exclusively influence the intensity of the x-rays, but also slightly the penetration of the same rays.

To establish a basis for the construction of coils, complying with all the requirements of the radiologists, would demand deep study. Among others, the following problems suggest themselves, which have already undergone partial investigation at the hands of some illustrious radiologists.

1st. To determine the mechanic value *m* which corresponds to the discharge of the secondary current according to the dimensions (length and depth) of the spark, created by the said discharge.

2d. To calculate the relation between this mechanic value *m* and the penetration of the x-rays produced by the discharge to which this value corresponds.

3d. And further to find the analogy between the mechanic value *m* and the intensity of the x-rays obtained by this value.

4th. In a given coil to determine what relation there exists between the volume of the discharge from the opening in the secondary, and the intensity of the primary current.

5. To determine the relation between the volume of the discharge and the voltage of the current, which flows in the primary circuit.

6. To determine the relation between

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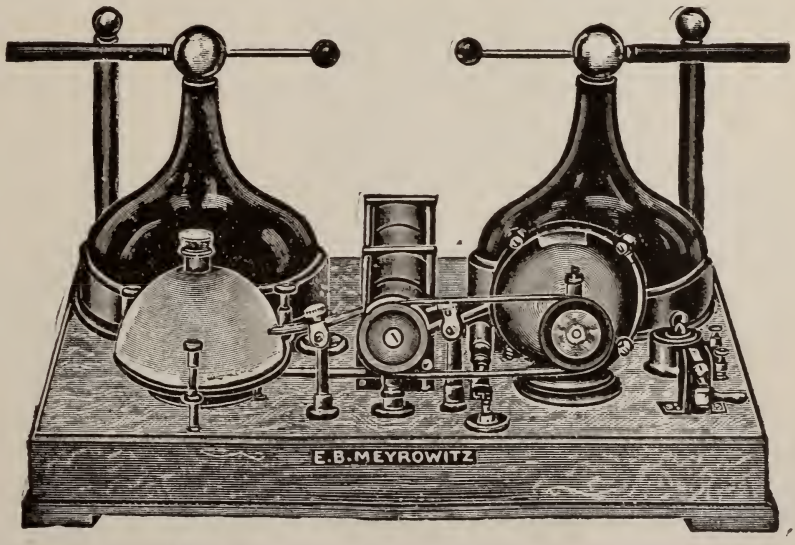

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the same volume and the electric capacity of the primary, including the condenser.

7, 8 and 9. To solve questions similar to those marked 4, 5 and 6, except that instead of relating to the volume of the electric discharges, refer to their potential, estimated by the length of the spark.

10. To vertify the influence of the length of time, the current circulates in the primary upon each of the various elements of the phenomena, that this current produces at the time of opening.

To facilitate the solving of the above mentioned problem, it would be well to study the following works:

Ueber die vorgange im Inductionsapparat. B. Walter in Annalen der Physik und Chemie, Neue Folge Bd. 62–1897, und Bd. 66–1898.

R. Colley-Wiedemann Annalen, 44, 1891.

Seiter-Tbid, 61, 1897.

Warburg-Tbid, 59, 1896

F. Braun-Tbid, 60, 1897.

Feddersen Poggendorf Ann. 116, 1862.

B. C. Heinke Electrotechn, Leitschr, 18, 1897.

Lisbon, Portugal, Oct. 10, 1901.

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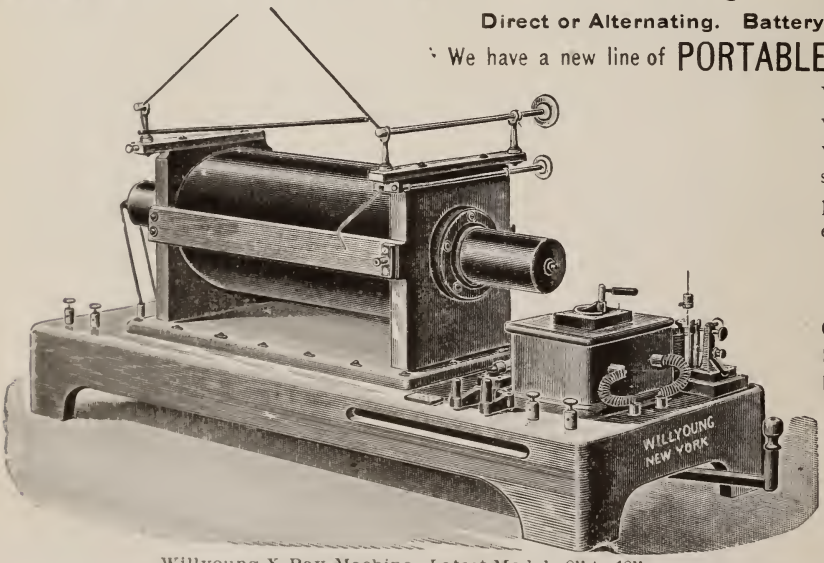

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Iodoform in Knee Joint. Radiograph taken four weeks after injection.

Case sent to St. Louis X-Ray Laboratory by Dr. W. H. Mayfield.

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Researches in the Direction of Obtaining Radiographs and Fluoroscopic Examinations of the Muscles and Ligaments.

Read before the Roentgen Society of America, University Building, Buffalo, N. Y., Nov. 10, 1901,

BY H. WESTBURY.

I trust that the title of this little paper will not lead the members to expect that any definite results have yet been obtained in this direction, but I think some brief explanation of what has already been done, with a note of the difficulties to be still overcome, may be interesting and may also incite some of our friends present to investigate this important branch of x-ray research.

There are three directions in which it may prove possible to obtain a definite shadow of the interior of the body i. e., the softer tissues outside the bones, viz., the photographic plate, the fluoroscopic screen and the x-ray tube.

1.—Regarding the photographic plate itself I have not made any attempt to investigate or alter the effect of the x-ray shadow as thrown upon the plate during exposure, as I recognize that while it may be quite in the bounds of possibility to obtain some coating apart from the usual gelatine emulsion which will produce startling results, this branch of research is being ably taken up by many well known photographers for color photography and other purposes. In fact, the question of obtaining various emulsions giving different results to the uniform black and white has so far proved a very disinteresting one. The old-fashioned collodion plate I may remark in passing, shows no difference to the gelatine. A suggestion has been made to me to try the old Daguerrotype process, but so far I have not done so. If any one present has, I would like to learn the results.

2.—Regarding the second direction—the fluoroscopic screen—I have endeavored to vary the results in two ways; first by interposition between the tube and the ordinary platine cyanide of barium screen and second by changing the composition of the screen itself. The question of interposition has, of course, been entered upon in conjunction with the tube more or less, bearing in mind that the object in view was to break up the light rays, if light rays they are, into their various co-ordinates. I need not go into, in this paper, the various experiments made with metallic substances, which have already been fully treated in the various papers published on the different capacity of substances to the x-rays and with which all of you must be more or less familiar. Briefly, none of the ordinary metallic materials or screens make any difference to the light rays. Some of the following experiments, however, are interesting, not so much from their results as their possibilities:—A screen coated with thorium and interposed between the tube and a barium screen seems to act as an in-

tensifyer, bringing the bones up in sharp outline and in isolated instances showing traces of the arteries, etc. A screen coated with zirconium has much the same effect, but not to such a marked degree. I have tried a number of other incandescent salts in the same way and have obtained the same results in many cases. Some of them when mixed with the platino cyanide of barium in making an ordinary screen show traces of the ligaments and muscles, but not clearly, and I firmly believe that it is in this direction of changing the screen itself that ultimate success lies. Nitrate of uranium has some very peculiar properties when subjected to the x-ray light, either alone or with other salts. Alone it is about equal to tungstate of calcium if prepared and flowed in the usual manner, but if used in lump form so that the rays strike larger crystals of it, traces of refraction may be seen, although I have not yetbeen able to prove this scientifically. Some other curious results are obtained with some of the quartz mineral blocks, especially such as show prismatic refraction. Feldopar, as you are doubtless aware, fluoresces considerable to the rays and even in the lump form a piece of ordinary note paper or cardboard is lit up when placed behind the crystal and the x-ray produced in front. All my researches in this direction seem to prove that the x-rays are really some form of light rays low in the spectrum, but of course, I am still unable to understand why, if this is really the case, an aluminum or other metallic screen grounded at one end prevents burning, which I have incontestably proved it does. This fact seems to adduce Mr. Tesla's theory of particles of matter, but on the other hand possibly this is explained by the counter theory that the injurious particles causing the burning emanate from the electric current and it is quite possible to obtain a spark from the grounded screen. Colored gelatine layers have all been tried and do not seem to affect the rays at all except in density and as you are aware the ordinary lens has no effect. The rays penetrate a diamond as easily as paper, hence the fact that a true diamond can always be told from a false one with a medium or low tube. A very high tube is apt to go through even carbon or paste imitations. Sulphide of zinc and calcium are pratically non-fluorescing to the rays, even if mixed with other fluorescing salts and yet they are decidedly useful for intensifying screens and just as effective as tungstate of calcium, which fact is certainly curious. I can safely say that the ordinary methods of producing color photography as at present known have not the slightest effect on radiography, only the same black and white bone shadows being obtained.

3.—The x-ray tube is, of course, only susceptible to different results by practically following out the same interposition theory as stated above. I have varied the glass used in the tube in many ways with practically little success; the only thing that altered the rays at all was a certain kind of ruby colored glass a mixture of actinic and nonactinic qualities which, you will remember, I showed at the last meeting. It had a bull's eye in the center made out of ordinary Crooke's tube glass and showed two different densities on the ordinary screen, but only very faint traces of the tissues could be discerned. Numerous varieties of coatings on the glass of the tube have been tried and when coated with certain incandescent salts, about the same results are obtained, as stated above, with a screen in interposition. You are probably aware that it is a very simple thing to change the rays proceeding from a tube, as far as the penetratric powers are concerned, either by using different glass or by surrounding the tube with partly opaque substances,

but this simply changes the working amount of rays produced and does not tend to help us in obtaining anything else but the bones, etc. I have carefully followed up so far as possible the isolated cases known to most of us, where a plate has been exposed in the usual manner and much to the operator's surprise, some portion of arteries or tissues have been obtained after development, but in each case I have been unable to find any such extraordinary conditions as to enable one to repeat the effects obtained at will. A recent plate even showed the hair lying close to the arm very plainly, but in another plate exposed identically the same, no such traces are visible. Again I have a plate showing the ligaments and tendons of the wrist very plainly—exposure one minute. Carbutt plate, medium the same conditions and even with the same wrist do not show these points. Are there, therefore, some peculiar conditions in the air, only rarely present, altering the molecules of the rays sufficiently to change their penetrative qualities, or what is the explanation? Of course, body conditions would make a great difference, as many of us have come across persons, whom it was almost impossible to penetrate, owing to the density of their flesh. I know of one such case at present that takes a tube which will easily penetrate an ordinary wall, before any shadow of the bones can be taken. This, however, can not very well explain the fact of the same person giving a different result, when exposed within five minutes of the first exposure.

I have it on good authority that Mine Curie has obtained some interesting results in this line with radium as an interposed substance; in fact, it is claimed that the lungs, heart, kidneys, etc., can be examined very plainly through the fluoroscope with this ally. As I have not yet had the opportunity to try this, of course, I can not say whether it is any help in the direction we desire. I have been promised some radium and hoped to have been able to show it at this meeting, but unfortunately, I have not yet received it, but shall certainly try it in this way as soon as it reaches me.

If there are any of our members who have made any researches in this direction I would very much like to hear from them, as the whole line of research is extremely fascinating and important to us all, and there are so many rare salts and minerals and combinations of such that it is impossible for any one person to try them all in any way, but in closing I would like to say that I firmly believe that this can and will be done and before very long. The benefit to the surgeon and doctor will be, I think, even more important than the ability to see the bones; at any rate, it will be one step nearer to the much desired power of seeing all that may occur in that complicated machine, our body.

THE DEVELOPMENT OF THE CROOKE'S TUBE FOR THE PAST TWELVE MONTHS.

While no very great or startling developments have been made in the Crooke's tube during the past twelve months, yet a number of minor improvements have been designed, making the Crooke's tube at the present day considerably in advance of that of a year ago. It should be remembered by all operators that the manufacturers are constantly experimenting in little matters of detail with the aim of bringing the tube nearer and nearer to perfection and while these little technical improvements would be passed by without notice by the operator, they all tend to improve the efficiency and penetrative power of the rays.

It may be interesting to members present to recapitulate for a few moments the steady progression, which has been made in the manufacture of Crooke's

tubes. Up to the present time all practical tubes for the production of x-rays have been made in a glass chamber whether of spherical, cylindrical or other shape bulb, into which are sealed by means of platinum wires, two or more electrodes usually made of aluminum which serve to carry the electrical current into the bulb.

The earliest forms of x-ray tubes were made with two electrodes set into the bulb at almost a right angle to each other, each terminating in a circular disc, of aluminum or other metal, one of such discs being made larger than the other. In use the negative terminal of the exciting apparatus was attached to the larger disc and the positive terminal to the smaller disc, thus making the larger disc the cathode and the smaller disc the anode. When the bulb was thus operated the cathode rays would produce x-rays at the point of contact of the electrical discharge in the tube, causing the x-rays to be thrown against the glass at a point opposite the cathode. Such tubes were elementary and so on gave way to an improved type.

The next form of tube seems to have been one in which the two electrodes were opposite each other with both cathode and anode inclined at an angle giving better results both for clearness and definition. Such a form of tube was employed by Mr. Edison in May, 1896, the National Electrical Exposition in New York City when many thousands of persons saw for the first time the x-ray phenomena. A number of experimentors had, however, found that some method of focusing the rays was absolutely necessary to obtain shape, and outline and tubes were finally designed with a piece of thin platinum at the end of one of the electrodes, leaving the cup-shaped aluminum at the end of the other, but made more or less concave so that the cathode rays were impinged upon the surface of the platinum electrode. The value of this detail has recently been recognized from the fact that all the present types of tubes are made on practically this principle with, of course, various improvements that have suggested themselves from time to time.

The size of the glass bulb is now made either four or five inches in diameter by nearly all the manufacturers, as this seems to be the most suitable for x-ray work. There does not seem to be much advantage gained by using larger sizes, although a few operators using very heavy coils or static machines use eight or ten-inch bulbs with good results, but as a general thing, extending the length of the terminals of the tube will prevent every chance of any sparks jumping across the outside of the tube.

Among the later improvements may be included the reinforcing of the anode with copper or nickle, designed to meet the demand for a tube, which would stand up against the heavy currents now used. Such currents will burn a hole through an ordinary anode in a very short time and if allowed to run, will melt it all up. Thick pieces of metal either platinum, comium or iridium or alloys of these metals have been used for some years, but the chief trouble with a solid anode is that the metal gives off so much gas that it is very difficult to obtain a steady vacuum in such tubes, added to which the cost is prohibitive However, the reinforcement of the anode is very satisfactory and until some better method of diffusing the heat is devised, it is probably the best type of tube for use with very heavy currents.

A recent improvement has been made on this reinforced type, consisting of a percentage of platinum being alloyed in the face of the nickle backing instead of being laid over in sheet form on it. This enables the operator to use a much heavier current than before, as this anode has the merit of being practically the same as a soild one. It also heats very

slowly and the platinum, of course, does not buckle up as the previous type will do if a white heat is obtained. Until recently a copper backing was used in tubes made abroad, but they have now discontinued this for nickle, probably owing to the fact that copper gives off gas very badly and also tends to discolor the bulb. Yet another form of anode we have noticed consists of nickle alloyed with iridium which gives fair results, but is more difficult to exhaust to a high vacuum than the alloyed platinum and nickle.

Some little improvements have been made within the past year in tubes with an adjustment for cooling off the target by means of water, but at the present time owing to their lack of uniformity and their expensive cost (from $40.00 to $60.00 each), they can not be recommended to the general user. Some further developments, however, on this line may produce a tube, which will prove satisfactory, as occasionally a magnificent tube may be seen with this device, but unfortunately, apart from the primal high price, they can not be repaired for anything, like a moderate figure.

Probably most of the experimenting on Crooke's tubes this year has been with the adjuster. Several new salts or amalgamation of salts have been tried with good results and it is now possible to obtain tubes in which either hydrogen or oxygen can be liberated in addition to the old-fashioned watery vapor obtained from potash alone. So far we have not discovered any salt suitable for liberating nitrogen, but as a matter of scientific curiosity, trust to do so very shortly.

The use of the adjuster tube is gradually growing in favor both in this country and abroad and there is no doubt that if the operator can be assured that he may keep his vacuum perfectly steady with the adjuster, then tubes not fitted with such a device would rapidly become obsolete. Last year, you will remember, that the device for lowering the vacuum was more or less in an elementary condition. The methods of sparking in common use were more or less likely to puncture the tube, owing to a spark penetrating the glass and the noise caused by the continual passing of the spark in the air was apt to be very irritating to the operator and I may add, terrifying to the average patient. A new device has been designed this year, which obviates this difficulty and by means of which the vacuum in a tube can be lowered or again raised at will. We are now, therefore, able to obtain body pictures in less time than formerly, owing to the fact that initially high vacuum tubes can be used with impunity. As the operators present are well aware, it is very easy with any apparatus to manipulate a low vacuum tube, with which the bones of the hand, arm or leg can be seen very plainly and with good definition, but immediately the operator endeavors to look through the body nothing is obtained. This, of course, is owing to the fact that such a tube has not sufficient penetrative power. If a high vacuum tube is placed on the apparatus and sufficient current forced through it to excite it, it will penetrate the heavy parts of the body without definition and all that can be seen is a fussy outline of the bones, the penetration being much too great. The problem, therefore, is to take such a high vacuum tube and increase the definition without lowering the penetration too much and so far this has only been done by means of chemical adjusters.

The user of a modern adjuster tube is especially cautioned in operating the adjuster to first simply allow a single spark to pass through the salt, as in most cases this is amply sufficient to reduce the vacuum of the tube at once. Failing this, he should still proceed with caution, disconnecting the adjuster wire frequently and allowing the current to

pass directly through the tube until he has the required vacuum. Many tubes are often reduced so low by a liberal use of the adjuster that failing sufficient current to heat up the anode and so absorb the gas, they have to be returned to the manufacturer for re-exhaustion.

The operator using an ordinary non-adjustable tube can, of course, temporarily lower the vacuum when it becomes too high by warming the body of the tube carefully, but great care has to be taken not to crack the bulb. Probably the safest way is to lay the tube on or near a radiator until it is gently warmed through. Such a tube can sometimes be reduced in vacuum by reversing the polarities for 20 or 30 minutes, taking care not to bombard the aluminum cathode long enough to melt it down. If the operator has a fairly powerful current, patient manipulation of the terminals of his machine in conjunction with spark gaps will sometimes lower a tube sufficiently to enable it to be used, although it must be remembered that a non-adjustable tube will finaily reach a point where the vacuum will not come down and it will have to be re-exhausted.

On the other hand, sometimes a tube will be too low in vacuum. In this case, if it is filled with a purplish gas it can usually be understood that there is a very fine leak or puncture somewhere and that it will have to be re-exhausted. If, however, the color of the gas is blue or grey then the operator can usually run the vacuum up with a little patience. If his exciting apparatus is powerful enough, the anode should be heated red hot and then allowed to cool off, then heated again and cooled off repeating at intervals of several days and the vacuum will probably improve until x-rays are obtained. On a static machine the use of one or both spark gaps will generally raise a tube sufficiently for use or if not a careful use of the Leyden jars or condenser. This also applies to a coil, but not to such a degree as to the static machine.

In closing I may say that while the Crooke's tube is still far from perfection, yet the last year has seen a number of minor improvements in construction and detail, improvements in most cases so small as to escape the notice of the average operator, but all tending to increase the efficiency and life of the tube. Speaking egotistically, I do not think that we have any reason to be ashamed of the development of Crooke's tubes made in this country and trust before long to see the product of American manufacturers in this line taking the same place as every other scientific manufacture—the top of the tree.

Harrison, New Jersey.

Dr. Niles R. Finsen in *Meddelelser fra Finsen's Lys. Institut*, gives a summary of his treatment of all skin diseases by use of the Finsen light. At the close of the year 1899 he had under treatment 121 cases of lupus. While during the previous years the lupus patients were treated exclusively by light, there were during 1898 and 1899 some cases which also had other treatment as preparatory for and auxiliary to the light cure.

Whilst under treatment with the rays nearly all the patients wore a protective bandage.

Some of the patients had an experimental treatment with Roentgen rays.

The report fails to give number of so-called permanent cures and also fails to mention result of treatment with the x-rays. Subsequent evidence, however, favors the Roentgen light to all other modes of treatment.

At the Academy of Medicine of Cincinnati, Dr. E. H. Shield stated that he had seen several cases of chronic rheumatism entirely relieved of pain by subjecting them to the x-rays. He also spoke of pigmented naevus of the foot improving under the rays.

How the Induction Static Machine Can Be Excited Without a Separate Charger.

Read Before the Roentgen Society of America, University Building, Buffalo, N. Y., Sept. 11, 1901,

BY JOHN TOWNSEND PITKIN, M. D.

Around the poles of a loadstone, an ordinary horseshoe magnet, or an electro magnet, there exists what is technically known as a field of force, the presence of which can be made manifest by its action on particles of iron or the electrification of a conductor brought within its confines.

When the permanent or electro--magnet is circular in form, or the magnetic circuit is closed by a suitable piece of iron called a keeper or armature, the magnetic lines of force will find a path of less resistance in the iron, than in an areal pathway, and the magnetic field of force will not be apparent.

Permeating the insulation and surrounding medium of an electrified wire, there also exists a magnetic field of force, shown by the electrification of neighboring conductors, the attraction of iron fillings or the diverging of a compass needle brought within its influence.

Various appellations have been given by recent writers and teachers of electro-magnetism, to the magnetic zone of influence. They are, 1, magnetic field, 2, induction action, which is subdivided into mutual and self-induction; 3, magnetic lines or tubes of force. The older writers spoke of it as an action at a distance or action by influence.

When a metallic object or conductor becomes the seat of a high tension electrical charge, it is customary to speak of its field, as made up of electro-static lines of force, or of electrical waves. The word magnetism for unknown reasons is not employed.

Having an inspiration in accord with the spirit of the times the writer has boldly ventured to draw the line of demarcation between the force called magnetism on the one hand, and electricity on the other, more sharply than it has ever been drawn before for the following reasons:

Inasmuch as the circular magnet is considered a unit complete within itself, so the horseshoe magnet and its keeper should be similarly considered. If the keeper is removed, its place will be taken by the air, or any other dielectric which comes within the magnetic pathway, does not the dielectric become an essential portion of the magnetic integer?

If so it follows that when the iron core of an electro-magnet is removed its place will be taken by the atmosphere, the air becoming a portion of the electro-magnet.

It also follows that an electrified wire is surrounded by an elongated magnet, consisting of the excited, investing tunics and the atmosphere, irrespective of the E. M. F. of the current, it does not matter whether the current is of low or high potential, the force which permeates the dielectric without breaking it down should always be called magnetism. Insulators are magnetic substances.

The Hertz waves employed in wireless telegraphy are not electrical, but magnetic in character. Magnetism is in all probability one of the interplanetary forces the essential constituent of the solar rays.

Consider, if you will, the position taken in this paper tenable and how the study of static electrical apparatus is thereby simplified and elucidated.

The glass, mica or hard rubber plates, revolving and stationary, are magnets, which, by their mutual reaction upon each other and the surrounding atmosphere, form magnetic circuits. Metallic objects placed in these circuits become electrified. The static machine is there-

fore a high potential dynamo, a generator of the lightning current.

If the current from such a generator is conducted to the arms of a second static machine, the revolving plates or armature of the second instrument will move in the opposite direction and light running machinery attached to the pulley on its axle can be operated. Under these circumstances the static machine is an electro-motor.

As already intimated the electro-magnets constituting the fields of a dynamo, a motor or a dynamotor find their analogue in the stationary or field plates of the static machine, the tinfoil or gilded paper taking the place of the wire wound upon the bobbin, and the sheet of glass or other material is the counterpart of the iron core.

In the construction of the Toepler static machine the stationary or field plates are usually circular in form, composed of two thin discs of glass cemented to each other.

Inclosed between these two sheets of glass are two large kidney shaped pieces of paper, similar to each other in their dimensions and symmetrical in their position which is equidistant from an imaginary line drawn vertically through the center of the field plates.

Superimposed on either side of each kidney shaped piece of paper at their center, is a narrow strip of tinfoil. The strips of tinfoil face outwards so that they may be seen through the glass plates, each strip is metallically connected to a fine wire brush which plays against the outer surface of the neighboring revolving disc where, by the friction between brush and disc, a condition of electro-magnetic excitation is established.

After excitation, the brushes and their supporters act as conductors of electricity, from the revolving to the stationary plates, and thus maintain the electro-magnetic activity of the latter structures.

It will be our effort to demonstrate that after primary excitation is obtained a collecting comb can perform the function of conductor equally as well as the brush and the apparatus can thus be relieved of the objectional friction action.

In other words, to show that brushes are only necessary on a Toepler or other variety of static machine to bring it into primary action.

As the result of considerable study and experimental work prosecuted with a view of incorporating in a single static machine all of the good features of its predecessors, to eliminate as far as possible their objectional ones and, at the same time, add such improvements as might prove of benefit, the writer determined to incorporate within a single case upon a common axle a single sectioned, variously modified, Toepler instrument with a Holtz machine of many sections, both portions to have revolving plates of the same dimensions.

As constructed the Toepler section develops the initial charge which excites all portions of the apparatus. After full electrical activity is obtained, by a special device, operated from the outside of the case, the brushes are thrown out of action and their places taken by small collecting combs, then the entire machine can be operated as a purely induction apparatus.

This device consists of a hard rubber knob or handle the base of which passes through the woodwork at the rear of the case. On the inside of the machine the base of the handle is fastened by a hinge joint to a long piece of hard rubber tubing in such a manner that the turning of the knob will impart to the tubing a to and fro motion. The tubing is placed diagonally across the machine behind the posterior wheel, just under the axle, nearly at right angle to the neutralizing rod. It is supported at either extremity by a short arm, which extends to a small metallic hub attached

to the projecting edge of the stationary plates. From the same hub there projects at other angles a brush and a comb holder. So that the to and fro motion of the rod imparted through the knob on the outside of the case will throw one of these structures into and the other out of action.

Owing to the resistance in the form of air gaps interposed between the collecting combs of the field plates and the revolving discs the Toepler machine thus constructed, can not reverse its polarity while in operation.

If the brushes are removed and are not replaced by collecting combs, the Toepler section appears to work backwards because it consumes some of the energy generated by the other portions of the apparatus.

The Toepler section also differs from the conventional form of that machine in that the exciting energy for both stationary plates is obtained from the external or posterion revolving disc. Not any energy is taken from the internal or anterior disc, consequently, that structure is not provided as is usually the case with sectors.

When all the portions of the apparatus are electrically active the Toepler section generates a quantity of electricity which compares favorably with the amount generated by any single section of the Holtz.

The kidney shaped paper fields of the Toepler are turned from their usual symmetrical position and are brought as nearly as possible into this alinement with the saddle shaped paper fields of the Holtz.

This combination of old and new principles has been operated most successfully in the hands of several local experts. It is now presented from the home of my alma mater for your inspection, commendation or criticism.

Buffalo N. Y.

X-Ray an Absolute Necessity in Dental Surgery.

BY DR. FRANK AUSTIN ROY.

Mr. President and Gentlemen of the Roentgen Society of America.

We make a very strong statement when we claim that anything is an absolute necessity, but the electrics have become such to modern life, to twentieth century existence.

Some places exist without the telephone, telegraph, etc., but not for long in this century. They are asleep or dying because lacking the necessities of twentieth century life.

So the surgeon who goes on guessing with or without good judgment and experience, probing and prodding and cutting for mere diagnosis, while his confreres use the x-ray and know what to do without preliminary exploratory operating. The surgeon who fails to use this necessity will drop out of the race this century.

This positive diagnosis has become a necessity also to dental surgery. Dealing with the structures that affect the appearance of the face as well as having their more utilitarian value at the gateway of the digestive tract, any extra or uncertain cutting here does far more harm because disfigurement is added to loss of use and impairment of the nutritive functions so necessary to life. So I may say positively that in this twentieth century the x-ray is an absolute necessity to dental surgery. Without the x-ray such surgery is of the past.

Dr. Price and others of this society have done an immense amount of x-ray work for dental surgery. Your wonderful pictures have corrected diagnosis and shown how useful the x-ray is to us.

I belong to that class of dentists who believe we must go beyond the merely mechanical in dentistry and meet all the surgical requirements that are in any

way connected with the teeth, yet not caring to do any surgery not so connected.

There are very many troubles of the teeth and adjoining parts that require more than mere mechanical treatment. True surgical work is necessary. To diagnose the location and extent of the trouble is always difficult, but with the x-ray it becomes positive.

Very few dentists have neither the time or inclination to take up for themselves the study of the x-ray and the necessary photography. I believe we can much better afford to pay an expert than spend time becoming only mediocre x-ray operators, especially as good dental x-ray work is very difficult to attain.

Dentists can find good men within reach in any section of the country. I do not think any one thing could do more to extend and popularize the use of the x-ray. You who do this kind of work should advertise yourselves among the dentists for the good of the cause, even if you are too busy yourselves.

Being difficult work, you must get a good fee to pay you for the extra trouble that comes up in many cases.

It may take some time for the dentist to learn to read the negatives aright, but if he really knows the pathological conditions liable to be met in dental surgery, then, with the assistance of a slight knowledge of photography, he will get positive results and be willing to pay well for good x-ray work.

I have had very fine work done for my patients, giving me positive diagnosis, and reassuring the patients as to proposed operations.

There is no need of citing cases. You have had a great many fine negatives of such cases exhibited before this society.

Why should a New York surgeon advise drilling into the jaw to see if there be a nonerupted tooth, when a New Orleans dentist had located the tooth with the x-ray?

Why should a patient go on suffering pain for years with an apparently healthy tooth and wish it extracted, when the x-ray picture showed conclusively a slight blind abscess easily cured by a simple operation.

Why should we go on probing and prodding and cutting blindly when a perfect diagnosis can be made with the help of your services with the x-ray?

New York City.

Hysteresis.

It has been noticed by operators of x-ray coil machines that when the interruptions are very rapid there are less x-rays than when the interruptions are slower. We have been asked to explain this. In the *Journal of Physical Therapeutics* for Oct. 15. Ch. Colombo and Thouvenet have written these words: "The more frequent the interruptions the shorter becomes the time during which the case is excited, for here the phenomena of hysteresis comes into play; that is to say, a delay of magnetization and of demagnetization. The magnetization does not arise immediately on the passage of the current, and does not cease immediately. The current stops in the same way as a mill-wheel; does not begin to move immediately the water falls on it, nor does it stop immediately the water ceases to flow, on account of the phenomena of inertia. Hysteresis represents magnetic inertia. Now as the phenomena of hysteresis have come into play, it may be said that the greater the speed the less the magnetization and consequently the less the secondary discharge. Hence high frequencies can not be obtained by the interrupter, which in reality possesses an action much more limited than might be thought and which, to work well, ought to work the more slowly the greater the size of the coil."

Subscribe for THE AMERICAN X-RAY JOURNAL—$3.00 a year.

X-Ray in Country Practice.

Read before the Roentgen Society of America, University Building, Buffalo, N. Y., Sept. 11, 1901,

BY DR. JOSEPH C. CLARKE.

The x-ray in the practice of medicine and surgery in the country has become a decided necessity as an adjunct to surgical skill and medical diagnosis and the object of this paper is to show the simplicity of its use in many emergencies that arise.

The country physician may be a little backward upon the theory of the x-ray light, the cause of the x-ray burn and many other mooted points, but if he is going to do x-ray work he must have a good apparatus which every morning must be put in working order, ready for the emergency that may come upon him like a bolt of lightning out of a clear sky. My usual course during the muggy weather is to put a Mason fruit jar, filled with cracked ice in the static machine and if it is very damp and humid, light my gas stove for about half an hour, raising the temperature of the room to about 90 degrees. This, with the help of a charger, will insure a good current every day of the 365. After four years of experience with actual cases, I am more than ever a firm friend of the soft tube and have yet to have a burn occur in my practice.

The patient appears with a needle in the hand or an elbow that is injured and a radiograph is desired. My photographer furnishes me with the size plate needed and after an exposure of from 2 to 30 minutes, depending upon the thickness of the part, the plate is returned to the gallery and developed under my direction. My experience with ordinary plates has been so satisfactory that I shall continue to use them until I find something better.

If an operation is decided upon, the plate is brought back and used for reference during the operation and the prints from the plate are made later.

Now all this is very simple, but to read an abnormal condition correctly, one must know the normal and I have on hand radiographs of nearly all the joints taken to locate foreign bodies, and by comparison am able to make a sure diagnosis.

Since the meeting in New York last December, where my treatment of Lupus was the only case reported in this country, I have treated three cases of Lupus successfully and present a photo of one of them. There have been no relapses in these cases.

I believe the Roentgen ray will cure rapidly and quickly the superficial varieties of Lupus and will control and assist caustics in the cure of the deeper varieties that are characterized by relapses and the formation of tubercles. I believe it will relieve the pain and often cause marked lessening of discharge in epithelial cancer, but do not believe it will cure them, nor do I believe it will cure pulmonary tuberculosis and I would suggest this society make a definite statement upon these subjects, because the quacks all over the country are victimizing many, who if they were warned, would then have no one to blame but themselves.

The use of the Roentgen ray, in my opinion, will for some time to come be an emergency one, and the surgeon whose office is equipped with apparatus and familiarity due to daily use will always be prepared for any emergency that may arise, and also can dip into the many new avenues of use that are constantly opening. I believe a clear cut statement as to just what can be done by the x-ray as an aid to diagnosis by any good common-sense physician will do more to advance the use of the x-ray than columns upon the cause of x-ray burn and other theories.

The following emergency case came into my office last Friday: A child 16

months old, with a history of having commenced to choke the Wednesday evening preceding. Temp. 193, pulse 160, respiration 60, croupy and signs of decided obstruction in the larnyx. An x-ray examination showed a foreign substance in the larnyx. Tracheotomy was performed and the foreign substance located in the æsophagus and all efforts to reach it and remove it through the mouth failing, the subtance was pushed into the stomach with a bougie. The child, upon Saturday, passed a copper rivet ¾ of an inch long with a head ⅜ of an inch in diameter and is making a rapid recovery.

In conclusion, I would say, have a good apparatus that is always ready and then with care and ordinary skill successful results will follow your efforts.

Olean, N. Y.

Verdict—X-Ray Burn.

Otis Clapp & Son of Providence, R. I., have written us that a verdict has just been rendered against them for the sum of $6,750 on account of an x-ray burn inflicted with a static machine.

Dr. Augustus C. Bernays has recently been elected president of the Academy of Medicine. This is the most enlightened, classical and high grade medical body west of the Allegheny's. Lr. Dampheare was the retiring president. Both of these surgeons use the x-rays.

Dr. John B. Deaver, of Philadelphia, in the *St. Louis Clinique*, says that the x-ray is used in making differential diagnosis between renal colic and appendicitis.

FRACTURE UPPER THIRD OF THIGH.
Note nature's effort to repair, by the abundance of callus thrown about the fragments, notwithstanding the bones are almost at right angles.
Property of St. Louis X-Ray Laboratory, Chemical Building, Eighth and Olive Streets.

X-Rays from Static Machines for Therapeutic Purposes.

The following letter from Dr. Pusey, of Chicago, will explain itself. The inquiry is a quotation from his reprint on the x-rays in the treatment of skin diseases. Dr. Pusey's opinion is not shared by all x-ray operators:

Nov. 7, 1901.

Dr. HEBER ROBARTS, St. Louis, Mo.

Dear Doctor:—I have your favor of October 30 asking me why "the work should not be undertaken with static machines or with the ordinary apparatus used for diagnostic purposes." The answer to this is suggested in the previous sentence of the same paragraph of my article, viz.: "It is necessary that all of the factors involved in producing the light be definite and that there be repeated exposures to a weak light, the effects of which may be controlled, rather than the use of a strong light for a few exposures." As I said in that paragraph I use the technique suggested by Schiff and Freund, described in my previous article, in which the light is produced by standard current of 12 volts and 1½ amperes and a coil of 30 c. m. spark length. I believe it is only by maintaining your factors definite and using a weak light that you can pursue the method with safety in all cases. The light produced with a static machine is in quantities which are greater than is safe to use repeatedly for long exposures and there is no way of accurately determining the factors in the production of light. Of course, the often made statement that burns do not occur with static machines is readily refutable. The ordinary apparatus used for diagnostic purposes requires a larger primary current than I believe is safe and the ordinary apparatus also is not equipped with means of measuring the primary current. For these reasons I believe it should not be used for the sort of work which I had under consideration. Of course, in desperate conditions like inoperable carcinomas one might be justified in running the risk of injury by the use of uncertain and large quantities of light, but I take up in my article rather more extensively than the malignant diseases minor affections of the skin which are treated with the x-rays, as acne, hypertrichosis, and the treatment of such cases should be undertaken only with apparatus where the chances of any damage are reduced to a minimum. I was afraid in writing my article, when considering its use in such conditions as acne, sycosis, ringworm, etc., that some men who are unfamiliar with the subject might be led on to use it in these

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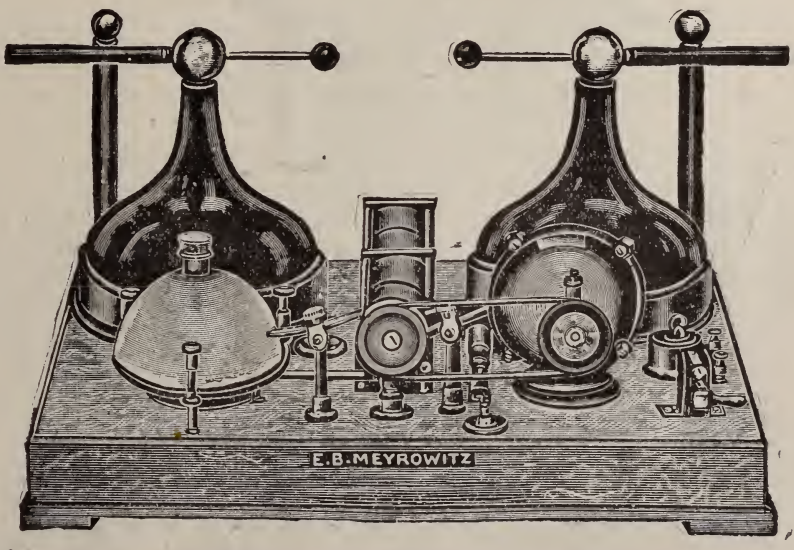

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360 St. Peter Street, St. Paul.
3 rue Scribe, Paris, France.

comparatively trivial affections without due care and with the production of unexpected disastrous results, I felt, therefore, that at least one short paragraph of caution should be given.

Thanking you for your kind letter, I am,

Yours truly, W. A. PUSEY.

The *Electrical Review*, of London, gave a brief summary of the meeting of the Roentgen Ray Society of America. The expression was kind and timely, and is appreciated by members who read this great weekly.

Otis Clapp & Son of Providence, R. I., will pay cash for Vol. 6 of THE AMERICAN X-RAY JOURNAL. Any one desiring to dispose of this Vol. please write to them.

D'Arsonval currents are not high frequencies, but are condenser discharges with not too high speed interruptions. They are oscillation discharges.

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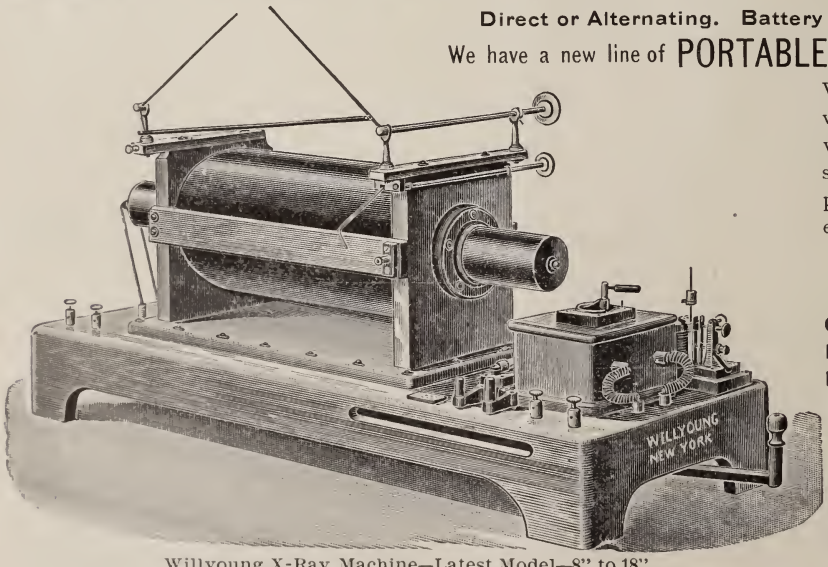

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Devoted to Practical X-Ray Work and Allied Arts and Sciences.

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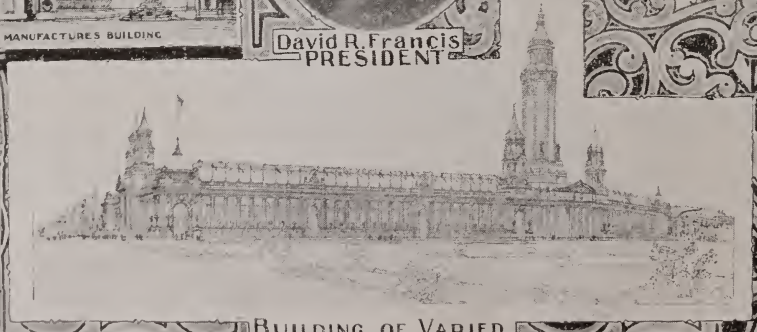

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THE AMERICAN
X-RAY JOURNAL.

Devoted to Practical X Ray Work and Allied Arts and Sciences.

VOL. 10. ST. LOUIS, APRIL, 1902. NO. 1.

The Practical X-Ray Diagnosis.

Prepared by J. Rudis-Jicinsky, A. M., M. D., M. E., Cedar Rapids, Ia. Revised by M. U. Dr. Joseph Hoffman, Vienna, Austria.

A series of A. B. C. teaching for workers in x-ray diagnosis and therapeutics, to be concluded in 20 articles. Fully illustrated.

PREFACE.

In presenting these series of articles to the student of the new branch of diagnosis, I wish to express my obligations to the many of my collaborators and authors, whose various works I have freely consulted, asking from the reader kind consideration of my effort to describe fully and practically the progress of the x-ray since its discovery, the phases of which have changed, especially in diagnosis, and are still changing.

What are the x-rays?

We do not know just what the x-rays are, nor why they are produced under the conditions existing in a vacuum tube. But we do know that by following certain processes and making certain chemical combinations we can make as much x-rays and in such proportions as we want or need for penetration of certain objects. It is difficult to predict to what final uses the simple fact discovered by Prof. Roentgen, that different substances are more or less opaque to the x-rays, in proportion to their density, may be put, and what the near future will bring us in regard to the proper diagnosis in Surgery and Medicine. There are enormous possibilities lying dormant.

Emile Gautier says: "Suppose that we are looking at a photograph representing the skeleton of a pocketbook. There are the metallic parts, the frame, the leather lightly discernable, while inside are the key and a piece of money.

"Let us now see how the photographer produces this queer picture.

"First, he goes into his dark cabinet. He has no electrical apparatus or any other apparatus for that matter.

"He places the pocketbook on a sensitive plate. At the end of two or three hours he takes his plate, develops it, and we have the photograph of the pocketbook. All this has been done without sun or electricity.

"What kind of a miracle is this?

"It is simple. The photographer has left in the proximity of the plate a tube, containing a few centigrams of chloride of barium. This story reads like a fairy tale, yet it is only one chapter of the history of science.

"In 1896, M. Henri Becquerel made the discovery that the compounds of a metal called uranium, emitted peculiar rays, and the emission was spontaneous and constant. That is, he discovered that this matter has in itself its own light and that this light was eternal. This fact reversed all known principles of chemistry. These rays were given the name of Becquerel rays, and the substances emitting them were called radioactive.

"It was in studying the properties of

the radioactive rays that the investigators ascertained in an ore, the ore of oxide of uranium, the existence of three substances. These substances were polonium, which was found by M. and Mme. Currie; the radium, which was also discovered by them; and the actinium, which was discovered by M. Debierne.

"These ores of uranium were secured at the state works at Jachymov, in Bohemia. Several thousand kilograms, besides tedious, expensive and hard labor, were required to obtain a few decigrams of the substances, which are now astonishing the scientific world. They partake at the same time of the properties of the cathodic and x-rays.

"These substances spontaneously generate electricity. In a laboratory of physics they upset all the apparatus. If the operator is saturated with their mysterious energies, he can not approach an electrical appliance without upsetting it. At a distance they produce a chemical reaction. One of the most wonderful results in connection with this is photographs as mentioned above. They are spontaneously luminous without undergoing any transformation to a perceptible degree.

"The price of these substances, owing to the difficulty of their production, practically annihilates their industrial value. But it is reasonable to suppose, that later on they will be produced as cheaply as aluminum, formerly so expensive and obtained so easily at small cost.

"We can already perceive the applications that will be made of these substances. It will be possible to treat wounds by the radioactive action of radium. The volts of radium may be used one day to cure neuralgia through slow emission of electricity.

"Anyone carrying in his pocket a few grains of the substances would be able to reproduce, and with what ease, all kinds of skiagraphs. With a sensitive plate he would be at liberty to read through solid bodies, as it has been demonstrated that the rays can penetrate through several centimeters of metal."

PART I.—LESSON I.

INTRODUCTION —*Apparatus for the production and application of Roentgen or X-Rays.*

Roentgen ray or x-ray diagnosis are the terms used to designate the methods which are employed for detecting of normal or abnormal conditions, disease or injury in some part or any organ of the human body; to observe during life the anatomical changes which can be recognized with the help of the x-ray only, or with the employment of the x-rays in connection with other methods of eliciting the signs of disease, or trauma. The proper significance of this method is shown, not by theory, but through clinical behavior and observation confirmed by the x-ray examination in all those cases where skiagraphy is possible. Inspection, Palpitation, Mensuration, Percussion and Auscultation, Blood count, Microscopical, Chemical and all modern methods of diagnosis are sometimes only subsidiary to these important findings of the x-rays. But for a complete and accurate exploration you must always employ all the different methods and modern means of diagnosis, to do your duty toward the patient and the profession at large.

The question of the value of the x rays in diagnosis of certain lesions seems to be settled; it is beyond the experimental stage and has come to stay. I desire to take this opportunity to urge the more general use of x-ray examinations by our profession and to repeat the warning again and again, that this branch should and must remain in our hands only, because there is a necessity of a great deal of refinement in operating the

x-ray, and its pictures, experience in examining, ability to read correctly the varying shadows, as well as a good deal of knowledge in anatomy, pathology, and physic. There are so many new "things", proprietary and otherwise, added to the list of the surgeon of today, that the individual can scarcely keep posted on all of them, but he will with great avidity appropriate those facts which can be instantly transformed into working force, and will always appreciate the demand for the practical, the utilizable, especially in the case of *early* and *proper* diagnosis.

Pushing aside the theoretical discussion and gain, from which is conspicuously apparent, it is well to review the results of actual , the good work only. For good x-ray work, the first requisite is an exciting apparatus, and *it makes no difference* if it is a coil or a static machine of good make. We are after the proper source of electricity, and nothing more. The knowledge of our apparatus, proper technique in each individual case, the knowledge of our Crookes' tube, the management of the same, the knowledge of the power of our x-ray produced, the distance of the tube from our object, the distance of the anode plate from the photographic plate specially prepared for the x-ray manipulations, the duration of exposure, the relative position of the tube to the object and the angle at which the picture or skiagraph is taken, are the first main rules in the photography of the invisible.

We have to know the capacity of our apparatus or the length of the spark, which may be produced. If a static machine is employed in our x-ray work, mark the number and diameter of revolving plates and their speed. If a coil is used, look always after current employed, remembering the amperage of the current passing to the tube. The best tube is the one which is known to you, and used every day, the one in which you know the distance between the anodal plate and the cathodal cup, the one in which you know and have learned to observe the quality of the vacuum backed up by a certain length of spark gap before radiance appears, and know all other points of individuality of the tube. Beside that, note the character of the photographic plate, when skiagraph should be made, the number of coatings of film, sensitiveness, the age of the plate and what support and the number of intensifying screens shall be used, if used at all. Also note the particulars of development, the developer used and all steps concerning printing, paper, etc. If we wish to make correct diagnosis in suitable cases for skiagraphy, and produce an accurate picture of the *status presens*, we must never be satisfied with one picture or skiagraph of the injured part or the diseased part examined, but make it also our duty to compare the picture of the diseased part with the normal one. We have to work as rapidly as possible, make short exposures and protect our patients. We always have to keep the obliqueness of the x-ray in mind, make skiagraph as near life size as possible, to get sharply defined outlines, remembering that we are dealing with shadows only, and use proper means of proof for measurements and exactness of our picture.

We will now briefly describe the different apparatus which may be employed as aids in x-ray diagnosis, and give some rules to guide us in their use.

APPARATUS REQUIRED.

The apparatus required for the production and application of the Roentgen or the x-ray, consists of following parts and accessories:

1. Source of electric current.
2. The Crooke's tube or the vacuum tube.
3. Induction coil or static machine with her own current, with or without Tesla's transformer.
4. Fluoroscope, fluorescent screen, skiameter.

5. Interrupter, with speed indicator and spark tester.
6. X-ray tube stand.
7. Moveable bar with wire-holder.
8. Connecting wires.
9. The casket.
10. Special dry plates or films.
11. Intensifying screens.
12. The copying frame.
13. The operating table. (Measuring stand for fluorometer).
14. Leaden box with diaphgrams for precluding the diffused rays.

The electric current may be generated by primary or plunge batteries, storage batteries or accumulator batteries, static machines, or the charging may be done by means of an electric light installation, thermo-piles, and constant, direct or alternating current.

To enable the observer to see the x-ray, it is necessary to employ a screen of tungstate of calcium or barium-platino-cyanide, which is mounted in a frame that can be stood on a table in the dark room or in the shape of a hand fluoroscope, which is a hood fitting closely to the face and excludes the outside light.

A B C of X-Rays.

We have arranged for a series of articles covering the entire teachings of the uses of the x-rays. This will include the physics of the apparatus, but more particularly the A B C or primary instruction in diagnosing and the therapy of radiant matter. The lessons will probably be divided into 20 sections, some of which will be liberally illustrated. No one interested in the x-rays and its teachings can afford to miss these lessons. They are unexcelled and absolutely new.

The Illinois School of Electro-Therapeutics, of Chicago, is doing good and faithful work and deserves the highest commendation.

Subscribe for THE AMERICAN X-RAY JOURNAL—$3.00 a year.

The Value of the X-Ray as a Therapeutic Agent.

Read before the Roentgen Society of America, at University Building, Buffalo, N. Y., on September 11, 1901,

BY PROF. H. P. PRATT, M. D., of Chicago

In the x-ray we have an agent whose therapeutic value has been underestimated in certain cases and overestimated in others. This is probably due to the lack of sufficient knowledge on the subject, especially as to the nature and character of this force and its method of application. We must not be carried away with the idea that it is a cure-all; if so, we will certainly be disappointed. But with a thorough knowledge of the nature and effects of this force, we may reasonably expect good results. It has its field of work. A full knowledge of this field can not be acquired in a day, but only by months of hard labor. Every day's work brings to us added knowledge. The limit of its healing powers time alone will decide.

This force has been applied with good results in the following cutaneous and other diseases: Hypertrichosis, sycosis, favus, rosacea, eczema, psoriasis, lupus vulgaris and erythematosus; also in tuberculosis of the bones, joints and softer tissues. In epitheleoma, carcinoma, sarcoma and osteosarcoma, improvement, and in some instances, cures have been reported. Most of the above diseases have been reported cured or much improved in the for eign medical journals, by such men as Schiff and Fruend, of Vienna; Kemmell and Hahn, of Hamburg; Steinbeck, Seyneira and many others.

Admitting that the x-ray is of some therapeutic value, as we must in the face of the above authorities, let us refer to history and note the progress made along this line and the obstacles we have had to contend with. We have in this country quite a number of investigators and original experimentors, who are working

along the same lines as our foreign friends. Such men as Jones, of San Francisco; Knox, of Cincinnati; Johnson and Merrill; and in our own city (Chicago) such men as Burdick, Blackmarr and Pusey. Our worthy president, also our secretary, our treasurer and other members of this society are working along this line; and, in fact, each city can make claim to individual workers as well. The first investigators found it a difficult task to overcome the various obstacles that lay in their path; the lack of a suitable apparatus, such as coils, tubes, etc., and especially the prejudices of the profession. With time came a better apparatus, and the x-ray burn, which being indisputable proof of the power of the x-ray to do something, called the attention of the profession to its therapeutic value.

The first published account that I saw of the x-ray burn came from Berlin by cable, to the *New York Journal*, July 23, 1896, as follows: "Dr. Markuse, whose interior has been photographed thirty times within the last twenty days by the Roentgen process, has lost all of his hair as a result, and his face has assumed a brownish color. The skin has peeled off his breast where the instrument had touched it, and on his back, what was first a sore, finally developed into a bleeding wound, surrounded by burnt looking cuticle. The victim is exhausted." My attention was first called to the x-ray burn in April, 1896, when Prof. Wightman and myself inoculated Guinea pigs with the bacilli of tuberculosis and exposed them to the x-ray, which tookthe hair off from the pigs in patches, leaving a sore. This state of affairs began to check progress for a while, preventing further investigation. Scientists were endeavoring to determine the cause of these injurious effects. It, however, took further experiments out of hands of the tyro and brought about a more careful and systematic method of investigation. More than one man has sacrificed his life in the development of the x-ray. To my knowledge there has been five or six deaths.

I will now give a brief review of my own work in this field. On the morning of the seventh day of February, 1896, I saw the first account of Prof. Roentgen's work. Having been a student and teacher of physics and interested in college work, I had in my experimental laboratory a Ruhmkorff coil, Crookes and Geissler tubes, which had been in my possession for a period of over 20 years, used for experimental work, and I was somewhat familiar with the cathode ray and the changes in vacuum tubes. I had observed similar phenomena, so I was in a position to formulate a theory immediately, which was published in all the daily papers and in the electrical and medical journals. I then followed up a series of experiments to test the correctness of my theory. In the first part of April, 1896, with the kind assistance of Prof. Hugo Wightman, I succeeded in destroying the bacilli of eight different diseases, in culture tubes, as follows:

The bacilli of Cholera,
" " " Diphtheria,
" " " Influenza,
" " " Glanders,
" " " Pneumonia,
" " " Typhoid,
" " " Tuberculosis,
" " " Anthrax.

An account of this was published in the Chicago *Times-Herald*, on April 13, 1896, and republished in other dailies, and in electrical, scientific and medical periodicals. Immediately after destroying the above cultures, thereby demonstrating the therapeutic value of the ray, I commenced to use it as a therapeutic agent, and on April 13, 1896, the date of the above announcement, I placed my first cancer patient under treatment. A report of this appeared in the Chicago *Times-Herald* of April 14, 1896. The

most notable effects observed at that time were the relief of pain and the checking of the hemorrhages. This was a case of cancer of the stomach. On the 18th day of April, 1896, assisted by Prof. Wightman, I inoculated Guinea pigs with the bacilli of tuberculosis and exposed them to the x-ray with the following result:—Those exposed to the x-ray increased in weight and thrived; the others died. On the sides of the pigs nearest the tubes, as I said before, all the hair came out, leaving a running sore. This experiment was repeated several months afterward.

Cable to the New York *Journal:* "Lyons, June 25, 1896.—Prof. Lortet, who has experimented on Guinea pigs, says investigation proves that Roentgen rays prevent the development of the bacilli of tuberculosis."

On July 9, 1897, I exposed to the x-ray, rabbits which had been inoculated with rabies by Dr. Lagorio, of Chicago. Results unsatisfactory.

On April 17, 1896, I treated my first patient suffering from pulmonary tuberculosis. This patient improved under treatment. I, however, lost track of this case and have been unable to obtain a report before this meeting. On April 19, 1896, I placed my second case of pulmonary tuberculosis under treatment. The patient died several weeks afterward. He was too far gone and he only continued his treatment about a week and then left the city. This case was placed under treatment in the interest of the New York *Journal*, and reports can be seen in that paper at the time.

On May 20, 1896, the third patient suffering from pulmonary tuberculosis, was placed under treatment. This patient was referred to me for treatment by Dr. Frances Dickinson and Dr. Effie Lobdell, of Harvey Medical College. The patient was examined by Dr. Wm. Harsha, Dr. Geo. F. Hawley, Dr. J. C. Spray, Dr. M. F. Sterling, Dr. J. E. Gilman and others, of Chicago.

The following record of this case was kept by Dr. M. F. Sterling:

Case: Andrew Gorgan was born near Naples, Italy, in 1875 His parents were vineyardists; both are living and healthy. He has a brother of 17, who is a strong and healthy boy. In 1886, the family emigrated to America and settled in Ohio. Near their home was a large creek of very cold water, and Andrew often stole away to bathe there with the other boys, remaining in wet clothes often for hours. He caught cold after cold, and at last a nagging cough set in, of which he could not get rid. Suddenly hemorrhage set in, and for the first time, his parents took alarm. Physicians were summoned, but he never got anything more than temporary relief. Hemorrhages again and again recurred, growth ceased at this point, appetite became irregular and capricious, sleep restless and unrefreshing, there was constant fever and drenching night sweats. The parents now determined to move to Chicago, desiring to consult a wider range of medical skill than the Ohio town afforded. They arrived in the autumn of 1895. He at once began attendance at the clinics of the medical colleges in rotation; as he found no improvement in one he tried another. At last his case was pronounced hopeless by several specialists, and his father was directed to use anything to make him comfortable. Treatment was considered useless, and so he was given up to die. Early in 1896, the x-ray was a topic of anxious investigation to us, as to whether it had therapeutic value or not, until we placed tube culture of the bacillus tuberculosis under the ray and found that no further propagation occurred after exposure of two hours. This test was made time after time with different cultures, always with the same results.

This discovery was given to the world, and was received with much adverse criticism, and even ridicule, by all classes of the profession. To the initiated, the thoughtful and those who really desired to see the demonstration of the truth, every facility was given to verify the statements made. After all doubt was removed as to the cultures, the conservative criticism was advanced that, although tube cultures were unable to stand the x-ray, it might not be the same with bacilli in the human lung tissue in the living organism. It was thus that this unquestioned case was submitted for experiment. Before placing him under the ray, his height was 4 feet 11¾ inches, weight 74 pounds. The right lung from apex to mammary region was said to be one big abscess, discharging pus in quantity. Appetite was gone, digestion impaired, sleep restless and unrefreshing until nearly morning, fever constant, rising to 104 degrees. Hemorrhages recurred every four or six weeks, amount varying from a few mouthfuls to a breakfast cup full at each discharge. Of the leading specialists who passed upon him, the most hopeful placed his longest possible limit of life at about five weeks.

His x-ray treatment began May 20, 1896, at 1:15 p. m., and continued for two hours at each seance. Before treatment his temperature, pulse and respiration were taken; temperature 103.5 degrees, pulse 100, respiration 34. At the beginning of the second hour, temperature 102 degrees, pulse 120, respiration 28. At the end of the second hour, temperature 101.75 degrees; pulse 120; respiration 22. Half an hour after the treatment ended, temperature 101 degrees, pulse 100, respiration 20. At the end of the first hour of treatment Andrew was sleeping soundly.

May 23, temperature 99.5 degrees, pulse 112, respiration 36. Second hour, temperature 100.20 degrees, pulse 112, respiration 30. Third hour, temperature 99 8 degrees, pulse 98, respiration 35. The patient reports night sweats much lessened, no return of hemorrhage, which was threatening at last treatment. Feels stronger and appetite is improved.

May 26, 1:30 p. m.; temperature 99 3 degrees, pulse 110, respiration 28. Second hour, temperature 100 degrees, pulse 120, respiration 27. Third hour, temperature 100 degrees, pulse 120, respiration 30.

May 28, 1:30 p. m.; temperature 98 2 degrees, pulse 90, respiration 18. Second hour, temperature 98 5 degrees, pulse 96, respiration 18 Third hour; temperature 100 degrees, pulse 96, respiration 18

Cough much lessened in frequency; yesterday only two paroxysms during the day. Bowels regular, appetite voracious, sleep restful and dreamless; awoke only twice to cough and immediately slept again. Sweating much less, but still overnormal in amount.

June 9, 1:30 p. m.; yesterday felt so well that he attended an Italian wedding in his church. Attended the supper at night, overate and was taken to the drug store to be treated for colic.

Has gained one pound in body weight. Reports almost no cough during the day, but several times during the night. Is in fine spirits; begins to walk about freely. Urine excessive in quantity, has been so since the first.

First hour, temperature 98.5 degrees, pulse 100, respiration 20. Second hour, temperature 98.5 degrees, pulse 100, respiration 28. Third hour, temperature 98.5 degrees, pulse 86, respiration 18.

The variation in pulse, respiration and temperature, is dependent upon the distance of the tube from the chest wall and the strength of the current. The closer the tube the stronger the force, and hence, the more powerful the electro-therapeutic action. A rise, therefore, of pulse and respiration always oc-

curs under treatment, but this declines abruptly about an hour later.

June 13. He has gained another pound in body weight. Microscopic examination of the sputa shows marked decrease in the number of bacilli. Urinalysis showed that although the urine was in excess, the proportion of the solids was unchanged. He, today, walked two miles without fatigue. Appetite still in excess, digestion good; present weight 78 pounds.

June 30. Yesterday he attended an Italian picnic in Lincoln Park; sat on the wet grass for several hours, caught cold and all his symptoms showed acute nephritis.

Now says he had acute inflammation of the kidney four years ago, and for a time this was a very bad complication.

Angust 6, 11:45 a. m. Temperature 99 degrees, pulse 92, respiration 14. Second hour, temperature 99.5 degrees, pulse 84, respiration 16. Third hour, temperature 100 degrees, pulse 92, respiration 18.

Says he feels good, appetite and digestion very good. Cough almost gone, except in the morning a little. Urine shows specific gravity 1014, reaction neutral. Sediment normal, no sugar, no blood, no albumen.

September 3, 1:30 p. m. Yesterday, wrestled to try his strength, then ran to a street corner and jumped on a street car in motion and got a sudden wrench; began to cough and brought up a small quantity of blood. Greatly frightened, but today no rise of temperature, pulse, or respiration. On examination found the blood came from the back of the throat. Complains of the throat being sore on swallowing; says he has eaten two pecks of peaches and one large watermelon without asssistance in two days. Complains of pain over the kidneys recurring at intervals. Small calculi voided with much pain. Microscopic examination of sputa shows only very few bacilli, in all not more than four in six slides.

June 23, 1897. Andrew Gorgan is in fair health. No fever or night sweats. Good appetite, sound sleep, and can walk for miles without great fatigue. From the day he took his first treatment he has never had the slightest hemorrhage from the lung; can take a deep breath without coughing. He is now simply weak and requires country air and a change from his very unsanitary surroundings.

This patient was in comparatively good health until his death, which took place July 9, 1900. Four months before his death he was at my office feeling better than he ever had. A few weeks later he took a severe cold and had an attack of pneumonia, which he partially recovered from. He finally died after an operation had been performed upon his foot or leg, I don't remember which, which resulted, as I understand, in blood poisoning. He had suffered for three or four years previously with stones in the kidneys, and we were in hopes that he would be able to be operated on for them. This case was reported by Dr. Finley Ellingwood, in the *Chicago Medical Times*, July, 1896, and by Dr. J. E. Gilman, before the Clinical Society, of June, 1897, and published in their official organ, *The Clinic*, July 15, 1897. From June 1, 1896, to March 1, 1901, I have treated for J. E. Gilman, over 50 patients, suffering from tuberculosis, cancerous, asthmatic, rheumatic, syphilitic and skin diseases, with the x-ray. I refer you to him for data of cases.

On June 8, 1896, Dr. John B. Murphy, of Chicago, referred to me for treatment a patient, suffering from lupus-vulgarus. The treatment continued for about three months, at which time the patient was discharged cured. The patient came to my office a year afterward feeling in the best of health. There was no re-

currence up to that time. She, however, left the city and I have been unable to obtain a final report in time for this paper.

On Oct. 21, 1896, Dr. Finley Ellingwood referred to me a patient, suffering from tuberculosis of the kidney. She was discharged cured by the doctor in about four months. The patient is still alive, and as Dr. Ellingwood informed me a few days ago, is enjoying the best of health.

For the results of the other patients treated by me for the various physicians, I will refer you to them for full data.

The pioneer worker's path is not strewn with roses. No sooner had we announced the destruction of the bacilli on April 13, 1896, and before the ink was dry, a cable from London to the *New York Journal*, dated April 14, 1896, stated that Dr. T. Glover Lyon had just tried similar experiments with negative results, and that the statements made by us, that we had accomplished it, were false.

On April 15, 1896, a cablegram came to the *New York Journal*, from Prof. Roentgen, which is as follows:

"Your dispatch tells me diphtheria was slain outright in the Chicago experiments, while no final and positive verdict is as yet given as to the effect on the bacilli of cholera, pneumonia, typhoid, and other plague germs tested. This is astonishing and partly disappoints my anticipation. I consider diphtheria and cholera the most deadly of plagues and believe positively that the bacilli of the other scourges would be the least difficult to kill. But I am confident that eventually the x-ray will prove an effectual cure for all such diseases.

"I will rejoice when it will be in the power of every competent physician to kill those bacilli. Then once having located them, the modus of annihilation will be mere technicality.

"If Profs. Pratt and Wightman have successfully completed their experiments, their names should go down to posterity as benefactors of the race, since humanity is immeasurably benefited by their work."

"What are your plans for the future?" was the next question.

"You know," he said, "that my original invention was accidental, but I am now going home full of new ideas to finish every detail.

"It is possible that I will hit upon the same modus of Profs. Pratt and Wightman.

"I am fully prepared and will have much better equipments to continue any investigations, and I will do so on my own lines, looking neither to the right nor to the left.

"All professional men are heartily welcome to my conclusions, though in their struggle to obtain the best possible results, each must go his way."

In answer to the question whether he had any conception of Prof. Pratt's methods, Prof. Roentgen said:

"I would rather not guess at Prof. Pratt's methods, but I am eagerly expecting further particulars, though as far as my own studies are concerned, I do not believe that they will be abrogated or adversely influenced by them. Americans sometimes accomplish great things in a hurry. We prefer to work more slowly and with greater deliberation. In conclusion let me repeat that I anticipate the usefulness of the x-ray in the cure of all manner of diseases from the start."

In the above dispatch, Dr. Roentgen also complimented me, thinking I was his old friend, Prof. Pratt, of Johns Hopkins University. After he discovered his error, he kept quiet for a short time until he had tried experiments on the bacilli of diseases. Then he made the statement that the x-ray was not a therapeutic agent, as it had no effect upon the tissues of the human body.

Just about this time Prof. Minck, of Munich University, succeeded in partially destroying the bacilli of typhoid fever.

On April 16, 1896, the following cable was received from Vienna: "The assertions made by Chicago professors, to the effect that they have established proof that Roentgen rays will kill bacteria of cholera and other diseases is regarded here as worthless, and the alleged discovery is absolutely false. Doctors of Vienna and Munich have proved to the contrary."

On April 27, 1896, Prof. Wm Schroeder, head of the electrical department of the University of Missouri, and Prof. Hickman, the bacteriologist, destroyed the bacilli of diphtheria in culture tubes. On August 1, 1896, they inoculated Guinea pigs with bacilli of diphtheria.

Several theories have been advanced to explain the nature and character of the x-ray. The two principal ones of today are the English and the German. The former is that of irregular transverse vibrations in the ether, the latter longitudinal waves of Hertz. Neither of these two theories seem to be quite satisfactory.

It appears to me that if we consider the x-ray as an electric current of very high potential, which makes its circuit from the inner surface of the tube outward, perpendicularly to the surface, then radiates in straight lines until the potential falls, when the rays return to complete their circuit by the terminals, we have a simple and practically useful explanation of all the phenomena.

After it was discovered that the x-ray possessed the power of blistering and burning the skin, the papers were filled with various warnings. My business, as well as that of others in this line, dropped off. No one wanted an x-ray picture taken, much less treatment.

The following theory, suggested by me, was published in the *Times-Herald*, April 13, 1896, the date of the original announcement, explaining the reason for the destruction of the bacilli:

"The magnetic force from the x-ray passes directly into the affected tissues. Electrolysis results, the chemical decomposition liberates oxygen, which unites with the free oxygen of the body and makes ozone. Ozone will kill every bacterium the human body possesses. The present state of the experiment proves outright murder in some instances and inability to work in others.

"The effect in either case, is eventually the same to the patient. The tissues in the latter instance gain new strength and drive out bacilli."

Eight months after this there was published in the daily papers, dated Dec. 6-7, 1896, the following article, defending the x-ray as a healing medium. I quote this in full, as it shows the same line of thought suggested in my original announcement, and also helps you to appreciate my position in the matter.

"Recently much has been published about the injurious effects of the x-ray upon the human body, such as its producing abscesses, burning and blistering of the skin, shedding the hair and finger nails, etc. For the last eight months I have had patients under the x-ray in my laboratory from 9 a. m. to 6 p. m., duration of treatment varying from a half hour to four hours at each sitting, and not once with any bad result in any case.

"After the Crookes tube is excited by the coil, the magnetic lines of force are projected down, in the same manner as they pass off from a magnet, and traversing the intervening space, pass through the body down to the floor, and back to the coil and tube again, completing the circuit.

"The x-ray is electrostatic in character and of a very high potential. With every discharge from the Crookes tube oxygen is liberated in the body as well as in the surrounding atmosphere which,

combining with the nascent oxygen, forms ozone.

"It is due to the electrolysis produced in the body that we are able to destroy the bacilli in contagious diseases; ozone being the most powerful germicide known.

"The ozone generated between the tube and the body does not produce the burning, etc., noted; it is the increased current which, passing through the body, produces electrolysis, the skin being of a higher resistance than the rest of the tissues.

"This same condition of burning takes place under the galvanic and static currents if excessive use be made of them. Except for potential alone, the two forces are identical.

"In some of the Eastern states criminals are electrocuted. Here electrolysis is carried to extreme, destroying the whole body; but the product of partial destruction exhibits abscesses, etc.

"In the disastrous treatments given and reported, the unskilled operators used a current in the apparatns of too high tension, and instead of hastening normal physiological change, carried their treatment to a point of electrocution. Strychnine is a good drug when used by a skillful physician, but a danger when in the hands of a tyro.

"It must not be forgotten that electric phenomena are very powerful, and not every man who can buy a machine is capable of applying it. The electrical machine must be as skillfully adjusted to each individual as the microscope to a specimen submitted to it. It is a treatment full of danger if ignorantly or rashly handled, but beyond price in value to the skilled and careful electro-therapeutist."

We will now take up the subject of x-ray tubes.

The hard and soft tubes are the same as high and low vacuum tubes. The x-rays are produced by the bombardment of the molecules of residual gas against the inner surface of the tube. The number of molecules of residual gas in the tube determines the degree of vacuum, as to whether it is a hard or soft tube.

The x-ray tube when excited, acts in a similar manner to a condenser or Leyden jar. It discharges in one direction, the outer surface of the tube becomes electro-positive, while the inner surface is electro-negative.

The tubes, as a rule, are excited from the terminals of the Ruhmkorff coil or the static machine. The current is established through the molecules of the residual gas in the tube, thereby connecting the cathode with the anode. Each oscillation in this circuit causes the molecules of residual gas to bombard the inner surface of the tube, which point of impact is the source of the x-ray.

When the tube is excited, some of the molecules of the residual gas are thrown from the cathode, striking the platinum disk or anode, which serves as a target, causing the molecules to rebound and strike the inner surface of the tube. This point of impact on the inner surface of the tube, as I said before, is the source of the x-ray. Every molecule of gas striking the inner surface of the tube, causes one or more lines of magnetic force to be thrown out at right angles to the surface of the tube. The distance to which the lines of force are projected or, in other words, the limit of the penetrating power of the ray, depends entirely on the potential of the tube, and this in turn depends on the force of the impact of the individual molecules of residual gas. The higher the vacuum, the less the number of molecules of residual gas in the tube, the greater the free path, the higher the potential, the greater the penetrating power. The lower the vacuum the greater the number of molecules, the less the free path,

the lower the potential, the less the penetrating power.

All substances through which the x-ray passes, form part of the x-ray circuit.

The x-ray circuit is the same as any other electrical circuit. It has its return forming an endless chain of molecules arranged in series. The higher the potential the greater the number of molecules added to the chain, the longer the chain; and vice versa.

The circuit is formed first from the point of impact on the inner surface of the tube, being directed outward until the potential drops, then returning to the tube through the terminals.

The x-ray is electro static in character, an accumulation of lines of magnetic force of high potential and short wave lengths in a circuit. They decompose every substance capable of being decomposed in their path and render every substance over which they travel a conductor of electricity.

The light which is emitted from the tubes is the result of the decomposition of the molecules in the atmosphere around and inside of the tube This light is not the x-ray current. The x-ray force is purely electrical and is invisible.

The softer the tube (limited) the greater are the number of the lines of force thrown out and the stronger the x-ray current, which increases decomposition; but the penetrative power is decreased.

The harder the tube the less the number of lines of force thrown out, and consequently the weaker the x-ray current and the less the decomposition, but the greater the penetrating power.

For good therapeutic effects, use a soft tube, increase or decrease the primary current to suit the case, but be careful to avoid x-ray burns. The ordinary hard tube will not burn during any reasonable time of exposure.

It has been my aim to establish the proposition that this new force is simply an agent or element for producing electrolysis and to give a more comprehensive idea of this force, I may restate my hypothesis based on "electrolysis," which is the "disassociation of the elements of a compound by the aid of electrical energy." When a direct current is applied to the body, be it the galvanic, the static or x-ray current, for the x-ray current is as much a current as the others, electrolysis ensues, producing a continual dissociation and association of the elements of the body as long as the current is applied.

The stronger the current the greater is the number of ions evolved, and vice versa. Ions are the products of electrolysis. Those evolved at the anode or positive pole, or on the surface of the body nearest the tube, are termed anions, and those evolved at the cathode or negative pole, on the opposite side of the body, away from the tube, are termed kations.

There are two distinct forms of reaction produced, found in the polar and interpolar regions. The polar region is the region of the body that comes in contact with the poles or electrodes, or the surfaces of the body; the interpolar region, the region between the poles, or within the surfaces of the body.

When the direct or x-ray current is applied to the body, immediately electrolysis takes place, driving all the electro-positive elements or ions along the lines of force away from the positive pole or anode, or surface of the body nearest the x-ray tube, to the cathode which is on the opposite side of the body, and all of the electro-negative elements or ions away from the negative pole or cathode, or opposite side of the body, to the anode in the direction of the tube. In other words, all of the electro-positive elements are repelled from the anode or surface of the body nearest the tube, but attracted to the cathode on the opposite side of the body away from the

tube; and all the electro-negative elements are repelled from the cathode, or the surface of the body on the opposite side away from the tube, but attracted to the anode or surface of the body nearest the tube.

The sodium chlorid, formula Na Cl, and water, H_2O, the chlorin and the oxygen being electro-negative, are repelled from the negative side, but attracted to the positive. The hydrogen atoms of the solution being electro-positive are repelled from the positive side, but attracted to the negative side of the body. The accumulation of the ions at the negative pole, side, or cathode, called kations, have an alkaline reaction, while anions are of acid reaction. The two poles or surfaces are sometimes known as the alkali and acid poles and if the current is sufficiently strong to produce vesication (which is the x-ray burn) the effect of the local cautery at the negative is similar to that of an alkali (caustic potash), and the one at the anode similar to that of an acid (hydrochloric acid).

When an electrical current is applied to the human body it renders every portion of the body over which the lines of force pass (in the interpolar regions) aseptic. The current is antiseptic by virtue of the generation of ozone in the body, due to electrolysis. Ozone is one of the most powerful germicides known, and the integrity of the whole body is due to its presence. (Ozone is of neutral reaction). A sufficient amount of ozone in the human system will destroy all pathogenic microbes. In the polar regions we have two forms of action, which are purely local, having a varied effect upon the pathogenic microbes. We find forms of microbes that will thrive in an acid medium, but will be destroyed in an alkaline medium, and vice versa. Any form of microbes that can be destroyed by aid of an acid, can be destroyed with the positive pole of a galvanic battery; and those that are destroyed by an alkali will succumb to the negative pole. Remember that the acid radicals accumulate at the positive side (anode), and the alkaline radicals at the negative side (cathode).

The physiological effects of the anode and cathode on the tissues of the body are diametrically opposite. For instance, the ions found at the anode have an acid reaction, those of the cathode are alkaline. At the anode the circulation is diminished, at the cathode it is increased. At the anode the tissues are dehydrated, at the cathode they are hydrated. At the poles albumen is coagulated, at the cathode slightly, at the anode to an extreme degree. In the anode we have an acid cautery, in the cathode an alkaline one. The acids accumulated at the anode will destroy a large number of varieties of pathogenic microbes, while the alkalies accumulated at the cathode will destroy the rest. Andrew Gorgan was treated with the x-rays current for about six months, after which he remained in fairly good health, with temperature, pulse, and respiration normal until about four months before his death, which was due to pyaemia, not tuberculosis. Just before his death I was notified of his condition and requested his family in event of his demise to notify me immediately, so we could hold a post mortem, to determine if possible, the effect of the x-ray on the lung tissue. As this was one of the first patients treated with the x-ray, an autopsy would have been of great interest and benefit to science. Owing to extremely rapid decomposition they were forced to bury him immediately, thereby preventing a post mortem.

Taking into consideration that one lung was entirely gone before treatment began and the other one was seriously impaired, to stop the progress of the disease and to heal up the lungs at that late date, was little short of a miracle,

we had succeeded in keeping him alive for over four years and he enjoyed reasonable health.

The therapeutic properties of the x-ray may be summed up as follows:

The force from the x-ray tube is electrostatic in character and of very high potential, it acts on matter in the same manner as any electro-motive force; that is to say, it produces a dissociation of molecules along its lines of force, which is electrolysis, it may be used for cataphoresis.

The x-ray is a germicide through the liberation of the ions (which is electrolysis) along its lines of force; collecting in the polar region at the anode, anions (of acid reaction); at the cathode, kations (of alkaline reaction); in the interpolar region, ozone (of neutral reaction).

The x-ray, through the liberation of the ions, hastens physiological changes, or metabolism, causing a temporary rise in temperature and an increased elimination of waste products by the lungs, skin and kidneys, at the same time increasing the activity of the phagocytes.

The softer the x-ray tube (limited) the stronger the current, and consequently, the greater the electrolytic effect on the tissue.

In treating cancerous, tuberculous and other infectious diseases, more attention should be paid to the degree of vacuum in the tube, than to the apparatus used in exciting the tube. The degree of vacuum and the amount of current necessary can only be determined by actual experience coupled with a thorough knowledge of electro-physics and physiology.

For superficial and deep cancer, use a low tube and vary the current according to the depth of the lesion.

With reasonable care and proper insulation the x-ray burn can be avoided. The lower the tube the greater is the danger of producing a burn, owing to the increased number of lines of force thrown off from the tube. The area of the x-ray burn is limited, and it is not dangerous except with excessive use.

All of the x-ray burns produced, so far as I am able to learn, are due to the lack of proper antiseptic measures.

The microbes and impurities in the atmosphere are driven into the body, where, after a period of incubation, they set up a form of septicemia.

The x-ray tubes for therapeutic work, should be much larger than any of the tubes on the market. The average size should be from 18 to 20 cm. in diameter, or as large as the tube can be made and properly exhausted. The larger the tube the greater the number of lines of force thrown off, the stronger the current and the greater the electrolytic effect on the tissues.

Owing to the rapid discharge from the x-ray tubes, the eyeball is placed on a strain, especially if the fluoroscope is being used in making examinations, particles which are freed from the screen during decomposition and are driven along in the direction of the x-ray force, striking the eye, setting up an acute conjunctivitis, which seems to be one of the detrimental troubles that x-ray operators have to contend with. It becomes necessary to use a mild lotion in the eyes almost daily to allay or prevent this conjunctivitis. The remedy used must be simple and of such a nature as not to injure the eye in the least.

The preparation that I have used for the last five years, and the only one that has, so far, proved satisfactory in my case, is a prescription written by one of our local celebrities. I have forgotten the formula, but it is marketed under the name of "Murine."

One of the strongest proofs that the x-ray circuit is an electrical circuit, is that a picture can be taken of an object on the back of a photographic plate, away from the tube, showing a return of the lines of force.

As a preventative of x-ray burns, a screen must be used; a sheet of steel or of lead, arranged with a window cut into it about 14 inches square. On the side of the window nearest the tube, a celluloid screen of ¼ of an inch in thickness is placed. This is to prevent the microbes and particles of dust being driven into the body, and at the same time allows the x-ray to pass through without much interference, as it offers but a slight resistance to the ray. Back of the celluloid screen, away from the tube, I have shutters made of steel with openings in their centers, varying from one inch to 12 inches in diameter. These shutters are interchangeable. I use another screen made of lead-foil, which is arranged in close contact with the body, with holes cut into it the size and shape of the part that is being exposed to the ray. The patient is placed four to five inches from the tube. The celluloid, steel and lead plates are between the patient and the tube. Then the tube is crowded by increasing and decreasing the current, as required for the part of the body being submitted to the treatment. A low vacuum tube or soft tube, as it is sometimes called, should be used in treating all cases.

In treating lupus, increase the current until, as shown by the fluoroscope, a faint outline of the bones of the hand is seen.

In treating deep or internal cancer or tuberculosis, increase the current until the bones of the whole skeleton are visible. The length of time of exposure depends entirely upon the susceptibility of the patient to electrical influence.

At the last meeting of the Chicago Electro-Medical Society the Research Committee made a preliminary report on Priority in X-Ray Therapeutics, showing that the first successful attempt to destroy bacteria by means of x-rays was made by Drs. Pratt and Wightman, of Chicago, in April, 1896. Dr. Pratt also preceded by a few days Drs. Lortet and Genoud in the successful treatment of Guinea pigs after inoculation with the bacilli of tuberculosis, and was the first to apply the new radiations to the treatment of both cancer and tuberculosis in the human subject.

The final report of the committee, giving a summary of the work done in x-ray therapeutics during the year 1896, will be presented at the next meeting of the society.

T. P. HALL,
Secretary.

March 7, 1902.

The *Chicago Medical Times*, July, 1896, gives an account of Dr. Pratt's experiments with tuberculosis patients.—ED.

Tube and Exposure.

Dr. J. P. Hetherington, of Logansport, Ind., in writing to us, concludes his letter:

"It seems to me such a mistake for writers to state they have taken a radiograph in so many minutes. In nearly all illustrations, the only record of details given, is 'exposure (so many) minutes.' Such a record is no assistance or information for any one. We might as well prescribe a certain dose of medicine for all—babies or adults—without reference to conditions or desired results. The only way a radiograph can be useful to others—aside from a mere illustration—is to give all important details; and I believe you would add to science and the interest of your readers if you would require: Static machine or coil; make or form of tube; tube hard, medium or soft; make or brand of plate; length of exposure, and developer. I keep such a record of every plate I make and it is a wonderful assistance to look over the plates and observe where the results come from. It goes without saying that each tube is always worked with a strength of current that will develop its best radiance. I do not believe we will approach a *standard* any other way.

The length of exposure depends upon conditions which, if not given, renders the illustration scientifically useless. I do not believe my German 30-centimeter tube of low vacuum would make a radiograph in 5 hours that my high vacuum Wehnelt will make in 5 minutes or less on my 18 inch coil.

"How interesting and instructive it would be if each of us would take our favorite 'crack' tube to the next meeting of the Roentgen Society in Chicago, for comparison. Less than ten days after Dr. Price exhibited his voltohm and defended its merits in Buffalo, I could not find a voltohm for sale anywhere.

"Yours sincerely,
J. P. HETHERINGTON."

Roentgen Rays in Medicine and Surgery.

This book disappoints the x-ray worker. It is a nicely bound work, but the lasting impression it furnishes is its advertising a particular make of a machine. The book has the strong ear marks of Mr. Rollins, whose technical versatility has been much read and much admired. We regret exceedingly the book leans so much upon one side—forgetting the real essentials. Mr. Hinze is an admirable young man and a hard worker. He deserves encouragement. In fact, all parties concerned in the making of the book, deserve the best. This is about the sense of the description of the book that comes to us. One writer says: "I have seen Dr. Williams' book. It is a good, illustrated work, but not for the practitioner. The latest technique is forgotten altogether. There is nothing there about the method of skiagraphing the internal structures of bones; nothing about the beautiful skiagraphing of the chest by Dr. Donath, or internal organs on the under-exposed plate with the intensifying screen and the lead box and nothing about the latest method of localization with fluroscope, made stereoscopic or fluorometric conveniences. None of these are found, though known more than two years to the members of the Roentgen Society of America."

Radiant Ore in United States.

The following letter will explain itself and is a valuable contribution to the literature of the subject. ED.

TELLURIDE, Col., Dec. 1, 1901.

DR. HEBER ROBARTS,
St Louis, Mo.

Dear Sir:—I received a few days ago, the Nov. number of THE X-RAY JOURNAL, with a red cross in one corner, and so I hasten to send you the necessary $3 for another year's subscription.

While I am not at present engaged in radiography nor electrical work, yet I never miss reading every line of your valuable Journal, expecting to take up the work again before many months.

I send you in this letter a rather poor print from a negative made with a piece of uranium ore, which is found plentifully a few miles from here. This mineral is "Carnotite," or a uranyl-vanadate; U_2O_3, V_2O_3, and is a sandstone impregnated with the oxides. The mineral also contains radium, polonium and zirconium.

Under separate cover I will send you a small sample of this mineral and also a piece of "Rocoelite," a sandstone containing V_2O_3, (about 3 per cent).

These two minerals are both impregnations of the same sandstone formation, sometimes as separate layers and often intermixed.

The gircon crystals are easily collected in the residue after treating with hydrofluric acid.

Hoping these will be of some interest to you, I remain Yours respectfully,
ORR ADAMS.

Subscribe for THE AMERICAN X-RAY JOURNAL—$3.00 a year.

College Station, Tex., Dec. 30, 1901.
Dr. Heber Robarts,
St. Louis, Mo.

Dear Sir.—Please send The American X-Ray Journal for two years, beginning with the number for January, 1902, to the Department of Physics, A. & M., College Station, Texas.

Please send me back numbers (one each) of Vol. 1, No. 1; Vol. 1, No. 4; Vol. 2, No. 2; Vol. 3, No. 2; Vol. 4, No. 3; Vol. 4, No. 5; Vol. 5, No. 2; Vol. 7, No. 4. If there are any of these which you can't supply, please include them in the ad below.

Please insert the following ad. in the next two numbers:

"Wanted.—Back numbers of The American X-Ray Journal, Vol. 1, No. 3; Vol. 5, No. 5; Vol. 6, Nos. 1-3-4-5-6; Vol. 7, No. 6. Send postal to D. W. Spence, Prof. Physics, A. & M. College of Texas, College Station, Texas."

Please send me *duplicate* bills for all of above made out against Dept. of Physics, A. & M. College of Texas, and oblige, Yours Truly,

D. W. Spence.

[We regret our inability to supply the missing numbers of the American X-Ray Journal Prof. Spence needs for the Library of the State University. Readers who can spare such numbers or have duplicates will kindly write to the Professor. Ed]

Battle Creek, Mich., July 21, 1901.
Dr. Heber Robarts, St. Louis, Mo.

Dear Doctor:—I have been a reader of the X-Ray Journal since Vol 1 and No. 1, and a worker in x-ray work for the Battle Creek Sanitarium, since its first advent in '96, and am interested in all that pertains to it. On page 934, July number, you show a plate for a static machine made in two pieces. I wish to say that in one of my visits to Dr. Younghusband (now deceased), of Detroit, Mich., he showed me one of his machines that he had made with plates the same as the illustration in your X-Ray Journal, produced by Dr. J. M. G. Beard, only his plate did not narrow up at the bottom, but was made with a straight base. When I first saw it, it was in the year 1894, but on my next visit to the doctor, he had disposed of the machine and I gathered the idea that the divided plate impaired the output of the machine. I write this for your benefit and others you may desire to call the attention to.

Fraternally, H. A. Dow.

Perry, Iowa, December 10, 1901.
Editor X-Ray Journal:

A new motor desired to run a Static or x-ray apparatus. Will some genius invent a contrivance for driving a static machine, that you can wind up like a clock or a peanut roaster and run long enough to give a good static seance of half an hour's duration. Bring out an inventor. How many feet of wire rope and what weight would it require to a shaft and gearing, to run a static machine for thirty minutes, 250 revolutions per minute?

Up here, and in many places, there is no electric service or water pressure; hence an electric or water motor are out of the question, and a noisy gasoline engine is too high priced.

Please reply in next issue.

When your usually well behaved static machine goes on a strike and changes polarity while in motion, either when giving an insulation or while doing the invisible, it is owing to its warning you to cleanse the glass disks with a clean, dry, woolen cloth, scour the brass-work combs and brush-rods, axle buttons, etc., with strong aqua ammonia and whiting. This will remove grease and gum coating that comes from using calcium chloride (fused), sulphuric acid, etc. Also removes the corrosion from ozone, and your machine will work as

good as a new one and spark equal to a buxom widow in the dark and pick up its charge as expeditiously as the lady would a kiss. Electrically thine,

DR. JOHNSON.

---

101 Newhall Street.

BIRMINGHAM, ENGLAND, August 12, 1901.

HEBER ROBARTS, Esq. M. D.

Dear Sir:—I have long intended to write to you but since my return from South Africa, I have had so much to do that my time has been fully occupied. I am now engaged in writing a book on the x-rays, and should very much like to have a complete set of your journals from the first. Can you let me have them? I have only seen my last article since my return, and am very pleased with the way in which it was produced. I am herewith sending you a copy of a paper I read a few days since; it has not yet been published in England. You can do what you like with it. I have any amount of material for papers, but I am afraid that I shall have little time at present to send you anything. I, however, shall not forget you when the time comes. Hoping that you are well, with kind regards. Yours truly,

J. HALL EDWARDS.

Protection for X-Ray Workers' Hands.

By G. E. Pfahler, M. D., Assistant Chief Resident Physician and Skiagrapher to the Philadelphia Hospital.

Nearly every one who makes frequent fluoroscopic examinations or demonstrations with x-rays, suffers more or less from a dermatitis of the hands. This effect varies from a mere hyperaemia or pigmentation to fissures and ulcerations, followed by contractures. Some men are compelled to abandon the work entirely, while others continue to make themselves martyrs to the medical profession. This part of our work is not taken into consideration in the compensation for our labors. Therefore it behooves us to take every possible precaution for its prevention, and especially those of us who engage in general medical or surgical work, as it unfits us for our regular duties.

For this purpose I have had constructed a pair of mittens covered upon the backs with lead-foil. The mittens were made of chamois skin, though almost any substance will do. They should be made to fit loosely. For the lead-foil I used heavy tea-foil or lead. Adhesive plaster was placed over the top of the lead and the edges sewed to the mittens to hold it in place. All the ordinary manipulations neccessary can be made with these mittens.

The irritations of the developing solutions may be prevented by the use of rubber gloves. Since I have taken these precautions my hands are improving and I trust that this suggestion may be of value to others.

Multiple Use of Static Machine While Running.

Dr. W. B. Clark, of New Albany, Ind., has recently written to us of the use he makes of the static machine. In order that time and expense may be saved, he runs an insulated wire to adjacent rooms from his machine and operates Crooke's tubes and treats patients at other points all at the same time. He does not claim originality—save for himself—has not heard of others using the machine in this way.

Have You Got It?

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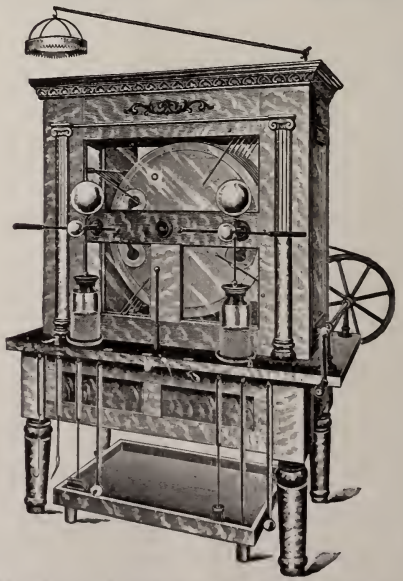

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THE AMERICAN X-RAY JOURNAL

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

PUBLISHED MONTHLY BY THE AMERICAN X-RAY PUBLISHING COMPANY

CHARLES P. RENNER, M. D., M. E., Editor.

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VOL. 10. *ST. LOUIS, MAY, 1902.* *No. 2.*

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CONTENTS VOL. 10, NO. 2.

LIBRARY OF THE
COLLEGE OF PHYSICIANS
OF PHILADELPHIA

The electrograph herewith shows the condition of a patient eighteen months after the disease began. A full conception of the depth can not be had from the picture because at the time the picture was taken the ulcerous excavation was packed with gauze. The flesh had sloughed from the side and back and to within three inches of the spine. The axilla was undermined almost to the glenoid cavity. The breast that had not fallen off was hard and insensative. It was crusty and had the appearance of dry gangrene. Ulcerous nodules abound over the chest and back while the base of the vast area that had sloughed away was pale and smooth. The patient was carried to Dr. Robarts' office almost moribund. She was too weak to talk. Her pulse was too frequent and weak and irregular to count. Of course the case had been abandoned as inoperable. An optomistic uncle insisted that she be treated so long as she lived. No surgery had ever been done. Great masses of dead flesh were adherent to the edges of the ulcer. The discharge was profuse and the odor most foul. The coil and tube was used exposing the affected parts, ten minutes each, thirty minutes in all, the first sitting. The tube was a German make adjusted to give visual radiation of the carpus two feet, the patient one foot from the tube. The patient immediately improved physically. With a few exceptions the treatments were daily till the twentieth exposure when she was suddenly attacked with hypostatic pneumonia and died on the twenty-ninth day after the first treatment. The wound had wholly ceased to slough, odor had long since ceased, pain was gone, the wound was healing at many places about the edges: at one place it had filled in nearly one inch. Her sleep, strength, appetite and appearance had greatly improved.

The picture was taken two weeks before death and is reproduced to show how a body can compensate and live with so extensive decaying tissue; and also to show that notwithstanding the nearness to death the x-rays gave demonstrated hope when all other procedures known to man had failed.

THE AMERICAN
X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. 10. *ST. LOUIS, MAY, 1902.* *No. 2.*

The Practical X-Ray Diagnosis.

Prepared by J. Rudis-Jicinsky, A. M., M. D., M. E., Cedar Rapids, Ia. Revised by M. U. Dr. Joseph Hoffman, Vienna, Austria.

A series of A. B. C. teaching for workers in x-ray diagnosis and therapeutics, to be concluded in 20 articles. Fully illustrated.

Description of Parts. Source of Electric Current.

LESSON II.

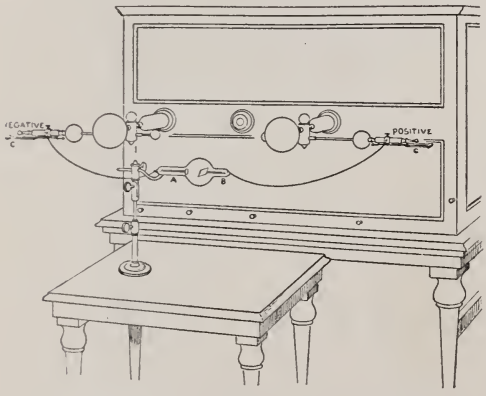
We know that an electric current is a source of energy—that is to say, it is capable of doing work. This is clear from its power of evolving heat, one form of energy. But the electrical energy may be transformed directly into mechanical work, and from there, according to the principle of conservation of energy, when we keep up a constant supply of the same, into the unknown ray so convenient in our diagnosis. The simplest way of considering the different sources of electricity will be to divide the first into two main divisions, according to the kind of energy which is employed to maintain the current. These two kinds of energy are: 1. Mechanical Work; 2. Energy of Chemical Action.

Electrical Measurement.

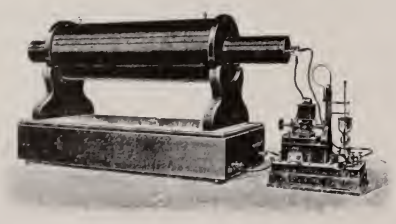
The successful operator in radiology requires to know not only whether a current will be produced under certain circumstances, so that he may be able to determine the conditions most favorable to its production, but he has to remember also, the electric quantity conveyed in one second by his current of unit strength. These units are based on the centimetre as measure of length, the gramme as a measure of mass, and the second as a measure of time. The practical unit of electric current is defined as one-tenth of the centimetre, gramme second unit of the current, and is called an Ampere after the great French electrician of that name. The unit of electromotive force is called a Volt, after Volta, and is taken to be a hundred million C. G. S. units. The unit of resistance, which is called the Ohm, is then defined as the resistance of a conductor through which an electro-motive force of one Volt will produce a current of one Ampere. The unit of power employed is defined electrically as the power developed in a circuit traversed by a current of one Ampere with a potential difference at its terminals of one Volt. This unit is called Watt.

As has been previously stated, various methods of generating the electric current for the production of the x-rays may be employed, namely: Primary Batteries, Plunge Batteries, or Accumulator Batteries, Static Machines, or the charging may be done by means of an Electric light Installation, Thermo-pils and Constant, Direct or Alternating Current, each working equally satisfactorily, but requiring more or less different accessory apparatus to add to their general efficiency. The least expensive form in end for the general practitioner,

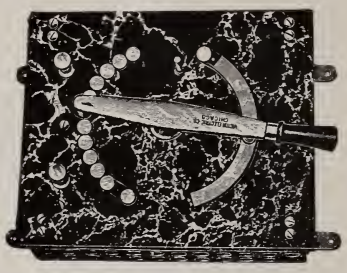
I think, is to employ a good Static Machine, which may be used for both purposes, the Electro-Therapeutics and Radiology, or if we use the induction coil, the Primary Batteries, and any good set of cells giving the voltage required to operate the coil, will answer. Either, if properly constructed and in the hands of a competent manipulator, will do the x-ray work.



The average voltage required by 8 to 10-inch coil is about 10.6 volts, represented by twelve cells of Edison Laland Battery Type S. With these cells, the outfit consists simply of the vacuum tube, coil, fluoroscope or screen, and batteries, the electro-motive force of the cells making it safe to use the vibrator of the coil without injury to the same,



while the single condenser in the base of the coil has sufficient micro-farad capacity to give a good fluorescence. Better and more steady discharge is obtained by the employment of an additional adjustable multiple condenser of at least 2.5 micro-farads. For a coil giving 12-inch spark we have to have twelve Edison Laland cells. Where there is no other source of electricity at disposal, recourse to such a battery can be taken. It has, however, the inconvenience of requiring frequent replenishing of the cells.

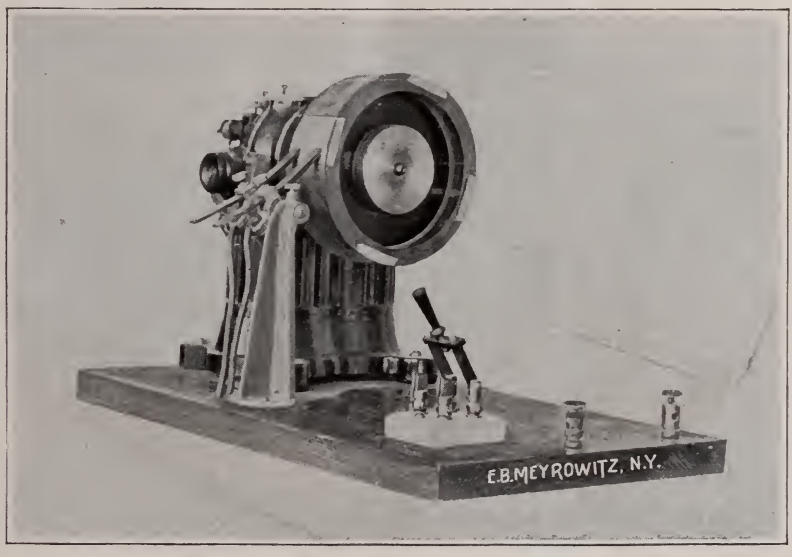


If no lighting circuit is to hand, accumulators or storage cells are recommended as being a useful and sure source of current. For the same results as above we use six storage cells, giving twelve volts. The difference between the two types of batteries is that the storage cells can be kept operative by being recharged at stated periods at any electric light station, while in the primary cells, the entire elements are consumed and have to be replaced. In making these statements, high speed interruptions are contemplated, and we employ a make and break wheel operated by a motor, which takes the place of the vibrator on the coil. Two additional storage cells are required to operate the motor.

If a lighting circuit is at disposal, which supplies continuous current, it will be very convenient to utilize this source of electricity for working the induction coil, or with the help of motor and a good rheostat a Static machine may be manipulated with good results. When making use of the constant incandescent current, it is only necessary to employ a shunt board to reduce the current to the required voltage, This will operate the coil in the same manner as the batteries, but the source of current being inexhaustible, it is, of course, preferable. At the same time a pro-

portionately better result is again obtained by the make and break wheel or interrupter, the motor of which can also be operated by the current. In this case the necessary resistances for regulating the strength of current must be interposed in the circuit. The current of the apparatus should be directly branched off from the main circuit and be provided with needful safety-fuses. The resistances are arranged so that a fixed resistance remains constantly interposed, and second resistance is adjustable for regulating the tension at pleasure. Now for instance, if we use the one hundred ten V. current from street circuit, the control of the voltage may be done by the interposed ten or more thirty-two candle power incandescent lamps, placed in series, reinforced by a sliding Rheostat. This gives ample power, and prevents a side variation.

If our lighting circuit supplies an alternating current, the use of a new coil consisting of two separate secondaries with their primaries connected in series, is recommended. Each such secondary must have a high and low potential terminal, due to position and method of winding. The secondary is wound in a disk, and the discharge from the two terminals is vastly different from the discharge of the Rumkorff coil or Tesla's transformer. Such apparatus is not only portable, but can be attached to any lamp socket, either in the physician's office, the ward of a hospital, or carried in a buggy, and attached to the alternating current socket in the patients' room, but if necessary, a storage battery may be employed. The alternating current can also be used in connection with a Static machine and a motor, but in such cases the direct current gives more satisfaction.

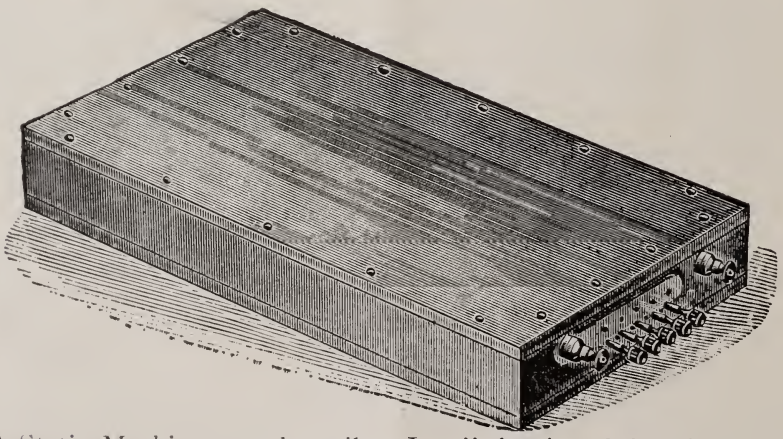


Static Machine.

LESSON III.

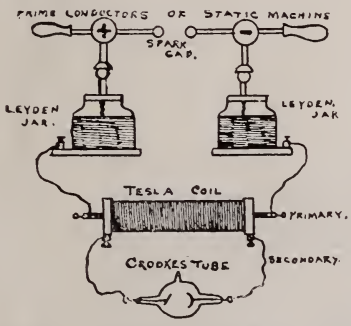
Although the discovery of static electricity was made by Guericke in 1671, and the treatment with static electricity recorded in 1750 and brought to America in 1752 by Franklin, more than two centuries ago, yet, it appears to have shared the common fate of most discoveries made before their time, and to have in main been forgotten. It has always been considered natural that electricity has some influence in some diseased condition, but a complete cure of some

cases by static electricity has generally been looked upon as an absurdity. Yet, the adage, *natura non agit saltatim*, has its application even here. For it is the scientist rather than Nature, who has drawn hard and fast lines everywhere—who marks out abrupt boundaries where she herself shades off with gradations. The static electricity has weathered many storms of adverse criticism, but with the remarkable discovery of Prof. Wm. Conrad Roentgen, it was found, that unlike other apparatus for x-ray generation which possess but single utility, the main representative of static electricity, the influence machine, is a commodity of the utmost therapeutic value. A Static Machine may be utilized as an instrument that combines treatment with diagnosis, capable of accomplishing good work in the x-ray field, and exercising a power to produce a thoroughly efficient form of medication in Electrology and Radiology both. The Static Machine is a very simple, safe and most convenient method of producing x-rays, especially in the office of the busy practitioner, and being independent of an electric circuit from the street, and generating its own electric source, it can be operated very easily in any locality, and is always ready for instant use.



In the Static Machines, powerful charges are produced by the revolution of glass disks arranged with rubbers, collectors and inducing strips; they may be strictly frictional or "influence" machines. The charges produced reside only on the surfaces of the bodies charged, and two mutual and equal phases of excitement are developed, the positive and negative charges with affinity for each other, neutralizing both. If the charge is great enough, the positive and negative surfaces need not be in actual contact, and we get a good spark for our x-ray work. It is necessary to find out first which is the positive and the negative prime conductor on our machine. The conductors are then connected with small condensers, known as "Leyden Jars," the size of these jars to be selected in accordance with the degree of vacuum of our Crooks tube. The connecting wires resting on some wooden support, stand, have to be covered with rubber tubing and go to the cathode and anode of our Crooks tube, having for the successful excitation of the same as a key, the spark-gap between the discharging rods of the machine, when starting. The length of spark depends altogether upon the size of our "Leyden Jars," the vacuum in the Crooks tube or the interrupter used on the discharging rods. Experience will teach us to regulate the length of a spark necessary for good effects. The jars may be omitted on account of a possible explosion, but

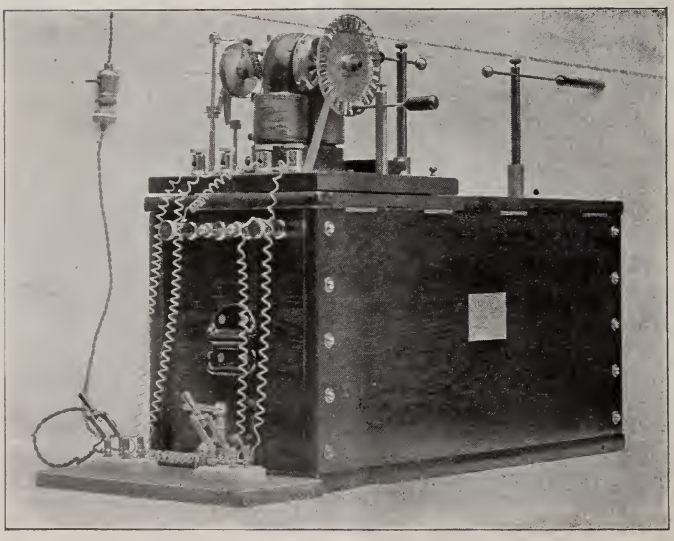
their action as condensers, if carefully manipulated, increase our volume of electricity, and give us more steady radiance. In my laboratory I have used, with comparatively good results, to bring my ten-plate Static Machine in proper motion, the direct current with one-fourth h. p. motor and rheostat with eight buttons.



The glass plates must always be turned to the left, looking at the machine from the front, and the revolutions may vary from 300 to 350 and more in x-ray work. To charge the machine we have to place the discharge rods about half an inch apart. The small arm on the front right-hand end of the case, if there is separate charger, should be turned down and the small chain attached to this arm should be hooked over the left-hand pole-pieee, so as to connect the small plates with the large plates; then start the small plates or Wimhurst machine, by turning the small handle to the right, making several revolutions, until the maximum spark is obtained; then stop the Wimhurst and immediately start the large plates by turning the driving wheel with or without the motor, to the left. The chain is then unhooked and the arm turned up. This explains one method of charging, but every make of machine has its own special device to do the same thing. Separate the discharge rods about an inch, and when machine is in action it will be seen that the current given off the positive pole is whiter in appearance, and has longer, straight handle to the spark produced. The discharge rods should be separated the full distance between the pole-pieces if necessary. The smallest jars will give the finest current; the medium jars have to touch the bottom of the same, and the connections must be properly made. Ordinarily, the machine should be let alone and the case never opened, except when necessary to adjust a plate or comb,

or to oil the shaft of the Wimshurst. When difficulty may be experienced in charging the machine, we may use, in humid weather, Calcium Chloride—about ten pounds, distributed in dishes in the four corners of the case—but never allow the Calcium to become fluid, and be careful not to use Chloride of Lime. The case must always be tightly sealed. If a motor is to be used for power, move the pulley nearer to the

end of the shaft, so that the belt will clear the case, and run the belt direct to the motor, which is usually placed on the floor or a shelf made for the purpose. A good Static machine of modern construction, if properly groomed and kept in order, will excite a tube equal to the requirements of general practitioners, and its usefulness, therapeutically, adds additional value. We have found that 10-16 plates will generate a sufficiency for all therapeutic and

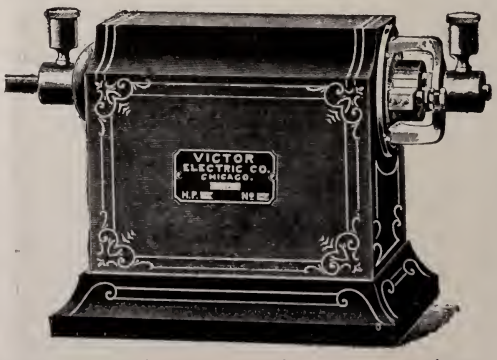


x-ray purposes.

In the laboratory of the expert x-ray worker, we will find the coil, just as well as the Static machine, but at the present time, there are but three forms of apparatus from which to choose, viz: the Rumkorff or simple form of induction coil, the Tesla or high induction coil, and portable; and the Static machine.

Very early in the history of the x-ray it was found that we have to deal only with the shadows, with all the limitations which the term implies. By repeating experiments, research, facts, experiences, better apparatus and better technique, we are now able to photograph not only the shadow of the bones, but the substance of the same, and do work that is much more successful.

There has been much written about the fallacies of the x-ray, tending to push aside this new method of diagnosis. But how about microscope, ophthalmoscope, or any other delicate instrument? You have to look until you see something; and in fact, to the unpracticed eye, the microscope or opthalmoscope is



much more liable to lead one astray than the very simple application of the x-ray. To practice medicine, we have to study;

to manage an individual case of typhoid, we have to read; to operate in a difficult case, we have to look up our authorities, etc., and to manage the new means of diagnosis, the x-ray, we have to study just as well.

It is very simple, indeed, to get hold of the handle or switch and produce the x-ray with the help of the coil or the Static machine, but it is really very difficult to manage the same and to know what to do in some cases, when the fundamental laws and principles of Electrology and Radiology are not understood. And let us state right here, that such and similar nonchalance was the main cause of misrepresentations and many mistakes in the beginning of x-ray phenomena, attributed falsely to the x-ray, instead of the operator himself.

A BOOK.

At last a book has been made for the benefit of x-ray workers. The title of the book is "A Pictorial System of Instruction." The volume is classed into six grand divisions: X-Ray Diagnosis, X-Ray Therapy. These two make up four-fifths of the entire book of over 1,000 pages. The remainder is devoted to Photo-Therapy, Hot-Air Therapy, Vibration Therapy and High Frequency Electric Currents. The book abounds with illustrations with explanatory foot-notes and referred to in the text for the purpose of quickening understanding and amplifying intellectual greed. There are no apparatus advertised in this precious book. This is left to the makers of machines, from whom doctors can get catalogues for the simple asking. This work is wholly new and has no parallel, even in part, in any book previously written. It is a concise, plain series of instructions to the worker of an x-ray machine. The doctor may read and at once imitate the practice of this great master, so simple are its teachings. The wide therapeutical aspect of radiation has sealed the importance of the x-rays in the mind of every true thinker of pathology. This Pictorial System of Instruction lifts the cloud of doubt, and to the practitioner everywhere draws aside the veil of hindrance to easy uses of the x-rays in diagnosis and to practice. This is Dr. Monell's best work. We will review the book in a subsequent issue of the AMERICAN X-RAY JOURNAL.

H. R.

Readers of the AMERICAN X-RAY JOURNAL are acquainted with correct methods of x-ray therapy.

The AMERICAN X-RAY JOURNAL is an *index medicus* of all that goes on in the x-ray world.

If you want the truth about the uses of the x-ray, purged of verbosity and speculation, read regularly the AMERICAN X-RAY JOURNAL. Where else can you get it?

We are pleased to note that Dr. H. H. Fabrique, Chief Surgeon of St. Francis Hospital, Wichita, Kansas, called upon Dr. Robarts during past week for instruction in the therapy of the x-rays. Dr. J. M. Haney of Centralia, Ill. and Dr. Albert H. Dollear of Jacksonville, Ill. were also here in the same capacity. It is a good sign when physicians seek the best means for information.

Priority in X-Ray Therapeutics.

A Summary of the Work Done in 1896.

(Report of the Research Committee of the Chicago Electro-Medical Society). Adopted March 25, 1902.

The first published suggestion for the therapeutic use of the x-ray appears to have been made by Dr. T. Glover Lyon in a letter to the London Lancet, February 1, 1896, page 326. This was followed by a second letter dated February 17. 1896 giving an account of his exposure of the bacilli of tuberculosis and diphtheria, in cultures, to the x-rays for twelve hours, with results entirely negative.

In the Munchener Medicinische Wochenschrift for February 4, 1896, pages 101, 102, Dr. Franz Mink gave an account of two exposures of bacteria cultures to the x-rays, for about half an hour each, with negative results. In the March number of the same journal, page 202, Dr. Mink reported a second exposure of a culture of the typhus bacilli in agar, for fifteen hours, with negative results.

On February 17, 1896, Professors Schuster and Delepine of Owens College (British Medical Journal, February 29, 1896) exposed to the X-Rays three sets of culture tubes containing cholera vibrio, bacillus coli communis, and bacillus typhosus, for 15, 30 and 60 minutes respectively. Two days later a similar set was exposed to the rays for two hours. The results were negative in both cases.

On April 5, 1896, Drs. H. Preston Pratt and Hugo Wightman of Chicago exposed to the x-rays for one, two and three hours respectively, three sets of culture tubes of the following bacilli: cholera, diptheria, influenza, glanders, pneumonia, typhoid, tuberculosis and anthrax. Several of the cultures were killed by one hour's exposure; and all by three hour's exposure.—(*Chicago Times-Herald*, April 13, 17, 18; *Chicago Tribune*, April 14, 1896.) April 13, 1896, Dr. Pratt treated two patients who had cancer of the stomach, who were immediately benefited by the exposures of one hour each.—(*Chicago Tribune*, April 14.) Guinea pigs were inoculated, April 18, with tubercular bacilli.—(*Times-Herald*, April 19,) and exposed to the x-rays for one hour daily. Those thus treated lived, though with x-ray burns; the controls all died of tuberculosis.

Dr. Pratt by request of the *New York Journal*, began the treatment of a case of pulmonary and laryngial tuberculosis by the x-rays, April 19, 1896. After one week, during which improvement was very marked, the patient left the city, and later died.—*New York Journal*, April 19, *et seq.*)

On April 23, 1896, Drs. Lortet and Genoud inoculated eight Guinea pigs with tubercular bacilli, and exposed three of them to the x-rays one hour daily. These three remained well; the rest developed suppurating abcesses.—(*Medical Week*, Paris, Vol. IV, 1896, pp. 326-27.)

Professors Schroder and Hickman of Missouri, April 27, snceeded in destroying the bacilli of diphtheria by the x-rays.)—*Chicago Tribune*, April 28, 1896, page 4.)

Two pronounced cases of pulmonary tuberculosis successfully treated by Dr. H. P. Pratt were reported by Dr. Finley Ellingwood in the *Chicago Medical Times*, Vol. XXIX, No. 7, July, 1896, and Sept. 1896. Treatment of the first was begun April 17 and continued for

six weeks, with marked improvement. Treatment of the second began May 20, and in September, 1896, he was to all appearances completely cured. (See also *The Clinic*, July 15, 1897.)

Dr. Stone of Fort Leavenworth, in a letter to the Association of American Physicians, April 30, 1896, stated that the x-rays in his experiments appeared to have no destructive effect upon bacteria.

Dr. F. Berton (*Medical Week*, Vol. IV, 1896, p. 351) exposed broth cultures of bacillus diphtheria to the x-rays for sixteen, thirty-two and sixty-four hours, without effect.

Dr. Despeignes (mentioned in *Medical Record*, August 29, 1896, page 307) used the x-rays for a case of carcinoma of the stomach. The patient improved under the treatment, but died later.

During the latter half of 1896, Drs. Pratt and Stirling (*Chicago Medical Times*, December, 1896, page 456) treated a number of disorders successfully with the x-rays; among which were lupus (in June), sciatica (in July), emotional melancholia (in September), dorsal pain, articular rheumatism, and tuberculosis of the kidney.

Dr. J. Tarkhanoff, in Gazetta Bolkina, 1896, No. 33, (*Presse Medicale*, February 24, 1897) reports the recovery of frogs poisoned by strychnine, when exposed to the x-rays. Those not exposed died.

Drs. Rendu and du Castel (*Progres Medical*, January 30, 1897, page 71; and *La Semaine Medicale*, 1897, page 20) gave a pneumonia patient relief in three applications of the x-rays.

Dr. Freund (*La Semaine Medicale*, 1897, page 24) reported the cure of a large, pigmented, hairy nevus by x-rays.

Dr. E. Aussat (*Jonrnal de clinique et de therapeutique infantile*, February 11, 1897; and *Lancet*, March 6, 1897, page 630) found no effect of the x-rays upon tubercular bacilli in cultures; but treated a child of seven years, by the rays for pulmonary and abdominal tuberculosis, with marked improvement.

Dr. Voigt, Hamburg, in November, 1896, treated a case of pharyngial carcinoma.—(Mentioned by Dr. Gocht in *Gebiete der Roentgenstrahlen*, Vol. 1, page 14.

Dr. Schiff at Versammlung Deutscher Naturforscher und Artze in Braunchweig, September 22, 1897, gave a report of his work in the treatment of lupus, extending over about one year.—(*Fortschritte suf dem Gebiete der Roentgenstrahlen*, Vol. 1, 1897-8, page 89.)

The Roentgen Society of America will meet sometime in December in annual session, unless changed by the managing board. Chicago will probably be the place of meeting.

The Roentgen Society of London have changed the rules that similar agents to the x-rays may be discussed at their meetings. They have two classes or character of meetings. One class admits the laity. These meetings are more for exhibition purposes and probably convivial. The other class admits members only or professional persons. In these meetings diagnosis and treatment are discussed. Their meetings are monthly. Election of members and officers occurs once a year if the new ruling prevails.

The two great meetings of the Roentgen Society of America, the one in December, 1900, in the Grand Central Palace, New York City, and the other in September, 1901, in the University of Buffalo, Buffalo, N. Y., will go down in the history of medicine as the most valuable meetings for the diffusion of x-ray information ever held. As time goes on and the importance of this subject grows, every member of the Society that attended these meetings will be honored for having embraced that opportunity.

Dr. J. F. Rinehart of Oakland, California, has recently reported satisfactory treatment of Epithelial Skin-Cancers and Sycosis Non-Parasitica with the x-ray.

The New Machine for 1902.

By John Townsend Pitkin, M. D.

Since the discovery of the x-rays by Professor Roentgen, each successive year has been productive of new and better apparatus for their generation.

Static machines having but eight revolving wheels have been replaced by others having ten, twelve, sixteen, eighteen or twenty-four revolving discs.

With each increase in the number of plates, other improvements being commensurate, a given tube and speed and absence of spark gaps has placed proportionately more x-ray light at our disposal.

Instead of an eighth of a horse power electro-motor as the source of propulsion of the apparatus, we now require one-half of a horse power for its actuation. This means that we have nearly one-half of a horse power of x-radiance.

Other evidences of the increase in the power of the modern apparatus are the thickness (not the length) of the spark, brightness of the flash, the heavy report or detonation and greater therapeutic action.

Owing to a better selection of insulators and conductors and the relative positions which they bear to each other, the Static machine recently installed for the year 1902, with twenty-four (24) revolving cycles, occupies no more floor space than was required for any of its less efficient predecessors.

As air space is a fairly good insulator for high tension electrical currents, small machines have been cheaply built by inclosing them in large cases, placing the conductors entering into the construction of the case beyond sparking distance.

By employing heavy plate glass for strength and insulation with only enough wood work to hold it and afford support for the axl the space inside of the machine utilized for the generation of ele

The cycles of the new mac twenty-nine inches in diamet have found larger plates less c because their "moment of ine greater—harder to maintain in l hence, their speed is often limit vibratory or rocking motion. warp in the plates throws them out of alignment, it is harder them properly adjusted and to rubbing. At an average spee voltage is excessive.

The stationary plates consist o pieces of glass, a superior and an set. Each field plate is double tin-foil inductor inclosed betwee The pieces of tin-foil are saddle with one serrated margin. Eac tor presents forty-two square i surface for electrification.

The advantage of the doub the single fields are manifold have greater exciting power anc ity or retentivity of the same, i more action in the revolving dis rarely loose their charge or spa the neutralizing system.

Glass is a better inducing than the air.

The field plates project bey revolving discs at either end of chine eight inches.

The axle is incased through cept in the bearings, in a heav rubber sleeve ; it is supported a end by an upright (not hor piece of wood, which extends fi top to the bottom of the case.

Over the sleeve of the axle sol rubber discs are placed ; they s the revolving plates from each ot from the field plates, and hold mer firmly in situ.

pp. 1045-1050 missing.

cases in the report. There are two points of interest in this report—First: the pictures show that the operator was master of his work. Dr. Wight is a surgeon. The x-rays brought to light what no other method of diagnosis could have done, and he operated from the facts thereby acquired, with the best results obtainable. One case of ankylosis of the elbow is especially interesting. It was an old tuberculous joint in which the external condyle was a mass of dead bone and pus surrounded with a thin shell of bone. The x-ray picture gave all the detailed information, and the surgeon performed a linear osteotomy. Repair was complete with motion through an arc of 65 degrees. Most of the cases mentioned in the paper involved the joints. The second point of interest is, that after all, the paper was not read—only by title. We are not aware of just the reason, but we feel quite certain that if Dr. Wight should present another paper on some surgical procedure, in which the x-rays figured in the case, he would be asked to read it. The past twelve months has added immensely to the surgical interest of the x-rays. Societies that ignore the tenets of our profession must lose the respect of modern practitioners.

H. R.

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X-Ray Divergence Chart.

SUPPLEMENT TO

A System of Instruction in X-Ray Methods and Medical Uses of Light, Hot-Air, Vibration and High-Frequency Currents.

By S. H. MONELL, M. D.

This chart shows at a glance the following points of essential interest to the X-Ray operator:—

1. A Plane Diagram of X-light radiations from the *anode* focus-point.

2. The rate of departure of X-Rays from a parallel path at different distances from the tube.

3. The proportionate loss of right-angle shadows at different distances horizontal to the perpendicular axis.

4. The area of non-distorted field of observation at any distance from the tube.

5. The area within which a body of any thickness will shadow a right-angled relation of the parts at a given distance from the tube.

6. The distance from the tube at which a part and the photographic plate must be exposed to secure essential correctness and non-distortion for a diagnostic field of any given size.

7. The general area of approximate non-distortion on the plate.

8. The obliquity of shadows at all distances outside of the central field of exact perpendicularity of radiation.

The Scale of the Chart reads down from the focus-point of the tube to an imaginary plate twenty inches distant. For greater distances, extend the indicated lines below the Chart, and apply the same rule of interpretation. For full explanatory description see Chapter XVIII.

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THE AMERICAN X-RAY JOURNAL

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

PUBLISHED MONTHLY BY THE AMERICAN X-RAY PUBLISHING COMPANY

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CONTENTS VOL. 10, NO. 2.

CONTENTS VOL. 10, NO. 3.

This radiograph is a section of one described in this number of the Journal, under the caption, "History of a Case of Unrecognized Fracture of the Radius," by Dr. Paul F. Fletcher. The arm, forearm and hand were taken in one plate, but the section that revealed injury was all that we had electrotyped. The offending spicula of bone is clearly seen. The radiograph was made in the x-ray laboratory of Dr. Robarts.

THE AMERICAN
X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. 10. *ST. LOUIS, JUNE, 1902.* *No. 3.*

The Practical X-Ray Diagnosis.

Prepared by J. Rudis-Jicinsky, A. M., M. D., M. E. Cedar Rapids, Ia. Revised by M. U. Dr. Joseph Hoffman, Vienna Austria.

A series of A B C teaching for workers in x-ray diagnosis and therapeutics, to be concluded in 20 articles. Fully illustrated.

Crooke's Tubes.

LESSON IV.

The Crookes' tubes or the Vacuum tubes which are used to generate the x-rays, are so named after Sir William Crookes, F. R. S., who constructed them for his famous experiments in radiant matter. In these tubes the air has been exhausted to such a degree that the remaining particles have a vastly greater freedom of movement than when under usual atmospheric pressure.

Under these circumstances, on leading a powerful electric force into the tube by means of its sealed-in electrodes, these air particles are thrust to and fro between the electrodes and the glass opposite, just as an electric machine causes pith balls to dance, and by their incessant bombardment cause heat to appear in both metal and glass. The tube is the most essential part of an x-ray outfit, and must be of good efficiency. The efficiency of the tube greatly depends focus tubes, containing a platinum reupon the spark length, the volume of the same and the proper technique. But the most important discovery, how to keep the character of the light more constant and complete, has to be made yet. If we work in the beginning with diminished tension and gradually increasing the same by means of the current regulator of our apparatus, the life of the tube will be considerably prolonged.

The interior action of an x-ray tube may be regulated. What the x-rays are themselves we are not yet able to say. What changes occur in the tube from the standpoint of a physicist we do not know positively; some say it is the disassociation of vapor molecules of water, others think that there is some breaking up of hydrogen atoms, and finally, the theory of corpuscles was given for the whole phenomena in the tube during the raying. We, however, do know how to get and reproduce some certain results of x-ray work; results giving us different degrees of x-rays with different degrees of shadows in our pictures. The rays we observe with the fluoroscope, the penetration and the shadows may be differentiated with a skiameter and to become a master observer of these rays, should be our aim.

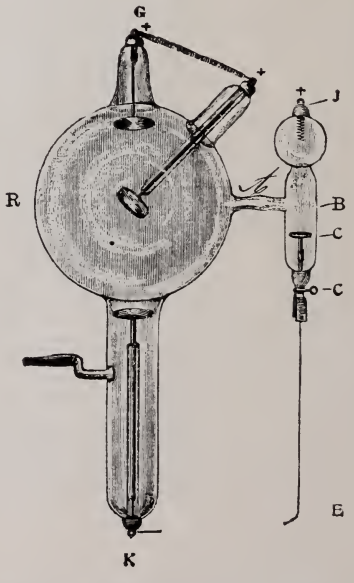
These tubes are made in various shapes. Globular, Pear-shaped and Cylindrical, so-called on account of the peculiar constructions of the electrodes. The best tubes yet made are the so-called

flector (Monell's etc.), as shown in Fig. 2, with or without the regulating device for increasing or decreasing the vacuum in the tube, or they may be reinforced

Fig. 2.

on platinum plate with platinum (Green and Bauer). The concave electrode is always used as the cathode. The cathode rays, proceeding from it, focus on the platinum sheet, which forms the anode with or without a disk reflector, rotary target, cooled target (Rollins), or continuous metallic conductor with or without the cup (See: Amer. X-Ray Journal, July, 1899), sending off from the spot on which they focus a powerful shaft of x-rays. As this spot is quite small, skiagraphs, or radiographs made with this or similar tubes are always well defined, and may now be made especially with the help of intensifying screens in a much shorter time than would have been considered possible at an earlier period of the photography of the invisible. Fig. 3 represents Thompson's double focus tube, having two cathode electrodes, the rays from which are projected simultaneously against the V-shaped anode placed between them. (Not shown.)

Leonard's double focus tube is constructed in such a way that a proper localization without any other device is not only possible, but sure and simple. (See: Amer. X-Ray Journal, Nov. 1899.) There are tubes in the market supplied with additional chamber containing volatile salts or wires, the heating of which reduces the vacuum of the tube, and thus a more uniform vacuum can be obtained or the vacuum itself may be regulated. Muller's Universal Roentgen Tube



etc.) Müller's Universal Röentgen Tube with auxiliary tube for regulating the vacuum to either a high or low degree is the latest. The advantages of this regulating modus operandi comprise the following:

1. That the use of a flame is entirely abrogated and,

2. That the regulating device can be used in the simplest and most effective

manner as an automatic regulator while the application is proceeding, and

3. That by reason of the addition of the auxiliary tube it recommends itself specially for long exposures as well as for exact impressions.

4. Most important of all advantages is the fact that the regulating elements contained in the auxiliary tube are so plentifully present that the longevity of the tube is thereby secured and with careful use should last for a long time.

Fig. 5 represents the tube, which was devised by Edison. Two slanting disks mutually converge the cathodic stream to the area of the glass bulb, at certain angle. With such a tube the over-heating is impossible. (Not shown.)

If we use the high potential and high frequency current another ingenious tube devised by Tesla may be employed. Fig. 6 shows the tube, which needs only

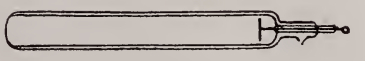


Fig. 6.

one terminal, but can not be used without the powerful Tesla coil.

There is another tube for stereoptic vision designed by Caldwell. By using two sources of x-rays in the same tube each eye views independently the shadow, with the result that the picture stands out distinctly. It is thought that the fluoroscopic examination of fractures especially may be made much more successfully, permitting immediate examination by this method with a fluoroscope having a special rotating shutter.

Reduction of Vacuum.

When the vacuum has become too high in consequence of much use, certain focus tubes had to be heated with a spirit lamp around the cathode or aluminium electrode until they again emit x-rays. This must not be done while the current is passing through the tube, the operator may receive shocks from the apparatus, or the lamp could explode. If the degree of exhaustion of vacuum in the common focus tube or the New Improved German tube is too high, sparks will often play around the tube; to avoid this we use a round metallic disk at the anode (See Fig. 7), and

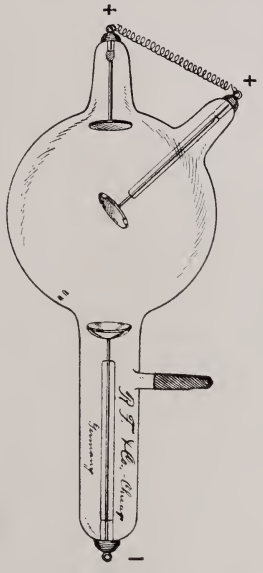


Fig. 7. Disk at anode, not shown.

get a steady light, that, by proper adjustment, may be increased to a brilliant glow, thus affording of any degree of penetration.

A very simple way to get a vacuum suited to our apparatus is by a hand regulator or a temporary regulator may be made by twisting a bit of wire on a stick. This way we may always cause several sparks to pass into the chemical bulb, place the regulator or short circuiting rod in contact with the platinum loop at the anode and cause the spark to pass to the cathode end of the tube. A very few sparks, sometimes one or two, should lower the vacuum sufficiently for the time being.

In discussing the problem of the proper manipulation of the vacuum of a tube to get good results and good

effects, we have to consider also the raising of the vacuum electrically in case of necessity. As stated already, the vacuum of a tube is constantly changing and the quantity differs occasionally and can never be relied upon to remain the same in every exposure. Our experience of observation with the help of the fluoroscope, therefore, is a better guide in each given case than all the theoretical advices given, lengths of exposures, etc. Sometimes few beautiful flashes of the x-ray, as seen on the screen of our fluoroscope, give us photographically better results than prolonged exposures made according to some given pattern. It is only necessary to become familiar with the stage of vacuum in our tube adopted for certain work, and to know how to produce it. We can expel gas from anode of our tube by introducing a variable capacity discharge in the anode end of the tube, and in this way or by simple burning, lower the vacuum, and by capacity discharge in cathode end and no discharge in anode, may raise the vacuum. So that by regulation of those two capacities, we can have the vacuum at a certain degree, and by varying the intensity of the current we can vary the quantity and the degree of our rays. The fluoroscope must always be our guide and if there is any blue color streaming along the inner walls of the tube, we know that we have only very weak rays, and it may require a longer stream of our current to produce the well-known green color of the x-ray proper. The x-rays have to have the necessary penetrating power, which easily may be made out on fluoroscopic examination, and the differentiation will follow, especially if we have a good apparatus possessing regulating mechanism of special construction.

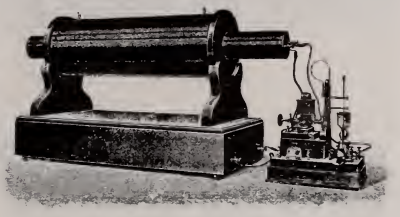
To raise the vacuum electrically, therefore, we have to simply send a moderate current through the tube continuously, the operator watching its behavior carefully for a little time, and as the fluoroscope indicates the different qualities of the rays, the observation may successfully be applied. (Rollins.)

We all know that the particles of gas in a Crookes' tube, and also those occluded in the terminals, become electrically charged and carry their charge from one terminal to the other when the tube is in action. The stream goes from the cathode to the anode. This movement of particles causes repulsion of unlike sign attraction, so that the particle being repelled from the cathode and attracted to the anode, strikes the latter with great force of the bombardment. This breaking up of the particles produces the x-ray; therefore, the more particles we have in action, the greater will be the quantity of rays. To have great contrast in our photographic work on our plates, we must have a good source of electricity, and a certain intensity of bombardment to each particle in our Cookes' tube; and to make short exposures, we must have a great quantity of rays, which we collect with the help of the calcium-tungstate screen, face down upon the film side of the sensitive plate. The vacuum of Crookes' tube is constanly changing quantity and should not be relied on to remain constant; it differs in different tubes and sometimes in one and the same tube. We therefore have always to watch our tube. To know our tube, the resistance of the same, and the proper technique is the whole secret of good results in radiology. The discovery of Roentgen, which makes possible and easy an absolutely correct diagnosis where previously uncertainty and error outweighed definite knowledge, through this results in experimentation and researches seems to be still more important.

LESSON V.

Induction Coils.

The induction coils used with x-ray apparatus are built on one and the same principle. The most practical point so far substantiated in the coil is that almost instanteous skiagraphs can be obtained with not less than a 12-inch spark gap. Larger coils than this are not required for general use. The commonly



known Ruhmkorff Coil is used mostly, being named after Ruhmkorff, of Paris, who, although not the inventor of same, made many instruments of the kind, and contrived various improvements. There is no question about it that one of the most important factors in the production of the x-ray is a perfect working induction coil, as upon its action depends the satisfactory fluorescence of the vacuum tube. In the laboratory of an expert the coils are used, being very much more powerful, and as it is claimed giving effects which cannot be produced with a static machine. The coils are not affected by atmospheric changes and are in some instances portable. In my experience the coils gave us good results in skiagraphy, especially when the inducing currents were short, sharp, snappy and vigorous in connection with a good interrupter, but we like the work of a static machine just as well. In regard to the portability the coil certainly plays the main part and then is by far the most satisfactory to handle.

The induction coil consists of primary and a secondary winding of many miles of wires and a case, which contains condensor or not. The primary coil and the condensor are provided with terminals for the connections. The primary coil is composed of a bundle of thin iron wires, around which a copper wire is wound. In coils giving 10 to 40-inch spark or over, the primary winding is entirely covered with an ebonite insulator, the inner coil is movable, so that it can easily be drawn out. This arrangement adds considerable to their efficiency and offers great security during transport. In introducing a quickly-interrupted current into the primary wire, currents of very high tension generated in the secondary wire and sparks of considerable length and volume are produced. The efficiency of an induction coil is greatly dependent upon the interrupter. (See the illustration in May issue of this Journal.)

When the coil is put in operation, a current regulator is interposed between the source of electricity, and the coil, in order to introduce into the latter the amount of current necessary for working tube. The speed of the interrupter must be also regulated until the most powerful results are obtained. A good coil has to maintain the full length of sparks even when the interrupter is working with great rapidity ,and what is just as important, the spark has to be produced with every interruption. This is a very important point, as good results can only be obtained by interruptions of high speed. Remember that the value of an induction coil depends not only on the length of spark, but it is also necessary for the spark to be powerful and complete with every interruption, even when the interrupter is running at its greatest speed. Experience has shown a rapidity of 1,000 to 1,500 interruptions per minute to be the most useful both for skiagraphy and screen work. When

operating with higher speed, the tube will not always glow at every interruption and may act irregularly, not steady. The alternating current was not so effective as direct current when derived from the dynamo machine for our coil, and when batteries are used the main inconvenience in alternating the direction of the primary current is the use of a double break-wheel. Direct current in the primary circuit with proper interruption is the thing we are after The kind of regulator, interrupter or vibrator or a break-wheel may be safely left with the manufacturer, who knows exactly what his coil properly needs.

When the apparatus is connected as per diagram (See: Amer. X-Ray Journal, Nov., 1899, page 663), it is ready for use and needs only the closing of the switch and possible slight adjustment of the contact screws to start the vibrator, interrupter, etc. When this is accomplished, the tube should become fluorescent. That is, if the tube has been so connected that the negative—or cathode current passes through the aluminum plate, which is in the tube, disk or any other device, the light which appears will be of a pale green color, and almost completely fill the space between the electrodes, while the x-ray may be instantly seen with the fluoroscope. If, however, the anode positive current passes into the tube through the aluminum electrode, the green light will be diffused part behind the platinum electrode and part of the lower edge of the bulge, while no light can be made out on the screen of the fluoroscope. In such a case, the wires which are connected to the tube should be reversed.

The Kinraide Induction coil was already mentioned; it consists of two separate secondaries with their primaries connected in series Fig. 9. The weak feature of the common Ruhmkorff coil is the heat developed in primary, but in this coil insulation can not be melted and no delicate part of the apparatus will suffer by the heat generated. The Kin-

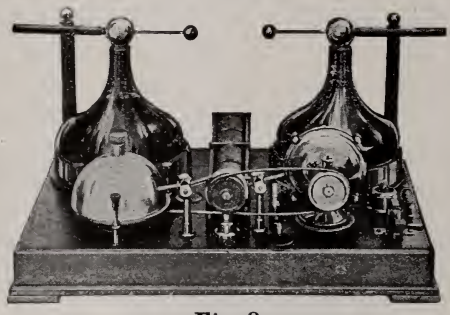


Fig. 9.

raide coil is portable, safe in operation, simple in construction, durable and may be operated with comparatively small amount of the current, giving strong x-ray light and great volume. The difficulty attending prolonged exposure does not exist, the skiagraphs will be very fine and finished negatives give full detail, and are as usually better than the positives.

There is another good coil to be mentioned and designated by Rollins. The vacuum in the tube with this apparatus may be regulated by moving rubber handles in front of the coil in and out. The contrast of light with tubes of different resistance may be observed very easily and with a Electrolytic-Interrupter the apparatus may be run for many hours daily. The coil may be operated from the direct or alternating current of 110 volts.

In case of any strikingly new development, the apparatus as first used is always a modified form of that already existing, but this gradually is abandoned and new types arise, which give more satisfaction or better results. The proof of this simple fact is also the Fessenden machine, which does not require delicate usage; is very simple, compact and portable. To start the machine all that is necessary, is to turn the switch and press

down the knob. There is no condenser, rheostat or other complicated apparatus, because all the adjustments are made by moving spark-gap handles. It is impossible for this coil to break down, because the insulation is different, even if deluged with water or acid. In such case you need only to remove the faulty section, and replace it with a new one, instead of requiring practically the rebuilding of the entire coil, as in the old method of construction. The volume of the spark in this coil is great and the energy of the secondary circuit may run up to 300 watts.

Observations on Broken Necks.

Dr. Reginald H. Sayre of New York presented a number of photographs from cases of fracture of the cervical vertebræ. In making the diagnosis the position of the head was of extreme importance; if the fracture involved the three upper vertebræ, the head would almost invariably be twisted to one side after the manner of torticollis, there was often also an abnormal straightness of the back of the neck. Dr. Sayre said experience had taught him that support of the cervical vertebræ was necessary for a much longer time than was generally supposed. Skiagraphs of these cases were often misleading, in very many cases an excellent mode of treatment was to envelope the body and head of the patient in plaster-of-Paris, so as to combine a helmet with a jacket.

These brief remarks on broken necks have one point of interest. "Skiagraphs of these cases are often misleading." All skiagraphs are misleading in the hands of the ignorant. Of course I mean the ignorant operator. This is like the old "inaccuracies of the x-rays" that haunted so many until the American X-Ray Journal pointed out the sources of the inaccuracies. If in the instance of the subject the operator would use some device to correct the distortion his picture would have a known value. If he has knowledge of normal anatomy then his picture would show to him the condition exactly as it is and the abnormal state be properly interpreted.

A New Application of the X-Ray.

According to the *Journal de Medicine* a man placed under arrest for illegal practice of medicine, claiming to be a graduate of an American college, presented a diploma which excited suspicion. The Roentgen rays revealed the outlines of a named erased to make room for that of the man who was thus convicted.

The above is taken from an exchange and as there are no comments we are urged again to give our disapproval of the publication of any matter that gives evidence of falsity or smacks of quackery in x-rays. It is more difficult to unlearn than to learn correctly. False impressions only weaken the great importance of raying. Some months ago the American X-Ray Journal published quite fully the advantages the x-ray gave to those who were trying to identify the original signature upon paintings. It was valueless in every case except where the signature was made in gold. Modern ink with a fair amount of erasure will not be seen either on plate or screen.

The Royal College of Physicians and the Royal College of Surgeons together have sanctioned a plan for the systematic investigation of cancer. It is prepared to raise $500,000 for the purpose.

(a) X-Ray Narrative.

A Series of Articles by Dr. F. S. O'Hara.

"It is remarkable what a part this machine can play in the destinies of mankind" said the gray-haired doctor as he leaned back in his chair and contemplated the trim outline of his static machine.

I surveyed the speaker with a quick and penetrative glance. It was late when I arrived in his office, but he had consulted with me regarding my ailment, advised me kindly what plan of treatment to follow, and now that our business had been finished we had turned to the discussion of the wonderful Roentgen Ray.

My analysis of Doctor Barsto was highly unsatisfactory. He was an enigma. That powerful build, agile movement, and immediate deduction from a line of reasoning. that he exhibited regarding my case, seemed more that of an expert detective than of a physician. And true it was that he had at one time been a great detective, but I am ahead of my story.

"To what particular destiny of man do you allude doctor?" I queried.

"Many, my dear sir, many and varied are the things in life intimately associated with the vital essence of life, electricity." What is it? You cannot see it, in its nascent state you cannot feel it, neither can you smell it nor yet can you taste it; yet it is that inexplicable something that rules this planet of ours, and if I am right in my theory it is that which holds the world of planets in position, and keeps chaos from supplanting cosmos. I call to mind a circumstance that if you have the time I shall take pleasure in relating to you, and which will show you one of the manifold uses to which a static machine can be put."

Assuring him that my time was in no wise so valuable as was his, I settled myself to hear the tale he was about to relate.

"It was soon after the discovery of the ray was made by Prof. Roentgen, that I purchased a machine for experimental purposes, little thinking it to be of great value to me. I had learned the use of the various portions of the apparatus, and had succeeded in acquiring a lovely dermatitis during the course of my experiments, when I was consulted by a friend of mine, regarding a legal matter that engrossed his attention.

You are probably unaware that I was, many years ago, a dabbler in the science of criminology to the extent that I perhaps merited the title of detective. I would not mention this but for the fact that it has a bearing upon the case in discussion.

One evening, after I had my machine about three months, an old human blood hound friend of mine called to see me to ask some advice regarding a certain case that was puzzling him not a little.

The story, briefly told, was that Mrs. A—— had reported to the police the loss of a diamond necklace worth $15,000.00. A servant of the household was suspected, a search warrant issued, and even the most minute investigation failed to reveal even a trace of the missing gems. The servant was incarcerated, upon suspicion, and whilst in prison had committed suicide by dashing his head against the jail wall.

There had been found a communication, an ante-mortem statement left by the man, that he could stand all else but disgrace, and in his last hour of life he vehemently asserted his innocenee in writing. The associates of this man had been watched, and still no trace of the missing property discovered. It was a perplexing case, and the reputation of my friend, the detective, depended upon the solution.

I queried him regarding the possibility of any other of the servants being at fault. No. They had also been under surveillance.

Could the woman have robbed herself, as is sometimes conveniently done when one is short of funds? No. That would leastways lead to a pawn shop, and all the loan offices had been investigated. The fact of the business, was that those stones had disappeared so completely that they had not left even a ring of blue smoke, and the question that confronted us, was, where, and how?

I was nonplussed. I went industriously into the family history, the husband was wealthy, there was no apparent reasons why either he or his wife should act in a suspicious manner.

Upon my suggestion each and every member of the household was shadowed for several weeks and nothing suspicious developed. It is without a doubt, that the solution of the mystery would never have occurred but for one little circumstance which I will now relate.

It was perhaps a month later that a Veterinary Surgeon, who was a good friend of mine called at my office, bearing in his arms a small dog. He begged pardon for his presumptiousness, but explained that he thought that he could presume upon our friendship, to such an extent, that I would make an examination of the canine, by aid of the Roentgen ray, and see if I could give him an idea of the cause of intestinal obstruction that existed in the dog. I told him that while I did not profess to skill in his line of business, I saw no reason why the ray should not be of benefit to beast as well as to mankind, and after connecting up the tube, I started the motor, turned out the lights in the room, and in a few moments the apple green color of the tube, told me that everything was in readiness for the test.

He held the dog within the focus of the rays, and I applied the fluoroscope to my eyes. A confused mass appeared in the interior of the animal, and upon changing the position of the dog, I saw the outline of a chain, possibly containing stones, mounted in metal of some kind.

The mind acts quickly in such cases. I hurried to the telephone and called up the police station. My friend Mr. Olden happened to be in, and I requested him to call at my office at once.

Whilst waiting for Olden I subjected the animal to a more accurate localization of the mass within its bowels. It is impossible to accurately localize an object seen, unless the distortion of the rays is corrected by means of the fluorometer. By correcting the rays from four distinct places, the accurate localization is unquestionable.

I was not certain that the mass was within the stomach of the canine, so I requested Dr. Albert to hold the animal quiet, whilst I applied the fluorometer, and adjusted the sights. Having set the tiny metal wings front and back it was plain to be seen that the foreign body was correctly located from front to back, and by changing the position of my tube without changing the position of the subject and repeating the procedure, with the rays penetrating from the side, I laid my second two points of correction, and I knew that a knife thrust in a direct line from point to point of correction must surely pass through the foreign body.

I queried the veterinarian as to whom the animal belonged. "To Mrs. A.," was the response, and I knew by intuition that the missing string of diamonds were brought to light by means of the wonderful Roentgen ray. It is to be remembered that diamonds are transparent to x-rays, and are not any more shadowed than that much charcoal, or

bits of wood. The gold mounting and chain, however, being wholly capable of absorbing rays, the mass was seen in black relief, in contrast to the translucent flesh.

Olden arrived, breathless, in a short time, and he in turn viewed the phenomenon.

Operation upon the canine was out of the question, and at the suggestion of Doctor Albert, a lethal dose of morphia was administered to the animal. In ten minutes the gems were in our hands. In the interim we had explained the case to the Doctor, and he coincided with our views, that the wisest course to pursue, was strict silence regarding the place in which we found the diamonds.

Next morning, Mrs. A. was made happy by the restoration of her diamond necklace, which she still wears, not knowing that they reposed for some time in the intestinal canal of her favorite poodle.

Olden received a handsome reward, which he concientiously divided with Doctor Albert, and I had the satisfaction of knowing from practical experience, one more use of the Roentgen ray."

Having finished his story, Doctor Barsto lighted his cigar, leaned far back in his chair, and blew rings of smoke towards the ceiling.

I thanked him for his entertaining narrative, and prepared to leave. "Come again," said he, "and I will tell you of some other cases, criminal and otherwise, in which my machine has figured."

SPRINGFIELD, ILL.

By reading the AMERICAN X-RAY JOURNAL you acquaint yourself with the correct methods of x-ray therapy.

A a recent meeting of the Harvard Medical Society of New York City, Dr. W. J. Morten read a paper on the treatment of malignant growths by the x-rays, with a provisional report on cases under treatment.

Notes on X-Light and Radio-Active Substances in Therapeutics.

William Rollin has made experiments with radio-active substances in the hope of finding a substitute for x-light. He found that some of the radiations retained their activity after passing through animal tissues as thick as the body of a guinea-pig. He is anxious to have radium tried on lupus, superficial cancer, and diseases of the skin in which x-light has been found useful. Radio-active substances can be used in sealed capsules held against the body by adhesive plaster, or they can be made to cover large areas by mixing them with rubber or celluloid to form moisture-proof plasters. These plasters may be still further protected by being coated on the side nearest the body by aluminum foil, and on the opposite sides by lead foil. They could be kept in stock by the yard by druggists and given to patients by prescription with proper directions as to the length of application. They could be worn at night. They could be used by the poor at much less expense than sittings for the use of x-light from a vacuum tube.

We are glad to print this little reference abstracted from the *New York Medical Record* because it really does have some significance. Becquerell carried a piece of radio-active substance in his pocket for several days and found a dermatitis developing at the point the substance was nearest the skin.

It is more difficult to unlearn false teachings than to acquire original truth. Begin right and read the AMERICAN X-RAY JOURNAL.

How can one hope to be informed unless he reads and thinks. Every reader of the AMERICAN X RAY JOURNAL is informed.

Radiotherapy of the Prostate.

By Dr. Heber Robarts.

I desire to call the readers attention to a method that is wholly new in literature—a mode of treatment for the restoration of diseased and hypertrophied prostates.

It is not known that the method to be mentioned has ever been used by others. I was persuaded to use the x-rays for the relief of pain in a patient that had long been a sufferer with a tender and hypertrophied prostate. The relief afforded encouraged me to use radiations in other similar cases. The first intimation however that this form of light would render relief came through a case of Dr. Logan's. The patient was being treated for extravasation in the corpora cavernosa and corpus spongiosum rendering the entire organ useless except as a channel for carrying away the contents of the bladder. At every effort to erection, deep, not painful dorsal incurvature attended. As an organ of pleasure it was an abomination. Time and alterative medication and local application gave no relief. There was no history to account for the trouble. The injury was of six months standing and futile efforts for relief urged the doctor to advise about the x-rays. The patient had suffered for some years periodically with prostatic disease. Since the later trouble, however, he had directed all his attention to the virile organ. I was consulted and by agreement we exposed the patient daily for the relief of the extravasation. About six exposures were made when the patient spoke of the relief the rays afforded the prostate. It must not be understood that the prostate resumed its normal size under this treatment. But after the treatment was discontinued the bulk of the unnatural prostate seemed to continuously lessen.

The method I have pursued for the treatment of these cases is to place the patient upon a chair having a wooden seat with a plane even surface throughout. In the middle of the seat there is an opening about one inch across, slightly greater laterally. Over the entire seat is fitted a sheet of lead with a fenestral equal to the size just mentioned. Surrounding the chair a curtain of lead is permitted to drop to near the floor. Eight inches beneath the seat the tube is suspended having its support in insulated thimbles resting in the curtains. The anode is directed towards the opening. The coil or static machine may be used as in all other therapy of the x-rays. The patient is seated with the perineum over the centre of the opening the widest portion being lateral to the patient. The bulb of the urethra should not be within the range of the radiation. About one inch from the junction of the scrotum with the perineum is the situation of the bulb. At this point the anterior edge of the opening in the seat should be placed. The patient sitting firmly upon the opening the perineum drops into it slightly, and if the body is somewhat inclined forward the prostate is immediately over the anode. The energy of the tube should be sufficient to give radiance through the prostate. If the carpus can be seen at a distance of four feet from the tube, radiation will be sufficient. This can be tested before the patient takes his seat. The current should pass through the tube without any apparent difficulty and therefore such a tube is a soft one. This is a relative term however. The source of electrical energy whether from coil or from plates very much determines the nature of the tubes capacity. When familiar with the apparatus and tube, without fluoroscopic test we can fairly accurately

judge of what the tube is doing in any particular case. With the coil having a rheostat with fifteen to twenty buttons the condition of the tube is determined quite accurately. The same can be done with a rheostat controlling the static machine and with the interrupters, fairly well regulate the tube. With the coil the degree of light can be regulated with almost the precision of a wick in an oil lamp. The position of the patient is important but it is not neccesary to use any protecting batting between the sheet of lead and the skin. This was a former notion, and may have been a good thing when there was a great deal of wasted energy about the tube.

The third pafient I treated was 70 years of age. The third lobe of the prostate was the only portion of the gland affected, so far as diagnosis could be made. On account of difficult micturattion he consulted me. The prostatic urethra was considerably lengthened. It was with considerable difficulty that a metal catheter could be introduced. He suffered with some pain and perineal uneasiness. I placed the patient in the radio-postatic position and gave him daily treatments of 15 minutes each for 20 days. The soreness and perineal uneasiness was not noticeable after the first treatment. Micturation became less troublesome after each treatment, and after the twentieth he was apparently well.

The next case I had was 55 years of age. The prostate gland was hypertrophied and would probably weigh 15 drachms or more. There was no trouble in urinating but if the bowels were at all constipated he suffered in the perineal region. He was not impotent but had precipitate semen. An anxious countenance foretold that he was worried. The radio-postatic position was directed and raying done for 15 minutes alternating days till 40 treatments were given. The patient apparently recovered. In all cases treated marked relief followed. It is too soon to know with what permanency these treatments will relieve the patient for this common and distressing affection. Roentgen-theapy is several years old already. I have been doing this work since its inception, and find suggestions every day for improving technique in x-ray work.

In tumors, especially of cancerous type the rays act with wonderful results. Tumors judged to be cancerous imbedded beneath the tissues yield to radiations. The prostate gland differs from cancerous structure. Hypertrophy is due to increased natural fibrous and muscular tissue of the organ together with the glandular structure. However the rays are not confined to one line of influence. It must be remembered that the most potent action for good is its revitalizing action, as is known to occur on scar tissue. Its antiphlogistic action is seen when psoriasis spots fade away. The two actions here mentioned might be enough to account for its benign influence on hypertrophied prostates. But we must know that the rays have bactericidal action and also an inflammatory action. May at least the first of these not be well influenced towards good in hypertrophy of the prostate. The analgesic action is the fifth well defined action of the x-rays on human tissue. This last action accounts for the immediate relief experienced by those suffering with painful prostates. As to just how nature act to remove hypertrophied conditions is conjectural and speculative. At present we are content with the known remedy.

In my teachings I find it is better for the doctor to know better how to relieve suffering than to understand the physics of his machine.

There has been probably no time in the history of civilized races when the

prostate gland was not known to a very large number of persons. It has been written that an organ is only known by its owner when diseased. In health we have no thought of the presence of an organ. When perversion of normal functions ensues, we are reminded of something going wrong. Our mode of living and the ever tendencies of man to excess in natural and unnatural ways, invited particularly in crowded districts where show and venery is encouraged, it can only be expected, and is perfectly natural, when we consider nervous and emotional dependencies, that the prostate should be hypertrophied or otherwise diseased. Following the laws that maintain other organs, exercise in moderation maintains normalcy: excessive use leads on to changed conditions.

The prostate gland is a venereal organ. The plexus of veins about the base of the gland receive the dorsal vein of the penis: the arteries are from the internal pudic, and they go on to form the capillaries of the trabeculae. The nerves are from the prostatic plexus, and besides supplying the prostate they are distributed to the vesiculae seminalis, and the erectile structure of the organ. The common seminal ducts perforate the prostate and terminate in the prostatic urethra where the twelve ejaculatory ducts of the prostate open. The secretion of the gland makes up by far the greater portion of the ejaculatory mass at the time of the orgasm. The secretion of the prostate like the testis, continues while the receptacles and ducts are empty. Disease of the prostate materially affects this.

The precision of the normal functions of this gland acting in harmony with the promptings of other venereal organs, assures to the owner immunity from knowledge of its presence. But this organ is subjected to many artificial and unnatural abuses. Its lower bourder is within one and a half to two inches from the anus, and in a normal condition weighs but four drachms, but in disease may enlarge to a weight of ninety drachms. In most instances it completely surrounds the urethra at the neck of the bladder. The three divisions of the gland, which are almost always present, lie between the urethra and the rectum. No tissue of any moment protects the prostate from the urethra and bowel. The recto-vesical pouch is four inches above the anus, and unless the gland is greatly enlarged it is in no way concerned with this fold of peritoneum. In all conditions of a distended rectum the prostate is pressed and encroached upon. The folds of mucous membrane in the rectum are subjected to thickning and ulceration. Such disturbance alters the physiological function of the prostate. Piles, strictures of the bowel and fistulae are likewise contributory causes. Fissure of the anus and diseased or irritable rectal pouches are disturbing elements. Constipation with impacted feces encourage the formation of a reservoir of the rectum and therefore pressure is made upon the gland. These are a few of the diseases of the rectum that materially have some bearing on the etiology of diseased prostates, and which were practically unknown to the primeval races. Very few of us reach fifty years of age without some acquaintance with the rec tum introduced to our senses by some form of disease.

The urethra is an organ of much unnatural interference. Stricture of the urethra narrows the channel and burdens the bladder in greater contraction to expel its contents. This strain has its effect upon the neck of the bladder, distending it and encroaching upon the prostate. Every effort at micturating has its malign influence here. Gonorrhea is a potent factor, especially when the prostatic urethra is involved. Repeated uses

of the sound disturbs the prostate. Venery, greatly over-indulged in, is the great parent of pathological prostates. It is in the prostatic urethra that we find the primary cause of many cases of impotency. The nerves that come down and preside over the ducts of the seminal receptacles and prostate are ever prone to abuse. A diseased prostate, by mechanical interference against the nerves of this region may keep up a constant irritation. Due to this, an increased flow of blood is encouraged, and congestion ensuing to all the adjacent organs, the prostate is in turn the greatest sufferer.

Strictures of the urethra and other diseases of the urinary tract, together with the affections of the rectum, should be cleared away with the least possible disturbance. I mean by disturbance, that the knife should be used with the greatest possible caution in the cure of these troubles. Relief should be prompt as possible, but the knife is not the only recource. Now, after all else is satisfactorily done, the prostate deserves the undivided attention. But most often when these contributing troubles are all cleared up, there yet remains a troubled prostate. The patient complains of throbbing, especially at night, heat, pulsating, weight, muscular movements, nervous uneasiness, fullness, fatigue, a mental unrest. There may be an overstimulation of the procreative organs, or a dimunition, or even a complete abolition of the sexual desires. The desires may remain and the power for erection be gone. There may be feeble erections and precipitate semen. All of these may be the direct result of an over-distended prostate. What shall we do with this hypertrophy? It has been the study of the ages. Old age does not necessarily mean an enlarged gland. Persons continent through the earlier periods of life, and those having escaped the popular diseases, go into the eighties without any hypertrophy whatever. Much has been said upon this subject of natural hypertrophy in old age. But I am sure that obedience to natural laws leads man up and onward without calling for remission in any particular, of any organ. So natural are the dispensations that the ideal is sometimes seen. The body as a whole moves in unison with its parts. It is physiological for an organ to slowly surrender, if done, in harmony with the ebb and flow of Nature's laws. Its lapsing functions should cause no physical jar nor mental disquiatude.

Treatment of hypertrophy of the prostate gland is far from being satisfactorily done. Medicine has utterly failed, whether used internally, locally or hyperdermatically. Electricity has always offered the greatest hope. Surgery with the knife alone, is not a success. Six modes of operation are practiced with the electric current: First: The galvano-cautery sound, which is introduced to the prostatic uretha must cauterize the tissue in situ, and by one or two successive breaks, and in two or more places. The tissues are seared, but the patient scarcely, if at all, feels pain So little local disturbance is elicited that there is no after effect appreciable. The treatment must be repeated a few times after a few weeks of intervening rest. Second: Bottini's rapid method at one seance. In this operation the cautery is thrust through the offending portion of the prostate and direct into the bladder. Third: Combination of suprapubic cystotomy and galvano-cautery has reached its perfection in the surgical skill of Belfield and Hunter-McGuire. The operation simply consists in removing the gland in situ by galvano-cautery through the superpubic opening. Fourth: Electrolysis with weak currents. Fifth: Electrolysis by strong currents, by which 15 milla, and sometimes 70m., may be

used. Encouraging reports are reported by Massey. The active pole, which is the negative one, is placed over the prostate in the uretha, while the indifferent pole is placed in the perineum. This treatment is done twice a week, while daily application of the negative pole to the prostate through the rectum is done with the positive pole over the abdomen The treatment is complicated by using the faradic current immediately following the galvanic application through the uretha. Zinc or tin electrodes are used. Sixth: Galvano-puncture, consists in plunging a platinum needle into the body of the prostate, the positive electrode placed over the abdomen to complete the circuit.

301 CHEMICAL BUILDING.

Origin of Cancer.

This was the subject of a communication sent to the Chelsea Clinical Society, March 25, by Dr. J. G. Adami of Montreal. We desire to record the points herein made, because they are in accord with the best informed persons upon this subject. It is especially useful to readers of the AMERICAN X-RAY JOURNAL, for they are doing work with the x-rays for the cure of cancer.

He said: "From a study of the syncytioma malignum, it might be legitimately deduced that there existed one form of tumor of highly malignant type, in which the infiltrating cells were not those of the organism itself, but were derived from another organism. The infiltrative and invasive properties of these cells were not a new aquirement, but were an exaltation of properties normally possessed by them, or, more exactly, under normal conditions it was observed that there was an interaction of two forces—one the invasive properties of these cells, and the other the protective properties of the surrounding maternal tissues, by which interaction the extent of invasion of the cells was strictly limited to the placental side. Dr. Adami's view was that the development of the syncytioma malignum must therefore be attributed to either an increase in the invasive properties of the syncytial cells or to a lessened resistance on the part of the maternal tissues, or a combination of the two. It was concluded, therefore, that if microparasites played any part in the production of the tumor that it must be either by exalting the infiltrative powers of the one, or by lowering the resistant powers of the other. Dr. Adami pointed out that proof positive of the existence of such specific microparasites was still wanting, and in its absence he found it difficult to conceive how specific microparasites could bring about those results.

The prevalent conception of cancer parasites, as existing within the cancer cells, involved the idea of malignant growths being the product of parasites acting within parasites, because, as shown by the study of syncytioma malignum, the tumor cells themselves were essentially parasitic in the organism.

In short, according to Dr. Adami, if the present popular idea was traced to its legitimate conclusion, the most that could be said for it was as the association of parasitic ideas might already have occurred to some, that the theory was in harmony with the great generalization of the poet who wrote that

> Great fleas have little fleas upon their backs to bite them,
> And little fleas have lesser fleas, and so on ad infinitum.

Dr. Adami wished to know if that generalization was also to be applied to explain the action of pathogenic bacteria. In the long-continued action of microparasites he was willing to recognize a process which might, like other modes of stimulation, initiate aberrant and neoplastic cell growth, but beyond that point he contended that they seemed to be asked to contemplate a most extraordinary condition of affairs.

The parasitic theory of the origin of cancer presents to many earnest and keen investigators so large a number of difficulties that, before being accepted as the true cause, a quantity of unsolved points must be made clear.

The progress towards this end has, of late, been by no means rapid.

The increase, however, in the facilities for cancer research in various countries of the world gives rise to the hope that the final unraveling of its mysteries may not be far distant.

History of a Case of Unrecognized Fracture of the Radius.

By Paul F. Fletcher, late A. A. Surgeon U. S. Army.

On March 12th of the present year, a young lady consulted me regarding peculiar, fugitive pains of the left arm and forearm. On questioning, the following history was elicited: Ten years ago, while riding on a sled, she was thrown to the ground, and in attempting to protect her body, injured her left wrist. The family physician was immediately summoned, and after an examination, declared the injury a sprain. He applied a dressing, placed the member in a sling and at the end of three weeks discharged the patient.

Soon after the removal of the dressing, the young woman experienced ill-defined, fugitive, yet persistent pain in the radial side of the fore-arm and hand, also at the posterior aspect of the humerus near the musculo-spiral groove.

The physician who had attended her before was again called, and after an examination, pronounced the condition one of partial paralysis, due to some affection of the radial nerve. At this time the patient observed great difficulty in manipulating the hand, and frequently dropped articles after grasping them.

The surgeon in attendance applied a plaster cast which was maintained for a long period—just how long I do not know—and during the time it remained in position, no pain was suffered. On the removal of the cast, pain and discomfort returned, and another surgeon was consulted. He advanced a diagnosis of synovitis of the wrist point, and placed a cast on the painful forearm and hand. The same relief of pain was noted, and when the cast was removed, it returned with the same degree of intensity.

At this time some one recommended that she consult the osteopathists at Kirksville. This was done, and a diagnosis of curvature of the spine in the region of the seventh cervical vertebra, was made. Osteopathic measures were followed for a short time, and then becoming discouraged, the patient abandoned this treatment and consulted me. I was as unsuccessful in reaching a diagnosis as my colleagues, but favored a diagnosis of synovitis. A cast was again applied, temporarily, and the patient advised to submit herself to the x-ray. This was consented to, a radiograph made, and lo! a fractnre site with a resultant spur of bone was discovered at the external and posterior aspect of the radius, five centimeters from the apex of the styloid process.

Operation was counseled and yielded to. Patient was taken to a hospital, and an incision made near the posterior surface of the radius, and the tissues separated down to the periosteum. On reaching the deeper tendons, that of the extensor carpi radialis longior was found adherent to the osseous spur. This spur was devoid of periosteum, or osteoncus, which had penetrated the tendon sheath and substance. The inflammatory deposit was extensive and had resulted in adhesion over a considerable area. These were broken up, the radialis longior tendon released and the spur chiseled from its bed, flush with the normal line of the shaft. The periosteum was then drawn over the denuded area and sewn with fine cat-gut, and the muscular structures permitted to resume their normal positions.

The integument was sutured with silkworm gut and a skin suture of fine carbolized cat-gut introduced. Union by first intention was secured.

The patient left the hospital in eight days. All pain, which before the operation was constant and occasionally of great paroxyismal intensity, has disappeared.

In performing this operation, I avoided disturbing muscular structures where possible, without exposing a much more extensive area of bone surface and interfering with the attachments of the Pronator Quadratus. I could not trace the fracture line to discover the course of the line of union. Superficially it appeared to be a Colles' fracture, yet, from the absence of much deformity, I am inclined to believe the injury to have been a greenstick fracture. (Radiograph of case on 2d page.)

St. Louis, Mo

"A Pictorial System of Instruction," the new and most invaluable work of Monell's, contains no part of the matter of his former works. All x-ray workers should have it.

X-Ray Prophecy.

Sometimes when you become familiar with a subject that is quite unknown to the many, it is easy to make a good guess that seems prophetic to others if it comes true. Readers of THE AMERICAN X-RAY JOURNAL will remember four years ago we predicted that no work on surgery would sell that ignored the x-rays. The prediction was treated with silent contempt. What about the works that have appeared? We predicted that successful operators and skin specialists would be compelled to use the rays or go out of business. They laughed at the suggestion. How is it? It is like a stampede now. They are all falling over each other to get there. Five years ago there were but three houses in America that made static machines, although electro-therapeutics was largely taught in special schools. Now, there are more than 25 manufacturing houses, some of whom like Van Houten & Ten Broeck, Waite & Bartlett Manufacturing Co., McIntosh Battery and Optical Co., R. W. Wagner Manufacturing Co., Electro-Therapeutic Manufacturing Company, and others that can not keep up with the demand for x-ray machines.

We made investigations of 120 medical colleges on this continent, and not one of these, two years ago taught x-ray therapy. We predict now, that within four years, not an accredited medical school in America will be without a professor of radio-therapy. Don't forget this.

Treatment of Epithetical Skin-Cancers and Sycosis Non-Parsitica with the X-Ray.

J. F. Rinehart speaks of the advantages of the treatment of these cases by the x-ray. It gives no pain, there is but little scar tissue left after the sore has healed, and there is the possibility of a more thorough eradication of the disease, as the effect of the rays is to destroy all the cancer cells within the area exposed. He reports a number of cases which illustrate the success of this treatment. It is best not to be in too great a hurry to obtain the reaction lest too much inflamation be caused. There is a great difference in skins as to their ability to withstand the x-ray. It is best to begin with a five-minute exposure at six or eight inches and try that for a day or two, and if no reaction is obtained, increase the time of exposure till the desired effect is produced.

This abstracted matter briefly points out a procedure that is quite correct and is imitated by all good operators. In diseases that are amenable to ordinary medication they differ in different subjects and require different modes of procedure to effect a cure. In x-ray therapy this must be observed.

We are glad of the interest the better medical journals are now taking in x-ray literature.

THE AMERICAN X-RAY JOURNAL two years ago predicted that every writer of a work on surgery that failed to give ample space to the importance of the x-ray, would have practically no sale. It has proven so.

Dr. Charles Warren Allen reports 13 cases of cancer under his care, and all of these are improving. One of his patients was a physician suffering with cancer of the rectum.

Carl Beck in his paper, entitled "Differentiation between Inflammatory Processes and Neoplasms of the Bones by the Roentgen Rays," says that many limbs have been sacrificed by unnecessary amputation, and many lives lost by deferred amputation, on account of errors in differentiating the various inflammatory processes from the growths of the bones and joints.

The x-rays have opened entirely new fields in this sphere, and in many cases the Roentgen rays give positive information.

Owners of x-ray machines, who desire to be up-to-date in x-ray work should read the AMERICAN X-RAY JOURNAL. Have you subscribed? Why not?

X-Ray Divergence Chart.

SUPPLEMENT TO

A System of Instruction in X-Ray Methods and Medical Uses of Light, Hot-Air, Vibration and High Frequency Currents.

By S. H. MONELL, M. D.

Students of X-Ray work should study this chart reproduced on the front cover of this Journal.

This chart shows at a glance the following points of essential interest to the X-Ray operator:—

1. A Plane Diagram of X-light radiations from the *anode* focus-point.
2. The rate of departure of X-Rays from a parallel path at different distances from the tube.
3. The proportionate loss of right-angle shadows at different distances horizontal to the perpendicular axis.
4. The area of non-distorted field of observation at any distance from the tube.
5. The area within which a body of any thickness will shadow a right-angled relation of the parts at a given distance from the tube.
6. The distance from the tube at which a part and the photographic plate must be exposed to secure essential correctness and non-distortion for a diagnostic field of any given size.
7. The general area of approximate non-distortion on the plate.
8. The obliquity of shadows at all distances outside of the central field of exact perpendicularity of radiation.

The scale of the Chart reads down from the focus-point of the tube to an imaginary plate twenty inches distant. For greater distances, extend the indicated lines below the Chart, and apply the same rule of interpretation. For full explanatory description see Chapter XVIII.

X-Ray Narrative.

The series of articles under this heading are being written by Dr. Fred S. O'Hara of Springfield, Ill. The articles are written for the benefit of physicians operating x-ray machines. On account of inability of physicians to receive the proper instruction in this branch of the science and art, or in other words, the diagnostic and therapeutical uses of the x-rays, these articles are written. They are interesting to all readers, but doubly so to those wishing clearer understanding of radiotherapy and correct methods of irradiation. They are alluring to a tired doctor whose services in the general field of practice have worn off the nural sheath. In these articles we find the awakening of green spots in the mental domain. The plan is to take up tired nature, and while repasting on vivid ideas, con sume modes and methods of doing accurate x-ray work. Like Oliver Wendell Holmes, William A. Hammond and Wier Mitchell, so Fred S. O'Hara inclines to the literary entertaining in teaching. He is a young man with a rare talent. Those who follow him will weigh more in the scale of knowledge.

Roentgen Society of America.

The regular meeting of the Roentgen Society of America will convene in Chicago, December 10th to 11th.

The local Committee are :

DR. RALPH R. CAMPBELL,
414 Marquette Building.

DR. JOHN B. MURPHY,
Reliance Building.

DR. LOUIS E. SCHMIDT,
424 North State Street.

DR. L. M. HARRIS, Chicago.

DR. W. L. BAUM, 103 State Street.

DR. H. C. ANTHONY,
465 Dearborn Avenue.

DR. W. A. PUSSY,
Columbus Medical Bld., Chicago.

An x-ray apparatns in the hands of one not able to use it properly is a cumbersome and expensive luxury. The new work of Monell's "A Pictorial System of Instruction," will teach any ordinary mind practical uses of the machine.

Dr. Reginald reports an old case of Lupus Vulgaries, which was repeatedly cut and scraped, with the local application of the usual remedies, had resulted in no improvement, until the x-ray was resorted to.

Radium.

Reference made in the following observations to diagnostic possibilities of radium in eye disease is not altogether new. It should be noted that in using radium fluorescing surfaces are not used But the points made have no advantage over the screen under the x-rays. We examined several hundred cases of blind and partially blind persons in 1896. There is a way to determine the degree of blindness, when due to atrophy of the optic nerve, by the x-rays. These observations of ours were widely published, at the time, all over the world.

Javal makes an interesting communication to the *Gazette des Hopitax Civils et Militaires*, April 17, 1902, concerning the curious properties of the new metal, radium, discovered and studied by Mr. and Mme. Currie. In the dark this metal emits a light which is peculiar in itself, which is not phosphorescence, and which is distinct from Roentgen rays, although bearing a certain analogy to the latter. The rays from this metal traverse opaque bodies and produce physiological effects. Currie thinks that these properties could be utilized to discover if the optic nerve in the blind is absolutely atrophied, and if, accordingly, all hope should be abandoned of the recovery of sight. Javal cites several instances in which certain blind patients could perceive the glimmer of radium. In others, on the contrary, there were no perception of its light. This metal is still extremely rare. It is prepared in the form of the chloride.

Surgical Operation in the Old

is referred to in the *Radiance Medical Journal* by Dr. J. C. Sexton. The doctor contends that it's disease, not years, that makes people old. In surgical operations shock is not a great factor. The loss of blood is. It is not necessary to produce deep narcosis in old people for the extreme sensibility of the nervous system incident to the prime of life seems dulled in old age. Old people can endure a great deal of surgical infliction. The observation is worthy of thoughtful consideration.

At the meridian of life the greatest tendency occurs for the growth of cancers. For women this is the most critical period. Scarcely is there a hospital that does not have cases under surgical care for cancer. But a lessening of this variety of cases is noted day by day. Instead of surgery the cases are being successfully treated with the x-rays. Surgery finds this fruitful field diminishing. We predict the ultimate restoration of cancerous cases without shock, by the benign system of radiotheraphy.

Dr. J. Rudis-Jicinsky reports two cases of Intestinal Obstruction, diagnosed by the x-ray.

We are glad to see some of our medical friends in old St. Louis awakening to the uses of the x-rays. Some of them are being provided with useful apparatus, and we trust they will not stop short of learning how to make the best use of them.

At a recent meeting of the Vienna Society of Physicians, Dr. Schiff and Dr. Freund presented an interesting paper, on Depilation by High-Tension Electric Currents.

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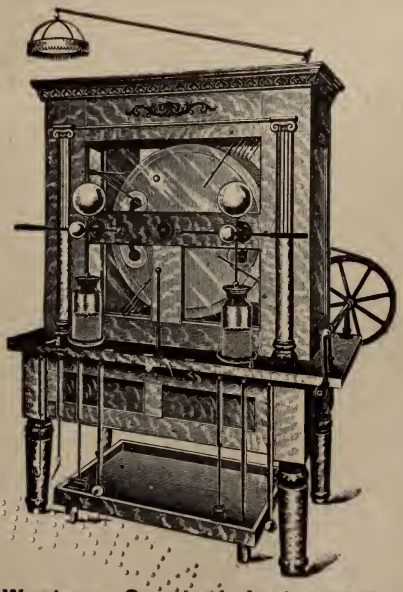

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President, WAITE & BARTLETT MFG. CO.,

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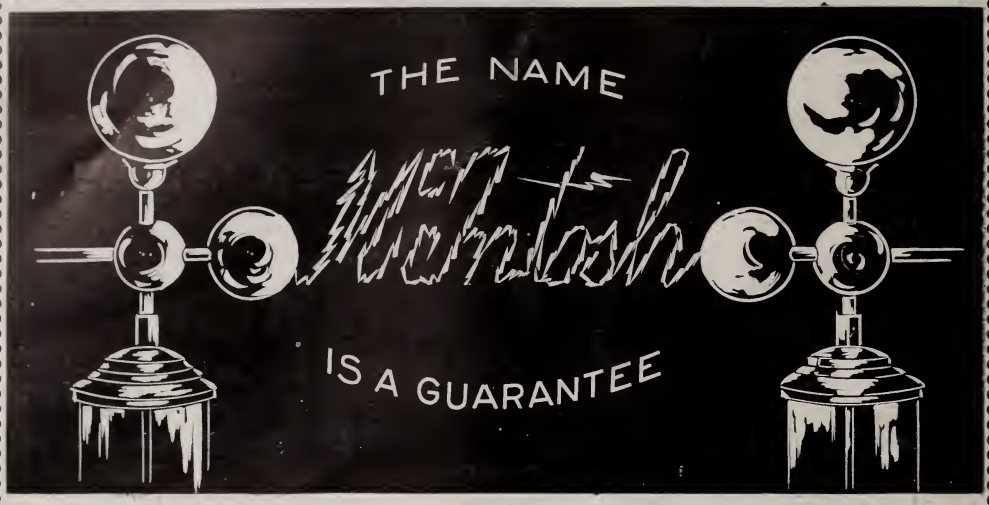

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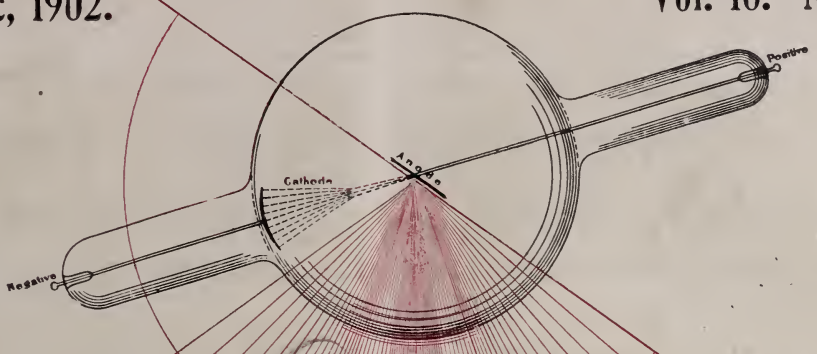

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CHARLES P. RENNER Editor

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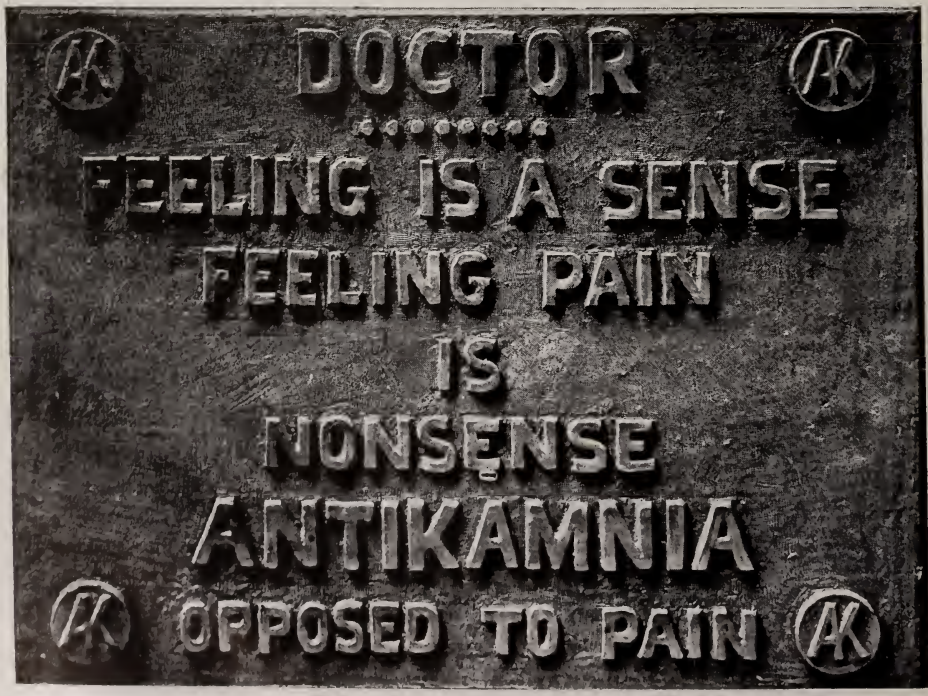

BLOOD INTRODUCTION

In all anaemic, consumptive and dyspeptic patients, where there is a lack of ability to *produce* good and sufficient blood, why not *introduce* it?

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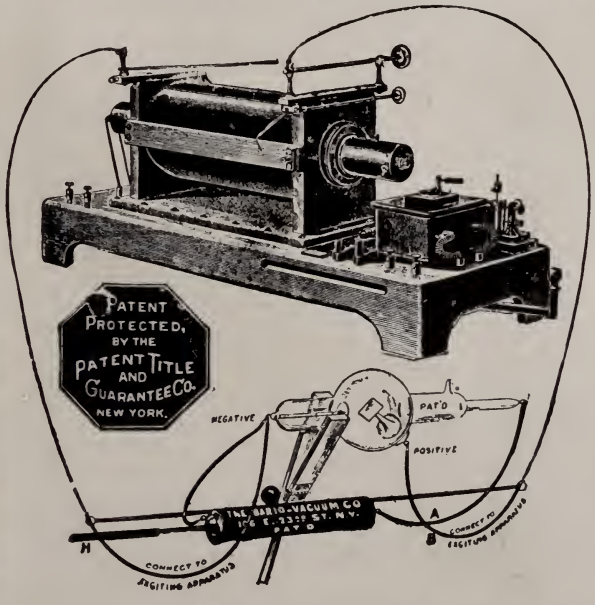

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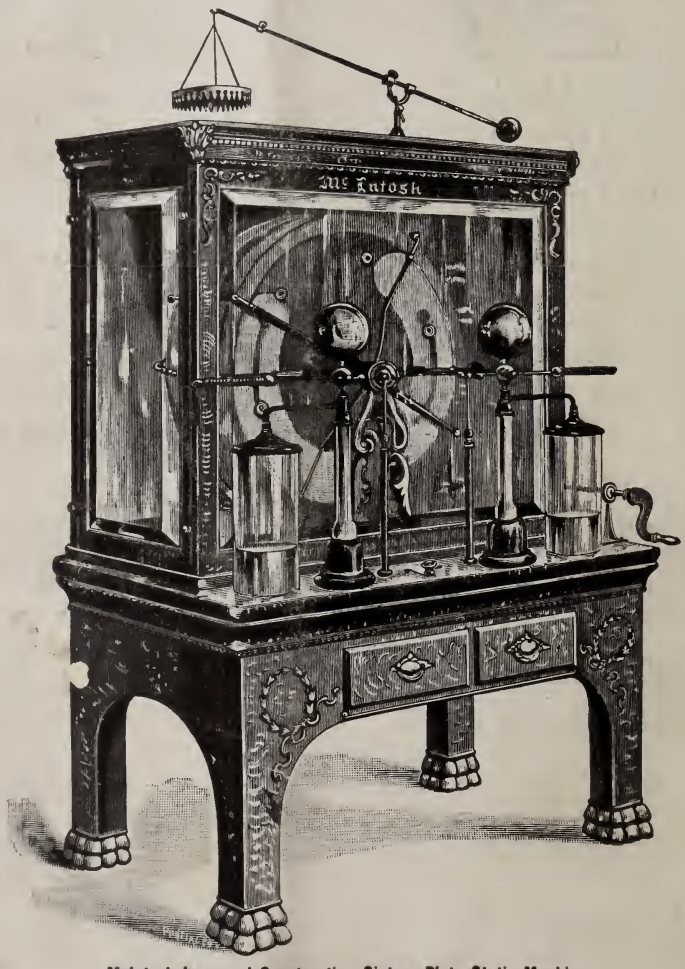

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