

The Galvanic Current applied in the Treatment of Insanity. By
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At Dr. Williams' request I have conducted during the past six months a few experiments with the galvanic battery in mental diseases. Thinking the results of these observations will be of service to those who intend pursuing this branch of study, with his permission I take the liberty of recording them.

We have used Dr. Emil Stöhrer's battery, which is, I believe, the simplest, and being moderate in price, and easily manageable, is preferable to others more costly and more elaborate. It consists of a compact case and frame, the latter supporting forty pairs of zinc and carbon plates, and a trough containing an equal number of glass cells filled with dilute sulphuric acid; this is easily raised to put the battery in action, or lowered when not required. Running along the bar supporting the plates is a small piece of apparatus called the commutator; to this the wires are attached, and being also in contact with the plates, movement either to the right or left increases or decreases the amount of electricity conveyed by the wires. An ebony handle at the top determines the direction of the current. So much for the instrument. It would certainly bear improving, especially with reference to the electrodes, which are clumsy, painful and uncertain, but on the whole its simplicity recommends it.

In my observations I have made no attempt to estimate even approximately the amount of electricity each case received. The galvanometers in common use are delicate and expensive, moreover the conductivity of the skin varies in almost every individual case. Some persons are peculiarly susceptible, while others hardly feel the full power of the battery. That this is greatly due to the state of the skin may be affirmed by having either electrode dipping in salted water, and the other applied to some distant organ, when the effects will be strongly felt, even by those who hardly felt them before.

The state of the weather, as well as the condition of the plates, has considerable influence on the amount of electricity generated. A damp, cold atmosphere, and a coated state of the plates both weaken the action of the battery. Hence, though I have given the average number

of cells used in each case, this is but a rough and uncertain estimate of the amount of electricity each received. It is always well to begin with a low power first; we thus gain the patient's confidence, and I believe I have seen more good result from a gentle application than a powerful one. In order to test if the patient is receiving a sufficient quantity to be of any use, it is only necessary to reverse the current; if he starts it is of sufficient strength.

In some cases the hands or feet were placed in a basin of acidulated water with one of the electrodes dipping in it, the other being applied to the head or spine; this increased the receptivity, and by having both hands or feet in the water, it was possible to send a current up or down both extremities at the same time.

CASE I. Melancholia.—J. L. B., male, 51, single, soldier.

History.—Had an attack of brain fever when about 18 years old. Enlisted in the army at the age of 30 years, and served in Malta and India. Conduct during service good, and he was considered temperate and steady. About two years ago he had an attack of sunstroke, while in India, and, after being in the hospital there for a short time, was discharged as unfit for service. On admission he was in a very low melancholic state, with greatly depressed bodily powers; "unable to comprehend simple questions; acts without purpose; puts his fingers in the fire; throws his clothes out of the window; runs about in an excited state almost nude." Spirits very much depressed; does not sleep much, refuses his food, and is extremely restless.

Treatment.—Stimulants and nourishment were given at frequent intervals, but the restlessness continued; he wanted constant watching to prevent him injuring himself, and required to be fed and dressed. It seemed as though nothing would be of use to stay his downward course, and the electric treatment was given with but small hopes of success. The positive pole was applied to the side of his head, over the temporal muscle, and the negative was placed at the inner side of the foot at first, afterwards the hand. He resisted violently at first, but willingly submitted afterwards. The effects of the current were very evident, by much flushing of the face, and congestion of the superficial veins. The pulse was increased after each application, on an average about six beats, but became much steadier. The mean number of cells in use was 32.

The result was most marvellous, and satisfactorily attributable to the treatment. Each application was followed by decided improvement, so that in a few days he was conscious, and able to feed himself; in less than a month the treatment was discontinued. Total number of sittings, 12. The patient himself fully appreciated the benefit he had received, and warmly expressed his thanks.

CASE 2. *Melancholia*.—E. W., female, aged 50, married.

History.—Duration of insanity, about 17 months; had a previous attack 16 years before, and then resided in an asylum for 18 months. On admission she was suffering from melancholia, with excitement. Is very violent, constantly talking nonsense, and falls down in a praying attitude to strangers, begging them to have mercy on her. Frequently bursts into tears, throws herself on the ground violently, and is very sleepless. Bodily health impoverished.

Treatment.—Various remedies had been given her, such as chloral, opium, ergot, morphia, bromides, Indian hemp, &c. Cold and warm douches, wet sheet packing, &c., were also used with apparent success, but she began to evince a tendency to dementia and obesity. She has had 14 applications of electricity, the negative pole being placed to the nape of the neck, and the positive held in the hand. On an average, 20 cells were used.

The result was to increase the force and frequency of the pulse about eight beats. Her mental health improved so that she has been discharged relieved.

CASE 3. *Melancholia*.—A. A., female, 26, single, farmer's daughter.

History.—Has been insane about three months; cause unknown. Bodily health, fair. Mentally, she seems in a state of depression, with a most determined propensity to commit suicide by strangulation.

Treatment.—Chloral in increasing doses was given to produce sleep, and she had a Turkish bath once a week, but without doing any good. She broke out into a state of great excitement with violence, a fortnight after admission, and endeavoured in every way to destroy herself. This endeavour was frustrated by constant watchfulness, nurses being told off to attend her night and day, with orders never to leave her side for an instant. Wet-sheet packing, subcutaneous morphia, ergot, and various other remedies were tried; but, with the exception of some slight improvement from the packing, she seemed little better. Electricity was applied 26 times, positive pole to head negative to hand. At first, she could only bear a very few cells, six or eight, and it seemed to make her head ache; however, she was afterwards able to bear more.

The result has been very satisfactory. She appears much brighter, converses rationally; employs herself skilfully in needlework; has no desire for self-destruction. Both she and her friends acknowledge the benefit that has resulted from the treatment, and she has since been discharged, recovered.

CASE 4. *Melancholia*.—J. W., male, 45 years of age, married.

History.—No cause can be assigned for his present attack, but it is believed he has been insane before. On admission he was in low bodily health, with a weak heart and rapid pulse; sleepless. Mentally, he seemed intensely melancholic, but with a wild appearance and extremely restless manner; could not comprehend questions, or answered in a rambling manner.

Treatment.—Nothing was given him but purgatives and stimulants; for a week after admission his restlessness rather increased, and the case was thought to be hopeless. Electricity was then tried; he resisted it furiously, but it was persevered with, even though sometimes he required restraining by six people. He had 20 applications, average 25 cells; positive pole to head and negative to hand.

Result.—The pulse at first was very rapid (140), but it gradually became slower and fuller at each application until it obtained a normal state. In each case it was slightly increased by the electricity. Coincident with the improvement in the state of the pulse, his mental and bodily powers improved; but symptoms of cerebral disorganisation have shown themselves, and consequently the treatment has been stopped.

CASE 5. *Acute Mania.*—L. D., female, aged 36, married.

History.—Duration of insanity, five months. *Bodily* health on admission, fair. *Mentally* in a state of acute mania, with delusions, it was said, on religious subjects, but her mutterings were unintelligible. Spirits were exalted; she was dangerous to others, and sleepless.

Treatment.—The furious excitement was calmed by opium, but she seemed to lapse into a state of dementia; became dirty in her habits, requiring to be fed and dressed, and observed an obstinate silence. *Electricity* was applied, first with the electrode to the head, and with the anelectrode to the hand, but as this reduced the frequency of the pulse, and did not make much change, the current was reversed.

Result.—After this she improved somewhat, began to converse rationally; behaves better now, and dresses and feeds herself. Her husband notices a great improvement in her. She has lately been working well in the laundry, and is convalescent. She had 16 sittings.

CASE 6. *Melancholia.*—E. F., female, aged 28, married.

History.—Duration of insanity, about seven months; supposed to have been caused by pregnancy and a hereditary predisposition. She is in a very depressed state, and is also much confused mentally; bodily health fair. After admission she seemed to brighten up a bit, but soon showed a tendency towards dementia. After the electricity had been applied the pulse increased; she could only bear twelve to twenty cells. Positive pole to head, and negative to hand. This order was reversed afterwards for a time. She had twenty applications.

Result.—The primary effect was to throw her into a perspiration. Her mental health has improved, and she is now working steadily.

CASE 7. *Melancholia.*—J. L., male, 28 years of age, single, groom.

History.—Insanity of nine months' duration, cause of which is unknown. Is in a peculiarly terrified state; fears injury from almost any object; thinks the trees or table will fall on him. His spirits are greatly depressed, and he says "he is punished in this way because he has written the Holy Name backwards." Has attempted suicide by drowning. Health fair, but has a cold and clammy skin.

Treatment.—Cold douches were chiefly used, but failed to rouse him from his depression. Electricity was successful to a certain extent; but it had to be discontinued at the end of a month, as ulcers broke out on his feet, and it has not since been resumed; the mental health of the patient has improved.

CASE 8. *Melancholia.*—S. F., female, aged 32 years, married.

History.—Duration of insanity, nine months; supposed to have been caused by loss of child and hereditary taint. The first symptoms observed were depression of spirits. Expresses great fear of being burnt, and has tried to drown herself. Has attempted suicide several times since she has been in the asylum, once or twice by strangulation. Bodily health fair.

Treatment.—Chloral, opium, and cold douches were tried without avail. The electric treatment was persevered in for three months; but, though she somewhat improved at the end of that time, it was only slightly. She seems to be lapsing into a state of dementia. She had altogether 22 applications, average number of cells, 22. Positive pole to head, negative to hand, afterwards for a time the reverse; in either case, but especially the latter, the result was a decrease in the frequency of the pulse.

CASE 9. *Dementia.*—L. T., female, aged 30, servant.

History.—Duration of insanity, about three years; has been in this asylum before. Her previous attack was attributed to "brain and typhus fever," when about 16 years of age. She is generally in a kind of hysterico-cataleptic state, showing no sign of animation, but just doing what is told her, and remaining in the position in which she is placed.

Treatment.—Various remedies have from time to time been used, but with no result. Electricity seemed to increase the strength of the pulse, which is usually almost imperceptible, and very rapid; but the mental symptoms were unimproved. In this case the current was applied 30 times; average number of cells, 16. Positive pole was at first applied to head or neck, and negative to hand, but as this had no effect the reverse was tried, and then the interrupted current, but without any reliable benefit, though sometimes a slight improvement was thought to have taken place.

CASE 10. *Melancholia.*—F. U., female, domestic servant, aged 30.

History.—Insanity has been observed in her for nearly four years. It is of a religious character, and appears to have been caused by disappointment in love, while an hereditary tendency predisposed to it. She will stand for a long while in a kind of trance, gazing at some unseen object; then will suddenly assume an attitude of prayer, and after muttering some words in a mechanical way, will rise and resume her former state. She shows no religious ecstasy; in fact, her manner is very lost and quiet. She answers questions with extreme difficulty, and as curtly as possible, but civilly. Says she has been conversing with Christ, and believes the medical officer is He. She is a well-made,

delicately-formed woman, with light auburn hair and fair complexion. Is tolerably stout, and appears in good health.

Treatment.—An alternate warm and cold douche were given night and morning for about a month, but they had no effect. *Electricity* was applied, the positive electrode being placed on the right or left temple, and the negative in the opposite hand.

Result.—With few exceptions the result was to increase the pulse considerably; this was partly due to the effects causing pain and some excitement, for at first and on some other occasions the beats were as many as 120 in the minute. Sometimes the pulse decreased in frequency. At the end of each application she used to fold her hands in prayer and say, "For what we have received," &c. She improved at first under its use, so much so as to be able to employ herself; but it ceased to produce any further good after about three months' application. She had 88 sittings.

Case 11. *Mania.*—E. L. B., aged 23, female domestic servant.

History.—Insanity first made its appearance in March, 1872, and was attributed to the death of her sister in a lunatic asylum. On admission she was in a state of mania, verging on dementia. Was subject to periodical attacks of excitement and destructiveness, when she made use of disgusting language, and was very quarrelsome. Occasionally laughed heartily without any reason, or burst into pretended tears. Was sleepless and dirty in her habits at night, with a tendency to wander about the dormitory. She is a stout, rather coarse made girl, but with some suspicions of heart disease.

Treatment.—*Chloral*, in ten to twenty grain doses, had no effect; in fact, it did not seem to suit her at all; the restlessness and talkativeness continued unabated, though the drug was tried for ten days. *Digitalis* was next administered, but she was reported as being more noisy than ever afterwards. *Opium* was added to the mixture, but there was still no improvement, even from increased doses. Then shower-baths were employed, and subcutaneous morphia injected, but without result. *Electricity* was tried; at first little effect was perceived, except decrease in frequency of pulse. As she was excited when first placed under its influence, and required to be restrained by four nurses, the decrease might have been the result of becoming calmer. Pulse before application 80, after 64. Afterwards it was increased both in fulness, steadiness, and frequency; on one or two occasions it was over 100 after the application, but generally the increase was only two to four beats. The current was passed from the head to the extremities, varying the seat of the electrode; sometimes it was placed on the left temple, sometimes on the right, and the other electrode in the opposite hand. The number of cells was from 20 to 24; occasionally this number had to be reduced, as there was a tendency to cause charring of the skin.

Result.—Four days after its first application she is reported as being "much improved mentally." This improvement continued

steadily to progress, and though occasionally subject to relapses, these are not nearly so violent nor so frequent now. In every respect she has improved considerably, and is now *convalescent*. The treatment was discontinued after four months. Total number of applications, 35.

CASE 12 *Locomotor Ataxia*.—Male, 39, widower, whitesmith.

History.—Has been insane about six months, caused, it is believed, by excessive smoking and drinking. He is an intelligent, pleasant looking man, with somewhat irregular features, very thin and wasted. Had a paralytic seizure about $2\frac{1}{2}$ years ago, and has never been able to walk since; movements choreic. Mentally he is not wholly conscious, and refuses to answer questions; memory deficient. Spirits much excited.

Treatment.—Not much beyond extra dietary, and *nux vomica* and steel. The electric treatment was continued for 12 applications; average 22 cells. Positive pole to back of neck, and negative to salted water, in which his feet were placed.

Result.—It had considerable effect on him, so that he could hardly bear it. The pulse was increased about 8 beats. He has decidedly improved, and can now walk about a little, but has to look at his feet; if he does not, he falls.

CASE 13. *Melancholia*.—T. W., 53, widower, printer.

History.—Has been several times insane before; the present attack has lasted about two months. He answered questions in a childish way, but correctly; under the delusion that Day and Martin's belonged to him; was very mischievous. Bodily health fair. Became more depressed, would frequently fall down in an attitude of prayer, and had a painfully anxious expression, though it was wanting in animation, and seemed of a low type.

Treatment.—Symptoms of exhaustion showed themselves after a few applications of the electricity (10 cells). The positive pole was applied to neck and negative to hand or foot. The pulse was extremely rapid and weak, but the current, though it caused some amount of disturbance, seemed to strengthen the circulation. However, he died shortly after; but it can hardly be supposed that the electricity in any way caused this untoward result.

CASE 14. *Progressive Paralysis*.—G. R., male, 52, agricultural labourer, married.

History.—Duration of insanity unknown, but has been two months in the Asylum. Was found wandering about the country, and said he had been turned out of his home. Is a dull, quiet looking man with very low type of features, and indifferent bodily health. Answers questions childishly, but is not wholly conscious, and there is great failure of memory. Spirits neither exalted nor depressed, no delusions of grandeur; in fact he seemed to be a case of dementia.

Treatment.—Had eight applications of electricity, with thirty cells.

The pulse was increased after each about four beats, and he seemed better for a time. But symptoms of Progressive Paralysis set in, and it was considered inadvisable to go on with the treatment. He died two months after.

CASE 15. *Mania*.—E. L. G., female, 35, married.

History.—Has been insane about three months; cause unknown. She is in feeble bodily health, and has paralysis of the right arm, the temperature of which is very much lowered. Sometimes complains of temporal and supraorbital pain in the left side of head. Suffers from "fits," the nature of which is uncertain. Mentally she is childish in her manner, and has a want of power to give expression to her thoughts, though she seems clearly to understand questions. Sometimes only replies, "I told you so," and other meaningless sentences. She is rather excited, and her spirits are somewhat depressed.

Treatment.—The electricity has been applied four times (12 cells), positive to left side of head, and negative to right hand. The pulse is very rapid, but it gained in strength under the current. The temperature of the affected side is much higher now (her extreme restlessness will not allow of a correct thermometric observation), and mentally there is a slight but marked improvement.*

In conclusion I would remark, that in the use of electricity we have a wide field for observation, and one that requires persevering industry and close attention. But it would be as well to employ it without regard to any preconceived theory, for till the nature of nerve element and its electrical condition is better understood, and how it is that galvanism can affect it, we must be content to trust to obtaining practical results from a series of, to a certain extent, indiscriminate applications.

I think, however, the above results show that in those cases where there seems to be a want of tone in the nervous system, the continuous electric current has in the majority of cases a most marked beneficial effect. I believe that an almost unerring guide as to whether, after a few applications, it will do good, is to notice the state of the pulse; if this increase in force and slightly in frequency, there is a great chance of the treatment being successful.

* The above cases are also recorded in the Appendix to the Sussex County Asylum Report.