
with a Note on the salutary rectitude of the Atrocles in General Paralysis

by William Richardson

n.n., c.m. published 1874.
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I

Introduction.

That there should have been much mystification in the subject of electro-therapeutics is what might be expected, when we take into consideration the very occult nature of the remedy and remember the saying of Michael Faraday that "he once thought he knew something of electricity, but the more he investigated it the less he understood it." Uncertainty and difficulty in asportioning the proper value to a remedy, which must operate in the ever-changing conditions of living bodies, meet physicians and physiologists daily; perhaps the complications are more entangled and difficult of solution in the case of electricity than of most other therapeutic agents.

It is not a matter of surprise that in early times it was assoc-
-cated with witchcraft and that some operators devised means of applying it which tended to impose on the susceptibility of mankind and could only act through the imagination of the patient. We are told that some physicians filled their cylinders for generating frictional electricity with purgatives, which were said to have a legitimate effect on the patient subjected to the electricity. Beekman Steiner maintains the conducting bodies become "etherealized" by the electricity passing along them and that of are sold is the best! Also that electricity becomes "animalized" by being first transmitted through the body of the operator; further that by making certain passes with the electrodes near a patient he receives an electrical influence in some mysterious manner without contact. Again, in Dropsy of Ciacco speaks of Carvajal, disease by changing the "pathological electrical formula" into the "physiological formula." To effect this he places a bifurcate electrode
from a Faradé apparatus in contact with the head and epipactrium, a quadrifurcated one in contact with the four extremities— the "physiological formula" being that sensitiveness to electricity diminishes from the summit of the head to the feet!

Further electricity has always been a hotly debated subject and the history of its use is intimately associated with the names of the Champions who have fought over its mode of production, its best therapeutic varieties, and manner of application etc. The names of Galvani and Volta, Duchenne and Remak, of number of "polarizers" versus "directaries" recall many battlefields of opinion.

It may be accepted as certain that all the processes of organic life, movement, thought, the chemical decompositions and combinations, the generation of heat in fact all molecular changes in the animal body are accompanied by variations in the electrical condition of that part.
Where the changes occur, owing to the quantity of saline fluid in the body and the absence of real nonconducting material, there is usually no generation of free electricity, but the equilibrium is as once restored.

Seeing therefore that electricity normally accompanies or one might say, intimately pervades our life and being, it would be surprising if applications of it from the exterior were not found to be of use in restoring the body from disease to health. There can be no doubt that given in certain doses electricity assists the general processes of nutrition as is exemplified in the experiments of Borenius and Lepra who electrified some puppies for a quarter of an hour daily for some weeks with the voltage current: they placed one for some time in a pan of water in basins of taps connected with the different poles. Those electrified were found to weigh more than those not so operated on.

*Quoted in Federal Handbook of Modern Surgical Electricity, (1877)*

Chapter IV, Page 114
Heidenham found that the voltaic current could restore to the muscles of the frog the excitability lost by fatigue. Also Dr. Poore has demonstrated that by means of passing a constant current along the arm of a man sustaining a weight, a much greater weight can be supported for a longer time than without the current; the feeling of pain is removed and the susceptibility of the muscles to the stimuli of the will is increased—called the "refreshing" effect of the current.

Passing from its effects on general nutrition and on the muscles, the voltaic current especially has been of great use in neurasthenia, anaesthesia, hysterical and spasmatic affections. Some physicians also recommend a gentle current after cerebral apoplexy.

In the treatment of the multiform diseases which are grouped under the name of insanity one would expect (without pre-judging the matter) that electricity should have a place and that its three forms (Franklinian, galvanic, and...
and paralytic) with their different ways of application might be adapted to the relief and cure of the many phases which mental aberration assumes. Yet it is apparent at the outset that there are many cases of insanity in our asylums which are hopeless as regards cure; it remains however to be seen whether even in these some amelioration of their distressing mental impotence and degradation cannot be achieved by the use of this potent remedy — one which in directness of its action on the brain tissue and circulation is second to none or capable of being adjusted with great precision. Dr. Niemeyer stated that in the constant current we have a means more powerful than any other of modifying the nutritive condition of parts that are deeply situated and although it cannot renew nervous tissue and there is no identity between electrical and nervous force, yet its influence on the nutrition of the brain and nervous system of the insane is very marked.

Footnote: A Practice of Medicine. Translated by Dr. Humphrey Stukeley (1874) Vol. II Page 290.
and worthy of consideration.

Further, in the case of many diseases, there are generally several ways of attempting or achieving their cure. I believe that electricity has come to be one very useful assistant to the asylum doctor; that no fully equipped asylum will be without its electrical room.

II

Sketch of Use of Electricity in Mental Disease and Bibliography.

During the 18th Century, Franklin’s electricity was used in a multitude of diseases, including epilepsy and spasmodic affections.

One of the first authors to recommend galvanism in disorders of the mind was Aldini of Bologna, nephew and pupil of Galvani, in his "Essai théorique et expérimentale sur le galvanisme" (1804, Paris). Professor Remat of Berlin in the "Application du courant constant au traitement de..."
Névérot (Paris 1865) advocated localized galvanisation of the Brain and Sympathetic. Benedict also used the constant current in several cases of mental alienation successfully, and Dr. Amundt had a large experience with good results.

In this Country, Dr. Clifford Allbutt treated a number of cases, and recorded his experience in the West Riding Asylum Report 1872 Vol II. The Journal of Mental Science in April 1873 (p. 79) contains a paper by Dr. A. H. Newth on a number of cases treated by him in the Sussex County Asylum at the request of Dr. Williams.

Dr. Althaus strongly recommends galvanisation of the Brain in Cerebral Phthisis and cases merging into Insanity. American Asylum galvanism has been used and Beard & Stockwell relate several cases treated by them.

† Report of Sussex Asylum (1872), London Medical Reins, July 2nd 1872.
⁻⁻⁻ A Treatise on Medical Electricity by Julius Althaus, MD (1873) Page 495
× A Practical Treatise on the Medical Surgical Use of Electricity by G. M. Beard, MD, and A. D. Rockwell, MD (1884) Page 416
Magneto-electric machines were in use in early times in the French and German asylums. M. Tulleau gives his reference of Faradism in his article "De l'application de l'électricité au traitement de l'aliénation mentale" in the Annale Medico-psychologique, 1859, Tome IV, p. 353 (3rd series) also Dr. Angy in the same volume p. 527. Messrs. Beard and Rockwell recommend General Faradization of the body in insanity.

From the above enumeration it is evident that the treatment of insanity by electricity has occupied considerable attention and quite recently a remarkable case of recovery with electrical treatment after 5 years' illness has been recorded by Dr. Robertson of Glasgow.

The Battery I employed in the "Physician's 60 cell Combined Battery" of Corinth & Son in use in the Southern Counties' Asylum, Dumfries.

The treatment of Insanity by Electricity by G. M. Beard and Journal of Mental Science Oct. 73 page 355.
Methods of Using Electricity in Insanity

1. Galvanization of the Brain.

In applying the continuous galvanic current to the head the following precautions should be observed:

1. To begin with a minimum dose. (Say 1 or 2 cells of a Croëtto or Leclanché Battery) and in this connection it may be well to recall Duchenne’s unfortunate accident. He applied a continuous current from 40 cells to the facial muscle of a patient. He man saw a light—called out “room seems all on fire.”

In spite of treatment almost entire blindness on one side was the result. No one can help admiring the courage and candour of the great electrician in recounting this case.

The strength of the current should be gradually increased— it is necessary to use some kind of rheostat so as to include successive cells in the circuit without interrupting the current— also when the application has been made.

(Translation of a treatise on localised electrification translated by J. W. Edworthy, M.D.)
the current is to be gradually and evenly diminished in strength.

Various ways have been suggested to test if the patient is receiving sufficient of the current. The galvanometer fixed on the battery is a useful aid. But in applying the same strength (or nearly) to several successive cases, I have noticed it is curious what a difference there is in the resistance of different heads. Not infrequently a patient, whose head offers much resistance and in whose case accordingly the galvanometer reads the passage of only a slight current, cannot bear the same amount of electricity as one in whom the resistance is less. The galvanometer, therefore, cannot be implicitly relied on.

Dr. H. Waltham recommends, as a test to reverse the current and if the patient is receiving sufficient he will start. A very good way is first to apply the current to one's own body and this, though not a mathematical test is a very useful one.
Lastly, the patient's sensations are of considerable value even in the Insane. I have noticed a marked sense of the current in cases of Dementia where I had no expectation of it. The patient should not be hurt and as a rule mild currents are most useful. The electrode should be large. Soft well moistened sponges being preferable as they can be gradually applied and the current increased by pressure.

In transmitting the galvanic current through the head, interruptions, reverses, and sudden variations are to be avoided. They cause dizziness, flashes of light and discomfort without any compensating advantage.

Beard and Rockwell recommend the negative pole to be applied first on account of less dizziness being caused if the current is opened and closed by the positive pole.

The usual positions for applying...
the Electrode, are the Temple, the Mastoid Process, the Parietal regions, one in the Frontal and one in the Occipital region or the back of the neck: the latter or Fronto-cervical direction is the one which I came to prefer as the current probably influences directly & indirectly the largest tract of the brain in that case. In my first Case I passed the current in 2 or 3 directions at one sitting, but I think that better results are obtained by transmitting it in only one direction.

Dr. Heath placed one pole in contact with the head and the other in contact with the feet which were dipped in acidulated water.

The Duration of application recommended by different authorities varies. Benedict advises never longer than 30 seconds and to be stopped on the occurrence of the slightest giddiness. Althaus, 60 to 90 seconds. Meyer, 2 to 3 minutes. These times however do not specially refer to the treatment of Insanity, chiefly to that of cerebral apoplexy. In the case of the 0th Paper already quoted.
Insane the duration of application may with benefit be extended to 5, 10 or even 15 minutes. The operator always "feeling the way" carefully so as not to hurt or weary the patient. Generally, it may be said that a gentle current (say 2 milliamperes) applied for from 5 to 15 minutes will produce the greatest therapeutic effect.

With regard to time of the day, when the Continuous current is being used to induce sleep it is best applied towards evening and I have often used it in the case of patients troubled with restlessness and insomnia, after they have gone to bed.

The dose may be repeated daily or intermitted according to the progress of the patient and the manner in which the treatment is borne.

2. Galvanisation of the Cervical Sympathetic is a procedure which has had many champions and detractors. Benefit strongly recommending it in Cerebral
Percy while others have argued as though the sympathetic trunk could not under any circumstances be reached by the current.

There are several methods of application: one electrode may be pressed into the carotid, maxillary fossa and the other over the transverse process of the 6th cervical vertebra or else on the manubrium sterno close to the sternocleidomastoid muscle. Another method is by placing one electrode in the carotid, maxillary fossa and the other in the mouth opposite the lower maxillary articulation.

In the first two methods, mentioned either the spinal cord and base of the brain or nerves such as the vagus, glossopharyngeal, superior laryngeal spinal accessory, will or necessarily be affected by the current. Dr. De Watteville very justly argues that the assertion, there are no marked changes in the papillary circulation of the side of the head, is no reason for...
maintaining the sympathetic is not affected at all. They might as well deny the continuous passage of a galvanic current through any nerve because it call forth neither sensation nor motion." D. Clifford Allbutt thinks that the effects attributed to galvanisation of the sympathetic are due to reflex action and may be called forth by any strong impression upon the cutaneous nerves of the region—such as blistersing.

This method is one which I have not used much as I was sceptic, better results are got by a direct application to the head and by the method of Central Galvanisation.

3. Central Galvanisation is a method of application much recommended by D. Beard of Rockwell of New York and it is treated at great length in their work. The pole (usually the negative) is placed at the epigastrum and re.
main's stationary; the positive pole is passed over the forehead, top of the head, down the inner border of the sternomastoid muscle to the sternum, round to the nape of the neck and down the entire length of the spine. Interruptions should be carefully avoided. The current (from 6 to 8 cells) applied to the head for 1 to 2 minutes, down the neck for 1 to 5 minutes, down the back for 3 to 6 minutes — in the latter case 10 to 30 cells may be used.

Beard and Rootwell claim that this method is especially useful where the whole central nervous system is exhausted and irritable (without any special part being affected) as in chronic nervous diseases of obscure pathology and that in these the current has a general tonic effect on the entire system. They further urge that central galvanisation brings the whole central nervous system under the influence of one pole, that...
As true influence is much greater than that of an application to the head only. I have employed this method with very satisfactory sedative results in cases of obtricate enervated restlessness (nocturnal) occurring in chronic cases of insanity (Cases No. 12, 13, 14.

4. General Faradisation. is also much advocated by Drs. Beard and Rockwell and its object is to bring all parts of the body as far as possible under the influence of the Faradic current. One electrode remains stationary in contact with the skin and the other is passed over the surface of the body. A spring is usually used for the movable electrode but the operator's hand may be used which enables him to judge precisely of the strength of the current. The neck and spine are the two localities which demand special attention. The duration of application may be from 5 to 25 minutes according to circumstances.
Beard and Rockwell recommend this method where there is general debility of the vital functions and impairment of nutrition.

It probably acts by promoting nutrition and tissue change also by influencing the electrical condition of the body. It is especially useful in cases complicated with amenorrhea and a few applications in the neighbourhood of the uterus will usually restore the menstruation.

Duchenne has put in record a case showing the care with which this paradox should be applied in the neighbourhood of the neck.

5. Have employed the continuous current by introducing one electrode insulated at its sides, into the external auditory meatus, filled with water or placing the other on the mastoid process of the opposite side of the head, in case of auditory hallucinations with delusions (No 10). The treatment on localized electricity. Translated by H. Jobst, M.D.

Page 80.
Case however was not hopeful and this plan of treatment did not produce any good result in the way of modifying the auditory symptoms.

6. Lastly another method of treating the insane with electricity is that described by Dr. Veilleux, Superintendent of the Female Division at Manéville who used it in some instances as a means of repression when one patient had struck another. This use belongs to a former age when it was the custom on such occasions “donner une douche à l'eucalyptus ou le jeter dans un corset de force”. In order to produce a “voluntary impression on the disordered intelligence of the patient” he charged the most powerful Leyden jar, gave the delinquent two violent shocks and shut him back to work.

Dr. Veilleux says with good result—“le moyen était bon” and he further maintains that the violent acts in such cases disappeared or became

Annalen Médico-psychologiques. 3ème série, t. V. P. 357.
less frequent under this treatment. (Page 389)

At the end of his paper in summarizing up the uses of electricity in the insane he arrives at employment for therapeutic, diagnostic and repressive purposes, "comme mesure de répression". This last use of electricity is one which I have not attempted; it is quite foreign to the treatment of the irresponsible affected one, placed under an charge; a deprivation of some little privilege and kindness with firmness being usually sufficient to correct any such aggressive tendency.
IV

The Phenomena resulting from

Galvanisation of the Brain.

Anyone may easily ascertain the subjective sensations by passing a gentle current (say 2 millinewtons strong) through the Temporal Region. A flash of light is seen on application of the electrodes, with a slight amount of Confusion of Thought. While the current is running there is not more than a sense of fullness; on breaking the current a more vivid flash is seen the fullness is more marked, sometimes amounting to an inclination to face from the chair. A flow of saliva is usually excited; there is a "gallant taste" in the mouth. In the skin under the electrodes there is of course a slight painful prickling. In some cases, flushing of the face is observable with diffusion of the eyes and not infrequently, there seen the movement, like hypnagogic described by Hitzig, a quick jerk of the eye to one side with a slower return in
the opposite direction. The objects in the
field of vision appear to the patient to
move. The pulse is sometimes quickened
in others is retarded. Further I have often
noticed in patient a drawn ness during the
passage of the current, then (chiefly
melancholies) described a feeling of-
lightness and thenitre.

If the current is much stronger
the following symptoms have been
described by Hitzig as occurring:
- on making the current, staggering and
  a tendency of the head and body to turn
towards the side where the positive elec-
trode is applied. When the current is
broken the body turns towards the
side of the Cathode. If one electrode is
removed from the head and applied to
another part of the body, the head
then turns to the side of the elec-
trode applied to it.

Three degrees of Galvanic Sensi-
ness are described by Hitzig,
(1) a sense of fulness chiefly felt on
breathing the Current.

O. Swaye cit. in London Medical Record March 5 1873.
(2) apparent movements of objects from the anode to the cathode, which are reversed on breaking the current.

(3) Shivering and rotation of the head and body towards the anode with an elevation to the cathode on breaking the current.

He further states that in locomotor ataxy there is great susceptibility to saline giddiness and that it is always most easily caused by placing one electrode in the auriculo-macillary fossa and the other (say) in the opposite hand, owing to the perfusion of blood vessels through the skull in the occipital or mastoid regions the saline current will reach the brain more easily.

Hitzig has sought to explain the real and apparent movements by the theory that with a transverse current one cerebral hemisphere is in a state of anelectrotonus and the other of catelectrotonus so causing a feeling of disturbed equilibrium and an effort to regain the balance.
2. Galvanisation of the sympathetic
The following phenomena result from this method
(1) A feeling of sleepiness and drowsiness, with a general sensation of warmth over the body, sometimes also sensible perspiration.
(2) The pulse rate is usually diminished; some observers say the force of the pulse is increased, some that it is diminished.
(3) Variable changes in the way of contraction or dilatation of the pupil.

3. In central galvanisation there are:
(1) Sensations of sleepiness.
(2) Diminution of the pulse rate. I have also noticed irregularity.
Actual sleep almost always follows immediately even in cases usually wakeful and nervous. (Cases Nos. 12, 13, 14)

4. General Faradisation
Causes a feeling of exhilaration and usually accelerates the heart's action.
The phenomena resulting from stimulation of the auditory nerve have been most carefully studied by Brenner of St. Petersburg. He states:

"In making cathodal closure there is a noise in the ear which gradually diminishes during the continuance of the closure of the circuit.

1) Cathodal opening causes no noise.
2) Anodal closure causes no noise.
3) Anodal opening causes a noise at the moment of the anodal opening.

Unsereheungen und Beobachtungen über die Wirkung elektrischer Ströme auf das Gehörorgan im gesunden und kranken Zustande. 1869 Leipzig."
V

How the Galvanic Current affects the Brain.

As the Brain is so completely encased by the bony skull with its internal membranes, and the pericranium and scalp externally; it was at one time seriously doubted whether a galvanic current of moderate strength, such as might be safely used for therapeutic purposes, could really penetrate through the dense coverings and traverse the cerebral substance. There can be no doubt but that many of the animal tissues offer great resistance; bone, conveys electricity 10 times less freely than muscle; while the dry epidermis is a bad conductor.

Dr. Power states that the resistance of his own body was found to be twice as great as that of the Atlantic cable. According to De Watteville 2,500 ohms may be assumed to represent

† A Practical Introduction to Medical Electricity, J. A. De Watteville, p. 31.
the average resistance of the human body.

Professor Ehr of Heidelberg was, I believe, the first to perform a series of experiments on the dead subject which to my mind are quite conclusive on this matter. One of these which is quite simple I repeated for my own satisfaction as follows:

The skin of the scalp was reflected forwards and backwards as in an ordinary Post-mortem examination: a quadrilateral piece of bone 2½" by 1½" was removed from the vertex with the saw and chisel. The dura mater corresponding to the opening, and the underlying cerebral substance to the extent of 1½ inch, were removed. The cavity thus caused was carefully dried and a piece of sponge left in it to soak up any fluid: the pericranium was scraped away from around the opening and the edge of the bone dried. The body was then left for about 4 hours sufficiently near a

five to make the denuded bone perfectly dry.
A "salvarsane" prop's tip, with the entire length of the sciatic nerve from the knee to
the spinal column attached, was prepared
and held in a piece of gutta percha
tissue with the nerve suspended and
hanging partly packed among the cerebral
substance.

On applying the electrodes of the battery
to the sides of the head just above the
ear (the skull being partly replaced) distinct
contractions were carried on
closing and opening by a current from
12 cells: in further trial slight trembling
of the toe was noticed with a current
(also salvarsan) from 3 cell...or making
and breaking the circuit.

In another of Pflüg's experiments
he covered the vertex with layers of
muscular tissue but in spite of its
well-conducting property the current
still traversed the cerebral substance.
Bürchtardt has also corroborated
Pflüg's experiments and in one instance
he injected warmed salt water into the arteries, giving much stronger currents so he inferred that the current travels the head more easily during life than after death.

When once the salutary current has overcome the resistance of the epicranius and bone it extends and diffuses itself throughout the cerebral substance which conducts better than the peripheral nerves and as the brain contains a large quantity of blood (one fifth of the whole quantity passing constantly through it) as well as the cerebro-spinal fluid which bathes its membranes and ventricles, the derived current will of necessity be distributed in a highly irregular manner which is impossible to predict. On reaching a point midway between the electrodes, the diverging paths again begin to converge to a focus at the other electrode. There can therefore be no absolute localization nor the derived current are weaker the
longer and more circuitous their course.

It should further be remembered that the saline current has an extensive and deep action as is proved by the experiments of Dr. Monnier who found that on passing a current through the anterior limbs of a large animal, the needle of a galvanometer, connected with wires introduced into the posterior limbs of the same animal, deviated. Similarly, in the case of a patient at the Hôpital de la Salpêtrière an introducing platinum needle into the forearm and allowing the needle to revolve to zero a deviation occurred when the current was passed through the opposite shoulder. The constant current in this characteristic that it cannot be localized, differs from the Faradic.

It must also be taken into account that the human body being an indifferent conductor, immediately after breaking the circuit, current of polarization in the opposite direction to the original one occurs. 

Practical: pp. 74, pp. 193, 194.
is generated has a therapeutic effect.
Moreover as the human body is a
mass of cells which contain and are bathed
in a warm saline fluid some of the
effects caused by the constant current
may be due to the electrolytic changes
which of necessity take place in the tissues.
There cannot be the slightest doubt
also that many of the results of salve-
ration are due to reflex action through
the nervous system; menstruation some-
time is induced in women by salvan-
ing the feet and shoulders also the salvan-
ting last is felt when some peripherical part
is being operated on. One eminent
Electrical Dr. Julius Althaus lays
much stress on this and maintains that
the transmission of the continuous
salvage current to the brain is effected
not only physically but largely physio-
logically by nervous action. In support
of this he adduces a most interesting case of
anesthesia of the fifth pair of cranial
nerves in which no cerebral symptoms were
produced on application of a current from
a machine on mercier electricity page 132.

+ do. page 144 et seq.
20. Daniells cells, only very slight sensation from 30 cells which caused intolerable pain, tingling, flashes of light applied to the head of a healthy person. The exquisite sensitiveness of the fifth pain or nerve, and the powerful reflex action occasioned by their irritation in such impure matter as dashing cold water on the face may effect the probability of some of the sensation occasioned in galvanisation of the brain being due to reflex action but on the other hand the high diffusibility of electricity must be taken into account when the argument is advanced that a flash of light is caused by applying the pole of a battery to a part of the face where the brain is not in the direct line of the current. Therefore, all cerebral symptoms must of necessity be reflex.

In E. Allthans' case apparently the brain itself did not react to the galvanic currents. Several experimentalists however have shown that in stimulating certain parts of the brain directly in animal, well defined and constant movements
are caused corresponding to the area stimulated. Trousch & Hitzig employed the galvanic current. Ferrier the faradie; although their results are somewhat different yet they both agree in the capacity of part of the cerebral convolutions to be irritated or excited by electricity, in fact the movements like epigastrum, seen as external galvanisation of the brain appear to be due to direct action on the intracranial centres.

When we reflect on the activity of circulation in the brain and the vital chemical change, which constantly take place in it—all associated with an alternation of electrical state, it is at once suggested that the current must have a therapeutical effect quite different from other agents by its influencing the natural electricity of the brain. Further by dilating the blood vessels and causing increased activity of the circulation, it possibly assists in the absorption of the opiate and softening of the membranes so common in
Chronic insanity - the catalytic action of Remak.

Dr. Ralfe has performed aningenious experiment which indicates how the current may possibly affect the nervous tissues.

Again the endometrial action of the galvanic current is well shown in an experiment of Dr. Ralfe. A tube containing some water and closed at one end by a silken membrane was placed in a vessel of common water. The positive pole of a battery was put into the water, the negative pole into the same water - the latter rose rapidly and in reversing the current the reverse occurred.

The amount of heat evolved on passage of a current through the brain will be infinitesimal as partly due to the more active circulation already noticed.

To sum up, when a galvanic current of therapeutic strength is applied to the head it passes through the brain, directly and also influences it by

O Lancaster July 4th 1874

+ Beard Rockwell's book p. 178
reflex action through the fifth pair; it has electrolytic, endosmotic, catalytic, and some other chemical thermal effects: the blood vessels are dilated. The circulation becomes more active. It thus produces direct and important change in the nutrition of the brain.
VI
Clinical Cases
Case 1. H. D. Dementia following
2 J. J. Dementia secondary to Manna
3 H. P. Epilepsy with
4 J. J. Epilepsy with
5 John L. Acute Melancholia with de
6 S. K. Acute Melancholia (wit
7 William M. Acute Melancholia
8 M. K. Acute Melancholia
9 Mrs. M. Acute Melancholia
10 Arch. L. Delusional Insanity
11 S. J. W. Mania (acute)
12 Charlotte M. Chronic Mania-mania
13 Isabella A. Chronic Mania - do
14 David B. General Paralytic - do
Melancholia with violence. Recovery.

In a case of Con genital weariness. Improvement.

Imbecility. Tito diminished in number.

Imbecility. do. 59

Lues. (Brain Disease). Relief. temporary improvement.

Brain disease. Temporary relief.

(Scimit) no improvement

No improvement.

(With Brain Disease) no improvement.

Improvement.

Nocturnal noises. Sleep quiet produced.

Sleep quiet. do.

do. do. but not always.
Case I.

A.D. became imbecile on the 2nd June 1883, she was admitted into the asylum on the 12th June 1883. The medical certificate described her as “thinking that she has lived a very bad life & is lost, that her children are to be taken from her” also as “wanting to run out of the house naked, refusing food, being very violent and sleeping badly.” She is married 38 years of age, dark & of “lymphatic temperament.”

On admission she was covered with bruises, had two broken ribs. She at once passed into a condition of great apathy and stupor; her health was very bad; oedema of the feet, eczema and abscesses under the scalp appearing.

August 16th. A.D. is in a condition of pronounced Dementia, she rarely speaks, is restless at night in an aimless manner, jerks under the bed & current from 6-9 elements was passed through head in antero-posterior
direction. She struggled very much so that the pulse could not be observed; she was unable to describe her sensations except that she had a feeling of burning where the electrodes were applied to the skin.
Duration = 10 minutes.
Result: On returning to her gallery, patient began to talk about her previous life and occupation which she had not done since admission; she also did some work. On the following day however this improvement had in great part disappeared.
17th August: Current from 6 – 9 cells passed thru head in antero-posterior direction – patient struggled a good deal. Duration = 10 minutes.
Result: She continues less torpid.
18th August: Current from 9 cells (1½ millivolt) passed thru head in fronto-occipital direction. Duration = 10 minutes.
Result: It had a rousing effect.
19th August: Current from 6 cells
(3 milliamperes) passed in fronto-occipital region. Patient struggled a good deal. Duration = 10 minutes.
Result = some flushing of the face; mentally she remains much the same.
20th August.
Current of 2½ milliamperes from 12 cells passed through head in antero-posterior direction.
2 mV. from 15 cells through the parietal region and 4-5½ mV. from 9-12 cells through the temporal region.
Patient struggled less to-day.
21st August.
2 mV. from 12 cells passed in antero-posterior direction.
3. mV. from 6 cells passed through the temporal region.
Result. Patient struggled somewhat; she also gave expression to delusions of identity. She now sleeps much better.
22nd August.
1½ mV. from 6 cells passed in fronto-occipital direction; 3-5 mV. from 9 to 12 cells passed through temporal region.
Patient cried most of the time. I will
never get home, I've no money and have lost my children.

23rd August
1 M. V. from 6 cells passed through the.
fronto-occipital region: 1 3/4 M.V. from 6
cells passed thro' the Temporal region.
The pulse afterwards was 88 per minute.
Result: the patient is much more composed
more talkative, observant of her surroundings
and more rational: sleeping better.

24th August:
2 M. V. from 6-9 cells passed in fronto-
occipital direction: 2-3 M. V. from 6-9
cells passed in temporal direction.
Pulse after setting 92 per minute
Result: Patient continues better and
more cheerful: sleeps well.

25th August: 1 1/2 M. V. passed through the
Temporal & Fronto-occipital regions in
both cases from 6 cells. Pulse before
the setting 84, after it 80.
Result: Patient now makes her bed,
cleans her room and dresses herself
the latter for the first time since admission.

26th August: 3 M.V. from 12 cells passed
through the Temporal Region 2 MV from 12 cells passed thru' the Fronto-occipital. Duration 10 minutes. Patient Cried a good deal during the time. Duration 10.

27th August.

1 3/4 MV. from 9 cells passed through the Temporal region: 1 MV. from 9 cells through the Fronto-occipital. Duration 10 minutes. Pulse before sitting 84, after 80 per minute. Patient is more composed and rational. Spoke correctly of her former places of abode but she still thinks she is Mrs. B. She rests well at night.

28th August.

2 1/2 MV. from 6 cell passed through Temporal region 2 1/2 MV. also passed through Fronto-occipital region: 12 cells were not well borne. Duration 10 mins. Pulse before 76, after 75 per minute. Patient's memory is good but she conf. acknowledge her husband.

29th August.

1/4 MV from 6 cells passed through Temporal region, 1 MV. through Fronto-occipital. Duration 10 minutes. Pulse after 86. Patient continues more rational & sleeps well.
30th August.
1 mV. passed through Temporal region
1 mV. through Fronto-occipital both
from 6 cells. Duration 10 mins.
Result: Pulse before 85, after 81 per
min: She continues, more rational.

Sept. 1st.
2 mV. passed through Temporal Region
1/2 mV. through occipito-frontal both
from 9 cells. Duration 10 mins.
Result: Pulse before 82, after 80 per
min: Patient continues, better.

Sept. 3rd.
1 mV. from 6 cells passed through
Temporal Region 1/2 mV. through the fronto-
occipital. Duration 10 minutes.
Result: Pulse before 83, after 76.

Sept. 5th.
1 mV. from 6 cells passed through
the Temporal and Occipito-Frontal regions
Duration 10 minutes.
Result: Pulse before 75, after 76: Patient
continues, better, and is progressing steadily.

Sept. 6th.
1/2 mV. from 6 cells passed through the
Temporal region 0 m.v. from 9 cells through the Occipital - Frontoal region.
Result: Pulse before 76 after 71 per min.
Patient now works industriously. Converse intelligently on ordinary topics and is in good spirits.
The battery was discontinued and H.B. was discharged on the 25th Sept. 83 by Dr. Rutherford - Recovered.
Remarks:
In H.B.'s case a notable improvement took place after the first application. The progress afterwards was more gradual. Sleep returned and as a rule the pulse was reduced in frequency by the application.
Case 2.

J. J. is a single woman, 25 years old and a domestic servant. She has a low narrow forehead while the lower part of the face is largely developed. At school she learnt slowly; the menses did not appear until the age of 20. A year later, on hearing suddenly of her father’s death, she became very maniacal, manifesting strong religious excitement and aversion to her friends. She was admitted into the Southern Counties’ Asylum, Dunmow, on the 8th January 1879 on medical certificate which state that "she thought she was dead - that her uncle was the devil" also that she suffered from violent excitement and restlessness.

After admission she sank into a condition of degraded dementia and at the time electrical treatment was commenced she was said long been of wet and dirty habits, both by night and day, unable to dress or undress herself, doing no work
Silent except when she exclaimed, "She's daft," which was the limit of her vocabulary. She was treacherous and apt to strike other patients.

16th October 1883

A current of 5 milliebers strength from 15 cell was passed through the temple, one 2 milliebers through the anterior-posterior direction. Duration 10 minutes. Result - slight lacrimation.

11th October.

6 m.v. passed through temple, 3 to 4 m.v. in occipito-frontal direction, both from 15 cell. Duration 10 minutes. Result: she sighs frequently. While the current is running it starts when the circuit is broken or closed.

The nurse reports her better in her habits and more pliable.

12th October.

1/4 m.v. from 9 cell through the temple. 1/2 m.v. from 12 cell passed in occipito-frontal direction. Duration 10 minutes. She sighs frequently, during the sitting.

13th October.
13th October.
5 mV. passed thru Temporal region, 2½ mV. thru fronto-occipital, both from 12 cell. Duration 10 minutes. Pulse both before and after the sitting 104 per min. She has since shown psychistic tendencies. Knocked another patient down.

16th October.
3½ mV. passed thru Temporal, 1 mV. in the antero-posterior direction - both from 12 cells - Duration 10 minutes. There was slight lacrymation. She started when the electrodes were removed.

17th October.
3 mV. from 12 cell passed thru the Temple, 2 mV. from 6 cell thru occipito-frontal region - 12 cells were not well borne in the antero-posterior direction - Duration 10 minutes. Result: The patient dressed herself in the following morning (18th) - the first time for a long period.

18th October.
½ mV. from 6 cell passed thru the Temple +½ mV. in the antero-posterior direction - Duration 10 minutes. She remarked "she's afloat" during the sitting.
She continues to dress herself.

19th October.

1 1/2 mv. passed thru the Temporal & Occipito-frontal regions both from 9 cells.

Pulse before 86, after 92 per minute.

20th October.

1 mv. from 9 cells passed through the Temporal and Occipito-frontal regions.

Duration 10 minutes.

22nd October.

2 mv. from 9 cells passed thru Temple.

1 1/2 mv. from 12 cells in Occipito-frontal direction.

23rd October.

6 mv. passed through the Temples, 2 mv. through the Occipito-frontal region both from 12 cell. Duration 10 minutes.

24th October.

1/2 mv. passed thru fronto-occipital dura.

1/2 mv. thru the Temples both from 12 cells. Duration 3 mins.

Remark: Patient is more cheerful & lively habits during day are now satisfactory; she continues to dress herself.

25th October.

1/2 mv. from 6 cells passed from the forehead.
to the nape of the neck "cervico-frontal" direction and 1 mV through the Temple, both from 6 cell! Duration 5 minutes.

29th October.
2 mV from 9 cells passed thru the Temple, Duration 5 minute

30th October.
1 mV from 6 cell passed in Cervico-frontal direction - Duration 5 minute

31st October.
½ mV from 9 cell passed thru Temples, Duration 5 minute

1st November.
Current from 6 cells passed in Cervico-frontal direction for 5 minute

2nd November
1 mV from 6 cell passed thru the Temples for 4½ minute

3rd November
½ mV from 6 cells passed in Cervico-frontal direction for 4 minutes

5th November, Patient was Faradized with a wire brush over the upper extremities, Duration 5 minutes

6th November
Faradization repeated for 4 minutes
7th November. General Faradisation of the body—chiefly the back— one electrode being placed over the sacrum the other (a sponge) moved over the back & chest. Duration 10 mins. Menstruation appeared on the next morning. It had been in abeyance for many months.

10th November

3/4 M.V. from 6 cells passed in the Cervico-frontral direction. Duration 5 mins.  

13th November

2 1/2 M.V. from 6 cells passed through the temples. Duration 5 mins.

Patient is more irritable today, has been striking the others.

14th November.

1 M.V. from 6 cells passed in Cervico-frontral direction. Duration 5 minutes.

Patient is again quiet.

The electrical treatment was now discontinued, but the patient continued to improve, sewed, knitted and worked industriously. Her habits became quite satisfactory both by day and night and
She talked freely, though in a simple way. Her mental condition of course remained one of unreality.

Remarks:

This case was chosen as a test of what electrical treatment might do in a case of apparently hopeless degraded dementia and although the result was not a "recovery", yet the patient was lifted from an abject condition to a state of usefulness to herself and others.
Case 3.

A.P. is single, 22 years of age. A Labourer.

He was brought to the asylum from the Poorhouse on the 16th September 80 in a state of epileptic mania. An embolic of slow intelligence he is able to read and write also to do manual work. He takes
epileptic fits daily, the number varying from 1 to 5. From the 1st to the 12th August 83 inclusive he had 35 fits chiefly severe grand mal.

He was treated with the voltaic current passed thru the head.

August 15th

Current from 6-9 cell passed through the head for 12 minutes.

Result: The pulse was increased 12 beats per minute, he complained of pain at the rear of electrodes, no fits during the 24 hours after.

August 16th

Current passed from 9 cell thru temple, mastoid region in the antero-posterior direction. Duration 15 minutes.

Result: The eyes were suffused with tears.
And somewhat injected, face flushed, pulse quickened by 12 beats per min. No fits in the succeeding 24 hours.

August 17th,

Current from 9 cells passed in antero-posterior direction from 6 cells transversely. Result: no fits in next 24 hours.

August 18th,

Current (2 mV) from 3 cells passed in antero-posterior direction. He seemed more sensitive to the current today. Result: no immediate. Patient had one fit in the following 24 hours.

August 19th,

2 mV passed in the occipito-frontal direction. 4 mV in the inter-parietal both from 6 cells. Duration 10 minutes. Result: patient fell asleep shortly after the application. No fits in the 24 hours after.

August 20th,

2 1/2 mV passed through the fronto-occipital direction 5 through the parietal, 6 2 through the Temporal area from 6 cells. Result: no fits in the 24 hours after. Duration: 12 minutes.
August 21st
3½ mv. passed in Fronto-occipital direction. 3½ mv. in the parietal both from nose cell. Duration: 11 minutes. The pulse during the sitting rose to 92 bpm.
8:20
Patient had 4 fits in the following 24 hours.
August 22nd
5½ mv. passed in Fronto-occipital direction. 2½ mv. in the Parietal both from 6 cells: an epileptic fit came on during the passage of the current transversely. It was only a slight one and on the strength of the current being increased by other six cells, the patient appeared to be conscious of some sensations to half regained full consciousness.
It is reported that when the patient does take fits they are not nearly so serious as formerly. Chiefly vertiginous – he wheels round but does not fall. Sometimes the convolution is limited to a spasm of the fingers. The patient also sleeps much more soundly.
23rd August:
2½ mvs through the Fronto-occipital region
2½ mvs through the Parietal, 2 2/3 through the Temporal: all from 6 cell
Pulse before the sitting 100, after it 96.
He had two slight fits in the succeeding 24 hours.

24th August:
2 mvs passed through Temples 2 1/2 in the
Fronto-occipital direction both from 6 cell
Fitz in succeeding 24 hours = one.

25th August:
3 1/2 mvs from 6 cell through Temples, pulse 102
5... in Fronto-occipital direction, pulse 96
The pulse before the sitting was 90. Patient
had no fits in succeeding 24 hours.

26th August.
5 mvs through Temples, pulse 89
2 1/3... Fronto-occipital region, pulse 92
6 cells used in each case: the pulse after
the sitting was 85. Patient had
no fits in the succeeding 24 hours.

27th August.
Pulse before sitting 85.
3½ mvs were passed in the Temporal
regain, 4½ mv. in the Fronto-occipital. Pulse after 8½. Duration 10 minutes. Patient had one fit in the succeeding 24 hours.
28th August: Pulse before sitting 68. 29 mv. from 6 cells, were passed thus, the Temples 4½ through the Fronto-occipital direction. Duration 10 minutes. Pulse after sitting 81. Patient is noticed to be more sleepy than usual; after falling asleep when seated. Duration 10. He had two slight fits in the succeeding 24 hours.
29th August:
4 to 3 mv. through the Temples.
2 mv. thus the Occipito-frontal direction both from six cells.
No fits in the succeeding 24 hours.
30th August: Duration 10 minutes.
6 mv. passed through the Temples.
4½ through the Occipito-frontal direction both from six cells. Duration 10 minutes. Pulse before 83 after sitting 8½.
Remarks:
As might be expected there was no
improvement in the unbecility of the
patient but quite a remarkable
diminution in the number of fits
which were reduced to two-thirds the
former number.
From 1st to 14th August 35 fits (before treatment)
14th to 29th 12 (during treatment)
1st to 14th Sept 18 (after treatment)
15th to 30th 26 do.
1st to 14th Oct 25 do.
15th to 30th Oct 32 do.
It will further be noticed that after
the constant current was discontinued
the fits gradually increased until
the latter half of October when they
were almost as numerous as before
after treatment. The fits were further much
less severe during the time of the
salvage treatment.
Another point of interest is that
alhough the constant current diminishes the
fits in number severity yet it did
not prevent the actual advent of a
fit as occurred on the 22nd August.
Case 4.

J. J. is a boy, 14 years of age, single, short and healthy looking. He has been epileptic "from childhood" and immediately before his admission into the asylum he was in a state of epileptic mania, tried to jump out of a window and was out of control. He is weak-minded, very slow in comprehension and utterance.

He was treated from the 29th of October till the 10th of November with the galvanic current passed through the brain once daily for 4 to 5 minutes. The current being generally derived from 6 cells and its strength varying from 1 to 5 milliampères.

Epileptic fit, 2nd of November.
1st to 16th of November 5 - during the treatment.
17th to 1st of October 10 - after.

Remarks.
This case shows the same reduction in number of fits as H. P.'s case: there was no improvement in the patient's mental condition. He was
removed from the asylum by his friends so that his case could not be further studied.
Case 5

John L. is 47 years of age, married and by trade a tailor. He is a tall, spare, anxious-looking man and on admission on the 26th May 1883 to the Strathearn Counties' Asylum, Darnpries, he was reported to be suicidal and dangerous. One doctor describes him as being "very excitable, quoting texts of Scripture in an incoherent way, says he saw Jesus Christ who told him to attend to his body and take his medicine, says as long as the lamp held on he burned but the lamp went out last night. He thinks that he is an evil spirit and that his soul is lost."

The patient's case was one of acute melancholia in which however there were signs of actual brain disease. When electrical treatment was commenced he was still in a state of deep depression.

August 15th. Current from 9 cells passed through the head, transversely and
Longitudinally not so well borne in the transverse direction. Duration 10 minutes.

16th August
Current up to 3 millivolts only from 6 to 9 cells passed in fronto-occipital direction for 10 minutes.
Obliteration of the pupils was noticed. Some pain was complained of at the posterior electrode.

17th August
2 to 3 millivolts passed in the fronto-occipital direction also through the temple. In the latter case giddiness complained of.
Duration 20 minutes. Pulse rose 4 beats during the application.

18th August
3 1/2 mV (6 cells) passed in fronto-occipital direction - pulse 72.
3 1/2 mV (9 cells) in parietal - pulse 74.
4 1/2 mV (6 cells) in temporal - pulse 72.
Result: Patient is less depressed and he sleeps better.

19th August: Pulse before application — 67.
5 mV (9 cells) passed in fronto-occipital direction — pulse 70.
5 mV (12 cells) in parietal — pulse 72.
10 mV (9 cells) in temporal — pulse 74.
Duration 10 minutes.
20th August:
3 3/4 mv (6 cells) in fronto-occipital direction. Pulse 73.
2 1/4 mv (664 cells) in parietal. 76.
3 1/2 mv (6 cells) in temporal. 70.

Patient is sleeping much better.

21st August:
2 2/3 mv (6 cells) in fronto-occipital direction. Pulse 76.
2 1/3 do. in parietal do. do. 82.
4 1/2 to 6 1/2 do. in temporal do. do. do. 80.

Patient is more cheerful, takes more interest in his work and personal attire.

22nd August:
2 millimeters in fronto-occipital direction. Pulse 81.
2 in parietal do. do. 85.
3 in temporal do. do. 78.

All from 6 cells. Duration 10 minutes.

23rd August:
3 1/2 mv in fronto-occipital direction.
2 do. in the parietal do. do. do. do. do. Duration 10 minutes.

Pulse before the application was 83.

24th August:
2 1/4 temporal.

Pulse before the application 80 per minute.
6 Mr. (c-cell) through Temple. Pulse 82 per min.
16.2 " " " Parotid region 82 " " "
3 (g/cell) Front occipit 80 " " "
Pulse after application 81. Patient again slept better.

25 August
Pulse before 84.
6 Mr. passed thro' Temple. Pulse 89 per min.
5 " " " Front occipit. Region 86 " " "
Pulse after 83.

At this stage of the treatment, John L. appeared to be much better, expressed himself as feeling lighter and more buoyant after each application. He slept soundly; his spirits were good, and he worked in a hearty way. He rarely referred to his muddled ideas, and I was sanguine he would be scored as a recovery. Owing to my absence from the asylum the treatment was intermittent and he distinctly relapsed, became again deluded and low spirited.

The treatment was again commenced and carried on from the 22nd October till the 27th November.
The applications were of 5 to 8 minutes duration each day, the strength from 1 to 7 millivolters, and the direction alternately through the Temple and from the forehead to the nape of the neck. He again improved somewhat, but it was evident that there was organic brain disease and that permanent improvement was not to be expected.

A minor point of interest in this case is the Pulse, which was increased in frequency by the galvanism more especially when the current was passed transversely. Further in this patient the brain tissue generally had a high degree of Conductivity, which was very noticeable in comparison with other patients on whom the same strength of current was used—but the galvanometer usually indicated in John J.'s case a considerable stream of electricity.
Case 6.
S. K., a case of Acute Suicidal Melancholia, was admitted into the Southern Counties' Asylum, Dumfries, on the 3rd January 1884. She had been insane 7 to 8 months previously. She was single; a domestic servant on 46 years of age. Treatment with Digital and opium was tried, but without any benefit, for the intense distress from which she suffered. She groaned constantly, demanded to be killed, constantly wrung her hand, tore her clothes, and struggled with the attendant for the key.

16th August
Current from 9 cell passed through the temple; no suppression of both eyes observed. She groaned less frequently, the pulse (100 per minute) was reduced to 14 beats. In the fronto-occipital direction the current up to 12 cell caused no effect on the eyes.

As the patient was sick, no attempt on the two following days. The current was not applied on the 19th and 20th.
3 to 5 milliamperes strength of current from 12 cell was passed in the antero-posterior direction. During its passage the patient strained less frequently. 5 mr. from 9 cell were passed through the Temple. No nystagmus of both eye was noticed.

After the application the patient was more composed and did not groan.

20th August:
3 mr. from 12 cell passed in antero-posterior direction
2 to 6 = 15 cell = parietal direction
6 ½ = 9 cell = temporal direction
Duration 15 minutes. Patient continue quieter and more composed.

21st August:
3 mr. from 12 cell passed in Fronto-occipital direction
1 ⅓ = Parietal =
8 = Temporal = nystagmus occurred when the current was passed through the temple.

22nd August:
2 ½ mr. (12 cells) in Fronto-occipital direction
1 ½ mr. = in Parietal =
7 mr. = in Temporal =
Patient continue quieter and more composed.
Salvage treatment was continued in the case daily, until the 7th September. The current was passed in two directions; through the temple, and from the forehead to the occiput, usually for 10 minutes, the strength varying from 1 to 6 milliamperes. Besides, the myotonia already noticed, there was frequently drowsiness during the passage of the current.

The patient steadily improved up to a certain point, became quiet and composed, did some work and slept much better at night but she relapsed again afterwards.

Treatment was again commenced and carried on from the 23rd October till the 22nd November. The current being passed through the head daily and alternately, through the temple, or from the forehead to the nape of the neck. The duration being 5 minutes.

The patient again improved some what but her delusions remained.
Remarks

From the descriptive remarks at the commencement it will be seen that the case was an extremely bad one and it was chosen on that account as a test of the galvanic current was of any use.

Improvement did take place and it was no doubt due to the sedative effects of the current on the brain and the sleep-producing influence which was very well marked in the woman's case.

A cure was not expected from the character of the delusions.
Case 7.

William W.K. is a Farmer, single, 73 years of age; he became insane in June 1883 and was admitted into the Southern Counties Asylum, Dumfries on the 9th October 1882. Before admission he was very violent, struck his relatives and broke the furniture. He had delusions that his relatives and the public had conspired to kill him, that he was lost and his condition generally was one of terror and unhappiness.

This patient was treated with the continuous saline current passed through the head daily from the 13th October 1883 until the 29th November—usually from 6 cells and of 162 millivolts strength. The duration was 5 minutes.

Little if any improvement resulted from the treatment. The patient was very sensitive to the current.
Case 8.

M.'s. is 32 years of age, a gardener's wife; she has suffered from delusions that people are going to take her away and injure her. She attempted to commit suicide by cutting her throat, was sleepy and would not take her food. When the galvanic treatment was commenced she was depressed, tearful and apathetic.

The galvanic current was passed through the head daily from the 24th August until the 7th September, usually of 1 to 3 milliamperes strength. The application lasting 10 minutes. The pulse was increased in frequency by each sitting sometimes 16 beats per minute. The patient was very sensitive to the current, dilatation of the pupils and sadness usually accompanying each application. Little, if any improvement resulted from the treatment.
Case 9.

Mrs. W. is 34 years of age, is the wife of a wood cutter. She was admitted into the Northern Counties' Asylum, Dumfries, on the 2nd October 1863. She was reported to have made a suicidal attempt. When admission treatment was commenced great taciturnity and obstinacy were two prominent features of her condition. She was treated with the galvanic current passed through the head daily from the 22nd October till the 30th November. A current of 1 millivolt strength from 6 cells being usually used. The duration of application was 5 minutes. No perceptible improvement took place in this case.
Case 10.

Archibald L., single, a Painter, 32 years of age was admitted into the Southern Counties' asylum, Dumfries on the 18th December 82. He had been 3 weeks insane. The alleged cause was alcoholic excess. He was a short, well built man, dark in color, of ordinary height. He was a good workman and had a pleasant address.

Before admission he suffered from hallucinations of hearing to a very great extent: at first he was preoccupied, constantly listening to voices, afterwards he would shout himself hoarse in answer to them.

This patient was treated with the continuous galvanic current passed through the head daily from the 15th of August till the 6th September, usually for from 10 to 15 minutes of the strength of current varying from 2 to 6 millamens.

He bore the current well: sometimes somnolence was noticed, insomnia, passing the current through the temple. No improvement of any consequence was noticed in the patient's condition.
As the auditory hallucinations were very troublesome to the patient, the current was passed into the external auditory meatus (filled with warm water) by an electrode inserted rectally at the point of the other electrode was placed over the definite mastoid process. This was repeated daily from the 29th October until the 29th November 1813, the electrode being introduced into the ears alternately, usually the anode was employed for this purpose. The strength of current was about 2 milliampères.

Result: There was no improvement in the auditory hallucinations or in the general condition of the patient.
Case 11.
S. J. W. was a young woman, 23 years of age and single she resided at home. Her mental condition was one of acute mania; she was restless, irritable, swore incoherently, had delusions about people speaking about her and was violent and indecent.
She was treated with the constant galvanic current passed through the head daily, from the 29th October 1883 until the 7th December, for from 14 to 17 minutes daily, the strength of current being from 1 to 3 milliamperes.
The passage of the current had a soothing effect and from the time it was applied she slept remarkably better. Further there was some improvement and steadying in her mental condition.
Case 12

Charlotte M. C. was a case of chronic mania who had been regularly noisy every night for two months preceding the application of the constant current. Her circulation was languid and her feet oedematous. Altogether she was not one in whom I thought it judicious to try the usual medicinal sedative.

22<sup>nd</sup> December at 8:30 p.m.

"Central galvanisation" was performed on the negative sponge electrode being applied to the epigastrium; the positive being applied to the vertex and gradually brought down by the sternomastoid 6 down the spine according to Bead Rockwell's method. The galvanometer indicated 1 millivolt.

The patient rested well on the night of the 22<sup>nd</sup> & 23<sup>rd</sup>.

24<sup>th</sup> December.

Central galvanisation repeated for 8 minutes. 15 to 18 cell were used 5 1/2 millivolt was indicated.

Patient was quiet and slept well for 3 nights, but was again noisy on the 27<sup>th</sup> inst.
28th November
Central galvanisation for 7 minutes. 12 to 18 cell used and 2 to 3 millievers indicated.
Result: Patient had a quiet night slept.

29th November.
Central galvanisation for 7 minutes. 12 to 18 cell used; 3 to 4 millievers indicated.
Result: Patient had a quiet night slept.

30th November.
Central galvanisation for 5 minutes. 12 cell used & ½ millievers indicated.
Result: a quiet night.

Remarks:
As this patient had been nervous nightly in two months, the effect of the current was very marked, and there could be no doubt but that the improved sleep was due to the sedative effect of the galvanism on the brain. The patient had now the returns of her nervous tendency, but not so continuously as before.
Case 13.

Tabella A.

a case of Chronic Mania with delusions, had been noisy, sleepless for a week and we do on the evening of the 1st December '83.

Central galvanisation was performed for 6 minutes - 1 to 3 millivebers were indicated.

Result: Patient had a quiet night and slept well. She remained quiet at night until the morning of the 5th December.

Central galvanisation for 3 minutes.
12-15 to 6 cell were used - as the pulse was irregular there was some faintness it was not continued the usual time.

Result: Patient slept well on the night of the 5th to 6th of December.

Patient was noisy on going to bed.

Central galvanisation for 6 minutes - 12 cells used - one milliveber indicated.

Result: Patient had a quiet night and slept well.
Remarks.
The positive pole was always applied to the head or spine: the negative to the epistaxis.
The sleep-producing effect of the galvanic current was very marked in this case.

A similar method of treatment was tried in the case of David B., another paralytic who was noisy nightly, also successfully, although not uniformly so.
Conclusions.

After a careful trial it must be confessed that electricity is no panacea, when confronted with the multiform diseases grouped under the heading of "Insanity."

In Dementia it is of greatest use in calling into action tracts of the brain which have become dormant through exhaustion caused by prolonged excitement & as in Case 1. or from inhibition as some writers suppose.

Further I believe that by a patient and persevering application of it in such chronic demented cases as J. F. (No. 2) modest but very satisfactory results may be obtained and the patient be lifted a step higher from conditions of object helplessness. 

Salvation of the brain with General Faradisation of the body are the best methods of treatment. 

Epilepsy in asylums is so
advanced and the brain is already so ravaged by disease that it offers little prospect of amendment: it will be seen however, that in Nos 3 & 4 (HPr., J. I.) a most notable diminution in the number and severity of the fits took place during galvanisation of the brain and Dr. Julius Althaus recommends electricity especially in cases where the menstrual function is dormant or irregular.

Of all mental diseases melancholia was to me the most disappointing in its results. From a priori considerations I thought that the Continuous Current which is so potent to relieve and cure neurasthenia would also be an efficient and in relieving the distressing mental pain of melancholia and in 2 of the five cases (John L. & K.) distinct but temporary relief was given. In this my experience agrees with that of Dr. Clifford Allbutt (West Riding Report 1872, Vol. II. p. 207). It must however be remarked that in most of my

Cases there was reason to believe the existence of organic disease of the brain and I would be inclined to think that in Simple Melancholia depending on Cerebral exhaustion generally in similar cases on the border land of Insanity the saline current should be of Considerable service.

Dr. Beard Rockwell & Dr. H. Warth relate instance of recovery from Melancholia under saline treatment. Dr. Beards Rockwell also recommend it in Hypochondriasis, but I found that in Hypochondriacal Melancholia it was of no use.

The continuous saline current passed through the brain was the method I used in Melancholia.

Salivation of the brain and auditory nerves does not relieve auditory hallucinations (Case 10) and generally where there is progressive brain disease it is unable to restore the physiological conditions of health.

In acute Malign Melancholia Salivation of the brain was found beneficial by Dr. W. Practical Treatise on the Medical Surgical uses of Electricity. Journal of Mental Science, April 1878, p. 79.
Neath and Clifford Albutt and I could recommend it from my experience.

About the soporific effects of the galvanic current there can be no doubt and I believe that it will be extensively used by asylum physicians in such cases as No. 12, 13 & 14. It certainly has not the baneful (sometimes debasing) effects of Chloral and morphia &c., being very unlikely to be abused in the same way as these drugs. There are no unpleasant after-effects and further it can be used in chronic cases where there is much nocturnal excitement combined with a weak circulation, oedema of the feet &c., in which one would hesitate to give the large doses of sedative drugs necessary to produce sleep in such cases; moreover its effects generally last for a few nights. Central galvanisation is the best method of application.

In hysterical insanity, the paralytic current has been found of use in articles referred to on preceding page.
as a "mental counter-irritant" - the somewhat coarser and more irregular current from the magneto-electric machine being of most service.

Frictional electricity has been almost entirely superseded by galvanism and Faradism, with regard to the shocks from the Leyden jar recommended by D. I. Veillier, D. Russell Reynolds says that "short of being hanged he could not imagine anything more unpleasant."
Note on the altered galvanic-reactibility of the muscles in General Paralysis of the Insane.

The subject of the Faradic-reactibility of muscle in this disease has been investigated by several writers. Lowe records his results in the West Riding Asylum Reports (1873) pp. 205-214; Bucknell & Juka in their "Psychological Medicine" p. 460 (3rd Edition). The general conclusions, in which all agree, is that there is, especially in advanced cases, a loss in some patients, an abolition of Faradic-reactibility in the muscles of the face, arms, legs. (In the 1st and 2nd stages of the disease. Lowe states that he found no change in the irritability of the facial muscles.)

I have examined the irritability of the muscles to the Faradic Current and find that in the 2nd and 3rd stage, there is a marked qualitative change in their reaction, which, so far
as have been able to learn, has not yet been described.

The order of contraction with the different pole and an opening-closing the circuit found to be altered and different from the normal order in health of

(1) Cathodal Clamping Contraction C.C.C.
(2) Anodal Opening Contraction A.O.C.
(3) Anodal Clamping Contraction A.C.C.
(4) Cathodal Opening Contraction C.O.C.

The following two cases will illustrate the point shortly:

Case I. Thomas B. in the 2nd stage
of General Paralysis
Breips muscle - right arm

(1) C.C.C (right) with current from 6 elements (1½ mV. median)
C.C.C (left) 12

(2) A.C.C. 9 (1½ mV.

(3) C.O.C. 21 (8 mV.
The anodal opening contraction absent

Tibialis Anterior (left)

(1) C.C.C. with 13 elements - 1½ millivolts indicated
(2) A.C.C. 24 - 4

no anodal opening contraction a Cathodal Opening Contraction with current up to 7½ millivolts.
Tibialis Anticus (right)

(1) C.C.C. (slight) with 15 elements - Current 1 ½ millivebers
    fair   18   

(2) A.C.C.   27    4 ds.
    Anodal opening contraction - Cathodal opening contraction absent.

Case II. John O'M. General Paralytic in the 3rd stage.

Tibialis Anticus (left)

C.C.C. with 24 elements - 3 ½ millivebers
A.C.C.   30    6    

The strength of current was increased up to 10 millivebers with 42 elements and neither Cathodal opening contraction nor Anodal opening contraction was elicited.

Biceps (right arm)

(1) C.C.C. slight with 15 elements - 1 ¼ millivebers
    fair   18   1 3/4    

(2) A.C.C.   24    5    

(3) C.C.C.   30    10    

no anodal opening contraction

The first qualitative change in the
Salvage excitability of the muscles in General Paralysis is the delay of the Anodal Opening Contraction till after the Cathodal Closing Contraction then it disappears entirely. The next to disappear is the Cathodal Opening Contraction. Further it may be added that there is also a quantitative change in the contractions, which are weaker than in health. After the muscles respond in a partial ineffective way to current which would not affect them in health.

Finis