EMPLOYMENT OF
ELECTRO-MAGNETISM

IN A

CASE OF POISONING,

WITH SUGGESTIONS FOR ITS APPLICATION TO
STILL-BORN CHILDREN
AND SOME FORMS OF DISEASE.

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(Communicated to THE LANCET by JOHN
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London.*)

A. T., an Englishman, the subject of this communication, aged 22 years, and of robust frame, is a clerk in one of the most respectable commercial houses in Valparaiso. He had a slight gleet, for which he prescribed himself pulverised cubebs, in doses of half an ounce, night and morning, and experienced from them neither good nor bad effects. On the night of the 16th of March, 1842, he went to an apothecary's shop and asked for cubebs. Not having confidence in the lad in attendance, he requested permission to examine the label on the bottle, and read thereon "*Pulv. Cubeb.*" He then ordered an ounce, divided into two parts, and with these returned home at midnight. He immediately took one of the powders, placed himself in bed, and, as was his custom, took up a book to read, but, as he expresses it, had not read two lines before he felt a dizziness and inclination to sleep. I accidentally discovered him the following morning about twelve o'clock with these symptoms: face red and swollen; lips dark-purple; mouth containing a viscid frothy saliva; tongue has a dry and chapped appearance in the centre, and the teeth are slightly coated with a brown sordes; veins of the forehead and temples turgid; eyes rolled upwards, injected, and their pupils contracted to a point; skin

moderately warm and moist, with clammy perspiration; feet cool; pulse very slow, moderately full, and dispersed by the least pressure; respiration very slow, short, and gasping. By agitating him violently he was aroused for a moment, uttered some incoherent expressions, and sank back into comatose sleep.

These were the symptoms when I first saw him. Dr. Houstoun of the Royal Navy, now practising in this place, and Dr. Barrabino, of the U. S. Navy, then attached to the U. S. schooner, *Shark*, came to my assistance. We administered the sulphate of zinc as an emetic, and hot mustard and water to arouse the sensibilities of the stomach to its impression. Large draughts of this, and titillation of the fauces, produced vomiting, and a small quantity of the powder apparently was brought up. The stomach-pump was at hand, but as vomiting was readily provoked, it was not used. The patient was made to sit on the edge of the bed with his feet hanging in a tub of almost boiling water strongly charged with mustard. One cup was applied to each temple, and about two ounces of blood abstracted. Large sinapisms were spread over the chest and stomach and inner parts of the thighs. A very strong liniment of ammonia, cantharides, and turpentine, was applied to the whole length of the spinal column, until the skin became very red and inflamed. When the stomach seemed to be cleared of all traces of the poison, the mustard draught was suspended, and a large quantity of olive, with castor oil, administered, but only a part remained. The patient now appeared to be sinking. The surface was cold and covered with a damp sweat; the face was pallid, with a purplish tinge; the jaw and eyelids were fallen, which the patient, by powerful sternutatories and severe blows on the face and shoulders with the open hand, was with difficulty made to raise. Ammonia and brandy and water were now given, with light broths, and an injection composed of turpentine and ammonia. This produced a slight discharge from the bowels. The stimulating liniment already mentioned was repeated to the spine and over the surface of the body. The pulse was hardly perceptible at the wrists, if, at times, it was at all to be felt. The stimulants were continued.

It was now 3 p.m. There were no signs of reaction, and the features wore the aspect of death. Under these discouraging circumstances, and when every effort seemed vainly expended, we now determined to dress the patient and, supported by two strong assistants, to take him from his room, continue the stimulants and light broths, and endeavour to walk him in the cool air. At first he made feeble but unsuccessful efforts to direct the movements of his legs, but at length could not be aroused, made no effort to stand, and sank almost lifeless into the

* *To the Editor of THE LANCET.*

Sir,—The following cases and observations having been forwarded to me from South America, by Dr. Page, I send them to you in the hope that they may prove interesting to your numerous readers. I am acquainted with Mr. A. T., the subject of the first case, and had heard of his narrow escape from his friends here. I may also add that a portion of the cubebs has been sent over, and has been examined by two eminent pharmaceutical chemists without their being able to detect any deleterious drug in combination with it, so that the effects described may be reasonably attributed to the magnitude of the doses. I am, Sir, your obedient servant,

JOHN HOGG.

Gower-street, Bedford-square,
Jan. 24, 1843.

arms of his assistants.* He was carried to his room and placed in a slightly reclining posture on his bed. His breathing was now short and hurried; his mouth wide extended and jaw fallen; nothing seemed capable of arousing him; the exhaustion was extreme; the pulse could be felt feebly at the wrist, maintained there probably by the agitation which he had just undergone. Dr. Houstoun had left a short time previous, Dr. Barrabino remained with me.

It was now 4 p.m., and worn out with fruitless efforts we desisted entirely from further exertion. At this juncture I thought of my electro-magnetic battery, and proposed its application to bring about reaction, for I felt we were justified in such desponding circumstances to make it a matter of experiment. Cerebral congestion was urged as an objection, but admitted not to be sufficient, in such a desperate case, to set aside the experiment. It was immediately tried, and with the happiest results. With an assistant rapidly rotating the wheel, I applied the balls at first to each side of the neck, and ran them down behind the clavicles. The arms and body now moved convulsively, but the patient lay as unconscious as before. I now passed one ball over the region of the heart, and the other to a corresponding point on the right side. In an instant his eyes opened widely, and with a ghastly expression of countenance; his head and body were thrown convulsively toward me, and he groaned. He now sank back into his reclining posture, and he was again asleep. The balls were re-applied in the same situation with similar results—a third and fourth time, and he cried, “No more.” Reaction was now positively established; the heart had received a strong impulse; the pulse was becoming rapidly developed, and the whole surface warm.

We now determined to desist, and watching him attentively, allow him to remain quiet for an hour. Reaction continued satisfactorily, and when the hour had expired he could be awaked by shaking his body and calling loudly his name. There was no further occasion for the battery. He was aroused at intervals; and at eleven o'clock in the evening was sufficiently awake to relate where he had got the medicine the preceding night, but was still drowsy, and when not disturbed inclined to sleep. Thus he passed the night, and on the following morning was pretty well. He then told me that he heard many things the preceding day that were said by persons about him, but he neither felt the power to open his eyes nor move his tongue to speak, although up to 3 p.m., when powerfully agitated and spoken to, he would reply in short and sometimes

broken sentences, and occasionally correctly. He further says that the last thing he has any recollection of was my remark, whilst they were attempting to walk him in the corridor, that nothing more could be done but to make the experiment. From that time all was blank to him, until, as he expressed it, “he felt as if a gun had been fired off within him, which thrilled through and shook him to the very extremities.” This was the application and effect of the electro-magnetic battery.

I have said that cerebral congestion was thought at the time to make the application of the battery in such cases objectionable. The result proved the incorrectness of this opinion, and sustains this argument in favour of the practice adopted, viz.,—By observing the phenomena of diseases a relation may be remarked between some of them in their earlier stages, whose terminations and consequences are quite dissimilar; apoplexy and epilepsy furnish an example. In both there is great cerebral congestion. The former generally terminates in effusion, and paralysis is the consequence; the latter terminates in spasms, and the patient returns to his usual health. Therefore it would seem that the muscular spasms equalise the circulation, and thus unload the brain; or, if we might suppose epilepsy to depend upon a determination, if I may use the expression, of the nervous principle to the nervous centres, the latter are relieved by throwing it off upon the nervous extremities, occasioning thereby spasm. Viewing these vital actions as the efforts of nature to relieve organs from the effects of undue accumulations, and restore the equilibrium in the nervous and vascular systems, it appears probable that severe narcotism of the nervous centres may be diffused and shaken off by the revulsive action of the battery on the nervous branches, and that the consequent developments of vital action would give an impulse to the general circulation which might relieve the cerebral congestion.

A question might arise as to the power of the medicine taken to destroy life. On this point the melancholy death of Mr. C., a French gentleman, late of this place, who took the same medicine and in the same quantity but a few weeks previous, affords convincing testimony. In illustration of my subject I asked Dr. Cazentre, a French practitioner of this place, and the physician of Mr. C., for an account of the circumstances attending his death, and the autopsy, which he very politely communicated as follows:—

“Mr. C. was afflicted for some time with a gonorrhœa, for which, without medical advice, he took balsam copaiba, even in large doses, but to no effect. He was now attacked with orchitis, and for the first time came to consult me. After eight days of constant attendance the swelling which existed in the left testicle disappeared, but the

* Broths and stimulants were poured into his mouth, but he could no longer swallow them.

blennorrhagia returned with more force. Vexed with this he again wished to take remedies which might relieve him at once of this afflicting disease. I recommended the use of the cubebs, which, taken for nine days, and gradually augmented to two drachms three times a-day, had almost completely taken away this obstinate affection, when, on the 13th of February, not having any of the remedy left, he sent the same recipe to the nearest apothecary's shop.* At ten o'clock at night he retired to his bed-chamber well and cheerful. Without consulting any one, on lying down, he took half an ounce of cubebs. No noise whatever was heard during the night, and at seven o'clock the following morning, when they entered his bed-chamber, they found him in a state of insensibility. Half an hour after I was with him, assisted by Dr. Veillon, and we found him in the following condition:—

"The body is in a state of supination; all the senses are extinguished, without hearing, speech, or movement; the eyelids are fallen, and when raised the eyes look cloudy and fixed; the pupils are dilated; extremities flexible; they obey the hand which raises them, and fall like an inert body; heat natural and equally diffused; face red; there are coloured, blackish spots on various parts of the body, but principally on the back; when the body is moved a species of strong rle is heard in the bronchia; pulse slow, feeble, and very irregular; respiration hardly perceptible. Not knowing to what to attribute a state so suddenly produced and so grave, and recognising by the symptoms the appearance of asphyxia, and thinking he might have taken too strong a dose of the medicine, Dr. Veillon and myself proceeded in consequence to extract from the stomach the cubeb that it might yet contain, and to cause reaction by the most powerful excitants. But all was in vain, and at twelve (noon) life was completely extinct. Nothing now remained but to make the autopsy, which we did the following morning at seven o'clock. All the cavities and organs were examined with the greatest care.

"*Exterior.*—The face is pallid, the integuments livid, principally behind, and the corpse rigid.

"*Abdomen.*—The stomach with no trace of inflammation, contains a tumblerful of liquid, in which is observed a little of the powdered cubebs, mixed with some aliment, which is almost digested; the intestines are sound and healthy; the bladder is full of crystalline urine; the liver, spleen, and kidneys are full of black and fluid blood.

"*Thorax.*—The lungs are excessively en-

gorged with blood, and when cut into with the knife this flows with a great abundance of froth from the bronchia; the left side of the heart is entirely empty, the right full of blood; the aorta and all the arterial system is entirely empty; the venous system of the thorax and abdomen, as well as the pulmonary artery, the vena cava and porte, are full of black and fluid blood, which flows abundantly as soon as the vessels are divided.

"*Head.*—The veins of the brain are also congested, but the congestion of this organ is not as great as that observed in the thoracic and abdominal viscera. I repeat, that in no part was there red or coagulated blood found, but always black and fluid, and filling all that appertained to the venous system."

Before closing this subject, I would beg leave to add my impression that electro-magnetism will not only be found a most useful agent in cases like the above, but in some forms of disease, particularly those of a highly congestive character, where oppression of the organs and the nervous system prevent reaction and speedily destroy life. I need not occupy space in adducing cases illustrative of my meaning. In practice I think we frequently see cases where death seems to be caused by an *obstruction* of the functions or organic movements which support life, more than by an *exhaustion* of the organic functions or of life itself. And in such cases electro-magnetism might communicate an impulse which would renew those sympathetic actions between the organs (if no positive lesion exist in any of them) upon which the continuance of life depends.

In all cases of asphyxia, electro-magnetism must be useful; and I am strongly impressed with the belief that it might be applied in very many instances to still-born children with the happiest effects; for this purpose an instrument might be used of a very portable form,—that used by me in the case related consists of a large *horse-shoe magnet*, mounted upon a stand, in a vertical position, with an *armature*, fixed upon an axis between the poles, so as to revolve in front by means of a wheel. The *armature* consists of two cylindrical bars of soft iron, connected by a cross-bar, and in the *centre* of the bar is an insulated ferule; as near the end of the bar as possible is fastened the "*breakpiece*." Around each of the cylindrical bars is wound *two thousand two hundred and fifty feet of wire*, covered with cotton thread, to prevent the current of electricity from passing from one wire to the other; the end of *one* of the coils is connected with the "*breakpiece*," and the other with the *ferule*. From one of the pillars, which are in *front* of the armature, the *springs* are made to act on the ferule and breakpiece. From the other pillar the spring connects with the *centre*; the *handles* are fastened by the *set screws* in

* He had previously got the cubebs at another shop, but on this occasion purchased it at the same shop where my patient subsequently procured his.

the base of the pillars. There are four set screws in the back of the upright block of wood to set out the magnet, so as to make the armature revolve as close as possible to the magnet. The shock is communicated on ordinary occasions by grasping large brass handles which connect with the instrument by short coils of wire, which are painted red. To apply it to different parts of the body long wires, covered with cotton-thread, and terminating in brass balls, are used. Two glass cylinders enclose the wire near the balls, for the operator to hold by while administering the shock.

ON THE

COMPOSITION OF PURE AND VITIATED ATMOSPHERES.

By R. D. THOMSON, M.D., Glasgow.

STRANGE as it may appear, the composition of common air is not, even yet, satisfactorily determined, in the opinions of all chemists. According to Dumas, "Ann. de Chim.," iii., 267, the atmosphere consists of oxygen, by weight, 23., azote, 77., and, dividing these numbers by what he has found to be the specific gravities of the gases, he deduces the composition in bulk to be

$$\frac{23}{1.1057} = 20.80 \text{ oxygen, } + \frac{97}{972} = 79.22 \text{ Azote.}$$

Calculation, however, shows that the specific gravity of oxygen, according to his data, ought to be 1.1066 or 1.1067; and we believe Dumas considers that the true specific gravity cannot be under 1.107. This is very near Dr. Thomson's number, viz., 1.1111.

Dumas has lately published some experiments, made at Copenhagen, on air taken from the surface of the ocean, where the ratios of the gases vary considerably from these data as follows:—

	By weight.	By Bulk. S. g. 1.1111.	By Bulk. S. g. 1.1067.
Oxygen..	22.58	20.3	20.40
Azote ...	77.42	79.7	79.60

It deserves remark, that the mean of six experiments out of ten, made by Dr. Thomas Thomson (First Principles, i., 98), gave for the composition of air at Glasgow, by bulk—

Oxygen	20.42
Azote	79.58

This remarkable coincidence between the composition of the air at the sea, where vegetation is absent, and of that in the oxygen-consuming city, perhaps deserves more attention than has yet been paid to it.

In connection with experiments upon pure air, the trials of Leblanc upon vitiated atmospheres are of high interest. The quantity of carbonic acid in the atmosphere in the normal state has been shown by the Sausures to vary from 3 to 6 parts in 10,000.

Leblanc (Ann. de Chim., v., 223,) has examined the quantity in crowded rooms, theatres, cities, &c. In the hospital La Pitie, the air of one of the wards containing 54 patients, afforded $\frac{3}{1000}$ of CO_2 , or 5 times more than that of normal air. Under similar circumstances, at the Salpetriere, the quantity was $\frac{8}{1000}$. In Dumas' class-room, after a lecture of an hour and a half, where nine hundred persons were present, the carbonic acid amounted to 1 per cent., and the same quantity of oxygen had disappeared. From other experiments, he considers this a maximum quantity for safety, and strongly recommends a better ventilation when so much carbonic acid is present. This result agrees with experiments made in this country. When the atmosphere is deteriorated by burning charcoal, he has seen death produced when 3 per cent. of carbonic acid was present in the atmosphere. In all such cases of death from stoves, he has found carbonic oxide in the air, and he attributes a deleterious effect to the agency of this gas. He has observed 1 per cent. of this gas to destroy an animal in two minutes, which is at variance with the statement of Nysten. This observation explains many of the inconsistencies which appeared some years ago in the evidence of some London chemists respecting the influence of Joyce's stoves. It is quite obvious that their structure was dangerous. Leblanc found that a candle was extinguished in air containing $4\frac{1}{2}$ or 6 per cent. of carbonic acid. In such an atmosphere life may be kept up for some time, but respiration is oppressive, and the animal is affected with very great uneasiness. Air expired from the lungs contains about 4 per cent. of carbonic acid, and hence this atmosphere is noxious. Even 3 per cent. in the atmosphere killed birds, and yet we have seen statements which affirmed that upwards of 3 per cent. had been detected in the London theatres. All these facts are pregnant with importance in reference to health. Our miners may not be suffocated by fire-damp explosions, but we should remember that their constitutions may be poisoned by the respiration of tainted atmospheres.—*Proceedings of the Glasgow Philosophical Society*, No. 4.

THE TALK ALL ON ONE SIDE.—Desgenettes had a way peculiarly his own of conducting his inquiries respecting his patients' ailments. He would put a question, but never suffer an answer to be made. If the patient offered to speak, the professor would say, "Your interruption is neither polite nor politic; it is rude to interrupt any one who is speaking to you; and it is unwise, because while am talking all the time that I can spare elapses."