

# HOSPITAL CLINICS AND MEDICAL PROGRESS.

## RECENT APPLICATIONS OF ELECTRICITY.

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### III. STATIC ELECTRICITY.

Formerly the machines used for generating static electricity were of the frictional type, in which the charge was obtained by rubbers impinging upon the rotating plates. At present nearly all are of the influence type, of which the Holtz and Wimshurst machines are the most often used. They may be driven by hand or by motors, and must be protected from dust and damp especially in this climate. The Wimshurst is self-charging and some of the Holtz machines have a miniature Wimshurst in one corner to start them with a sufficient charge. Calcium chloride may be kept in dishes under the glass cover to ensure the dryness of the air and all the metallic poles and electrodes must be frequently polished and rubbed if successful working is to be attained.

Among the various methods of applying static electricity besides the direct spark we find—

1. Simple charging or static insulation.
2. Monell's potential alteration.
3. The breeze.
4. The friction spark or massage by a roller.
5. Morton's static induction.

In simple charging the patient is insulated on the platform and the positive pole is connected with his chair by a chain, while the other pole is grounded. When the machine is set in motion the patient becomes positively electrified, his hair stands up and a light surrounds him if the room is darkened. The condition may be continued for a quarter of an hour or longer. The general effects are refreshing, but, if the positive pole is grounded, the effects of the negative pole are said by some writers to be depressing. However, simple charging is a preliminary to all other treatment on the insulating platform.

In potential alteration the charge is suddenly removed without discomfort to the patient by bringing the grounded electrode near the positive knob and thus creating a short circuit by a spark from one to the other. If this is repeated several times rapidly the patient undergoes a frequent and a fairly vigorous change of potential. Similarly, when the patient is insulated the static breeze may be employed either by the indirect or direct method; that is the charge of electricity in the patient may be withdrawn through a conductor held too far away to permit sparking, and passed either through the earth and a grounded conductor to the opposite pole, or direct to that pole without going through the earth. The current is felt as a cool wind blowing towards the patient when the conductor is held anywhere between sparking distance and a yard off. The nearer it is brought the stronger are the effects, and when near the sparking point the sensation resembles that of a douche of hot water. The presence of clothing introduces other modifications; thus a hot pricking sensation may replace that of a cool breeze, though the therapeutic effects are the same. We may employ this method for the relief of pain, such as neuralgia or headache, or as a powerful stimulant, according to the distance at

which the conductor is held, and the strength of our current. Electric massage is given by passing the roller electrode quickly over the clothing when showers of small sparks fly from it to the patient. The strength of the application is increased with the thickness of the clothing, and may be decreased by first partially withdrawing the charge from the patient by placing one's own foot on the platform.

Morton's static induction, as we have said before, is in a sense an application of high frequency currents. If two Leyden jars are fitted to a Wimshurst machine, and the outer coatings are connected, a secondary circuit is formed, and at the same time the primary circuit across the spark gap is intensified. Instead of a direct connection between the two outer coatings, conducting wires and ordinary moistened electrodes are used to convey the secondary current to a patient, the force being regulated by altering the distance of the spark gap on the primary circuit, and by using larger or smaller jars. Thus we can obtain a current which is almost painless and which produces muscular contractions of a strong type. This current is applied to a patient just like one from the ordinary galvanic or Faradic battery.

Lewis Jones<sup>7</sup> lays down that in using this current we must adjust the sparking distance between the discharging electrodes on the machine before commencing the treatment. From an eighth to a quarter of an inch is generally sufficient; indeed, with a quarter of an inch spark the treatment is severe.

The therapeutic effects of static electricity have been the subject of many ill-founded claims and rash theories; but, as in other forms of electrical treatment, there is a residuum of real value. We need not even despise its psychical use as a means of suggestion in hysterical conditions, but there are direct physical results of more importance. It may be applied either in a general or localised manner. Static insulation or simple charging is a type of the one, and Morton's induced current and the breeze are instances of the other. In general treatment the nutrition of patients is improved, their appetite and sleep return, the output of urea is increased, while uric acid is lessened. General applications have also given very good results in neurasthenia, hysteria, some forms of melancholia, obesity, and dysmenorrhœa, from their stimulating or tonic effect. They have this advantage over the electric bath, that they do not necessitate the removal of the clothing.

Localised treatment by Morton's currents directed to a motor point or nerve trunk brings into play damaged muscles and is of great value in various forms of paralysis, muscular rheumatism, and perhaps in neuralgias, though Jacoby throws doubt on its effect in the last case. The perfect manner in which it can be applied to a given spot only, and its force regulated, are one of its great advantages. The breeze is valuable chiefly as a sedative in pain, while sparking is used as a stimulant or counter-irritant. Indeed these three methods may respectively be

compared to sinusoidal, galvanic, and Faradic treatment, though certain differences exist in each case.

<sup>3</sup> Electro Therapy, vol. 1, p. 186. <sup>5</sup> Therapeutic Electricity.  
<sup>4</sup> Electro Therapy, vol. 2, p. 151. <sup>6</sup> Med. Electricity, ed. 3, p. 190.  
<sup>6</sup> Lancet, Oct. 18, 1902. <sup>7</sup> Med. Electricity, ed. 3, p. 177.

### PNEUMONIA.

AFTER the prolonged spell of fine and open weather which we have lately been enjoying, it is to be feared that the wintry cold, coming suddenly upon us, will prove disastrous to many, and that diseases of the lungs will exact a heavy tribute. It is then peculiarly seasonable and appropriate that the attention of the profession should be directed to the subject of pneumonia as it has been by the delivery, before the Royal College of Physicians, of the Croonian Lectures on "The Natural History and Pathology of Pneumonia"—lectures prepared by the late Dr. Washbourn, but read by Dr. Hale White—and by other papers on pneumonia by various authors which have recently appeared. Among the latter we would specially refer to a clinical lecture by Sir Dyce Duckworth on "The Treatment of Pneumonia" (Brit. Med. Journ., Nov. 15) for we can hardly fail to see that the many brilliant discoveries which have of late been made in regard to the bacteriology of the disease have tended to overshadow and to some extent to put in the background what, after all, ought to be to the practitioner the main point of interest, namely, the treatment of the patient.

The natural history of pneumonia, says Sir Dyce Duckworth, shows that it is an acute disease, that it is truly an inflammation of the lung, but that it is something more. Although it is a local inflammation it is a specific fever due to the influence of a toxin which is generated by two or three specific microbes which evidently are at the bottom of the whole process. The early symptoms of pneumonia consist of a feeling of weariness, a bad frontal headache, and shivering, with which the disease often starts. The patient is too ill for his work and goes to bed, but there may be nothing yet which points to inflammation of the lungs. The experienced eye will, however, detect symptoms worthy of note even at that early stage. A flushed face, rapid breathing, a quick pulse, a high temperature, in the absence of other things which cannot be detected, should certainly make one think of pneumonia in such cases; so one must examine the patient day after day until something definite is found. The signs which indicate a gradual progressive consolidation of the lung are an insidious increase in the frequency of breathing, and a high state of fever, the pulse and respiration reaching usually the proportion of one to two. Then there is the short cough and the expectoration of blood-stained mucus or rusty sputa, sticky and tenacious. When that is present the diagnosis is practically certain. On the third or fourth day there is apt to come out an eruption of herpes on the face, nose, cheek, or chin, which in the majority of cases is a favourable symptom.

Now as to treatment, the late Sir William Gull used to say that the essential thing for a pneumonia patient was to put him in a warm bed, and there is no doubt that a warm bed and good nursing are essential parts of the treatment. Such patients have no appetite, and there is no object in forcing food.

They are likely to do very well on a fever diet consisting mainly of milk and beef-tea. The high temperature of 102° to 103° appears to be a necessary part of the disease and one way out of it, so that as long as it keeps within limits one takes no steps to check it. But if the temperature should approach what may be called hyperpyrexia, the limit of which one may place at 105° Fahr., means must be taken to reduce it. This is best done by sponging with ice-water and placing a cradle under the bed covering. If this is not enough one may suspend small buckets of ice from the cradle, and so keep the patient in a cooling atmosphere; or one may apply Leiter's tubes, with ice-water, to the head; or put ice in bags in the axillæ or between the legs. If such means fail one may use some drug, not such things as antipyrin, antifebrin, and phenacetin, which are apt to be mischievous, but quinine in doses of 5 grains every two to four hours, until the temperature gives way. To place the patient in cold baths, as is still largely done in Germany and America, is a severe and exhausting process, which is unnecessary. As to other internal remedies it is usual to prescribe salines, as potassium citrate and ammonium citrate, which are certainly helpful. Quinine is also useful even in the absence of hyperpyrexia, or compound tincture of bark may be added to the saline.

The natural history of the disease shows that the inflammatory process comes to an end about the sixth or seventh day, although the physical signs of consolidation still remain, absorption of the inflammatory products taking some time. Supposing, however, the temperature does not fall by crisis on the seventh day, but goes on to the eighth or even the twelfth day: in such case there is probably some further disorder or complication; either the patient is in a very low condition and the disease is not resolving properly, or there is some pleural effusion, probably empyema, the presence of which is to be ascertained by the insertion of a needle into the dull area.

There are two symptoms connected with the nervous system which are of importance, delirium and insomnia. Delirium is especially apt to occur in pneumonia of the apex. It also occurs in elderly patients and in those who have been intemperate in alcohol. Pneumonia in the drunkard is almost certainly a deadly disease, while double pneumonia in such a patient is absolutely fatal; there is no chance for him.

When insomnia occurs, especially towards the crisis, about the sixth or seventh day, it is a very grave matter, and the question of the use of opium is a very serious one, one also on which there is great difference of opinion. It does not do to be too dogmatic, but there are certainly some cases in which it is beneficial when there is no reason to suppose that the kidneys are affected. A very good plan is to give morphine in small doses with compound spirits of ether, say 15 minims of liquor morphine with 1 fluid drachm of compound spirits of ether. If that is not sufficient the dose may be repeated.

Failure of the heart in pneumonia is a very serious condition, and one which is very apt to occur. The circulation through the lung is blocked, the right heart is distended, and the venous system is en-