

## Electricity: A History of its use in the Treatment of Mental Illness in Britain During the Second Half of the 19th Century

A. W. BEVERIDGE and E. B. RENVOIZE

The use of electricity in British psychiatry during the second half of the 19th century is examined. An account is given of the clinical and theoretical aspects of electrical therapy. Factors leading to its use and eventual decline are considered.

"On the occurrence of cases which refuse to yield to any ordinary remedy, the mandate 'let them be electrified' has often been issued, too frequently, rather with a vague hope of obtaining relief from an extraordinary remedy than from any well defined view of its real influence" [Golding-Bird, 1841 (Colwell, 1922)].

The use of electricity in medicine has followed a cyclical course throughout the centuries (Stevenson & Lewis Jones, 1892; Colwell, 1922; Beveridge and Renvoize, 1988). Clinicians have approached electrical methods with great enthusiasm, only to abandon them when they fail to produce results. In the second half of the 19th century, British asylum doctors began using electricity to treat their patients. The use of electricity by British psychiatry during this period is examined here, and the factors that led to its use and eventual decline outlined.

### The impact of nineteenth-century developments in electrical science on Victorian society

The 19th century saw major developments in the science of electricity. In 1831, Michael Faraday discovered the induction current, which provided the first continuous electrical current, and this quickly led to the production of practical machines for converting mechanical into electrical energy. In 1873, James Clerk Maxwell published *A Treatise on Electricity and Magnetism* in which he expressed his theories on electromagnetism and light. In 1875, Graham Bell invented the telephone, and in 1878 Joseph Swan developed a practical incandescent filament lamp. In 1882, the Electrical Lighting Act was passed, and in the same year Brighton became the first English city to have a permanent electricity supply. The following year, electric tramways began service at Kew. The closing decade of the century saw the Electrical Exhibition at the Crystal Palace in 1892 (Dunsheath, 1962; Bowers, 1982).

The developments in electrical science had a major impact on the everyday life of the Victorian population, with the creation of electrical lighting and the gradual introduction of electricity into workplaces and homes via the central mains. As one contemporary observed: "it seems we are moving from the Age of Steam to the Age of Electricity" (Anon, 1883a). The medical profession were keen to harness this exciting new power to treat their patients.

### The renewal of general medical interest in the therapeutic application of electricity

In Paris in the 1850s, Guillaume Duchenne (1855) published his successful results using electrical methods in the treatment of disease. His work *A Treatise on Localised Electrization and its Application to Pathology and Therapeutics* had a major impact on the medical profession, and according to Tuke (1892) "did most to renew the employment of electricity in medicine". Three other workers also contributed to the reawakening of interest in electricity at this time. In 1848, Du Bois-Reymond published his physiological work *Investigations on Animal Electricity* (Tuke, 1892), and in 1854, Moritz Meyer described the clinical applications of electricity in his book *Electricity Applied in Practical Medicine* (Meyer, 1869). Robert Remak, who coined the terms ectoderm, endoderm, and mesoderm, and was the first to describe ascending neuritis, made a careful study of the therapeutic effects of different types of electrical current (Colwell, 1922; Talbot, 1970). Remak, who published the results of his work in *Galvanotherapie* in 1858 (Stainbrook, 1948), recommended the use of the constant current in "morbid conditions of the brain accompanied by disordered mental functions" (Althaus, 1873).

British clinicians began applying electrical methods to their patients, and successes, especially in

neurological disorders, were claimed (Althaus, 1873). An 'Electrical Room' had been established at Guy's Hospital in London, and leading doctors such as Sir William Gull (Anon, 1863), Thomas Addison, and Golding-Bird used electricity to treat their patients (Colwell, 1922). Other London hospitals, such as St Bartholomew's (Lewis Jones, 1900), and the National Hospital for the Paralysed and Epileptic (Anon, 1866), also established electrical rooms.

Several weighty treatises on the subject of medical electricity appeared in the literature (Russell Reynolds, 1870*a,b*; Rutherford, 1871; Althaus, 1873; Poore, 1874, 1875; De Watteville, 1884; Bartholomew, 1887; Anon, 1888). The authors stressed the complexity of the subject and the amount of study needed to master this form of therapy. Althaus (1899) emphasised the artistry involved in applying electric techniques: "An application of the constant current to the brain . . . is, in a certain sense, an artistic performance which requires not only knowledge but also much practice and some talent like a good musical performance. . . . A man who labours with love and care and has the discrimination to select one of the methods described by me or several of them . . . will in the nature of things obtain better results than another whose heart is not in his work, who acts by mere routine, and who is devoid of the elements of an artistic disposition or true clinical instinct".

The medical profession were at pains to distinguish their involvement with electric methods from the use of such methods by lay people, who were derided as "quacks" (Anon, 1889; Horder, 1891). One columnist for *The Lancet* wrote: "Even from the lowest point of view - that of pecuniary profit - it is surely unwise to place in the hands of unqualified persons, work which would be far better done by members of the medical profession. Besides, with unqualified medical electricians there is no security that they will not sooner or later undertake the treatment of cases on their own account, promising cures, or selling electric or magnetic appliances, or advertising themselves in public prints" (Anon, 1895).

#### The asylum doctors' adoption of electricity to treat mental disorder

The 19th century saw the building of a large number of asylums throughout the country to house the mentally afflicted in Victorian society. Scull (1979) and Digby (1985), among others, examined the rise of the asylum doctors during this period. The example of the York Retreat, established in 1792 by Samuel Tuke, demonstrated that lay people were at

least as able as doctors to care for the insane. Over the century, the medical profession fought to establish its right to be the sole and legitimate agency for administering to the needs of the mentally disordered. By the latter half of the 19th century, doctors were winning the battle, and even the York Retreat was being run by a medical superintendent (Digby, 1985). The asylum doctors had argued that insanity was primarily a physical disorder of the brain and thus necessitated physical remedies, which could only be administered by the medically qualified. They sought to consolidate their position as the natural carers for the insane by the increasing professionalisation of their activities. The Medico-Psychological Association was set up in 1841, the *Asylum Journal* was founded in 1853, and regular academic meetings began to take place. By such means, lay people were excluded from the debate about the care of the mentally disordered.

The psychiatrists' espousal of electricity served several purposes. They were impressed with the successful results reported by their medical colleagues and thus, by using similar techniques, they hoped to gain some of the prestige of general medicine. They were utilising the very latest scientific knowledge in the interests of their patients, and thus deserved to be considered on an intellectual and social par with their medical peers. They were also harnessing the mysterious new power of electricity which was making such an impact on Victorian society. The asylum doctors' advocacy of electricity also reinforced their claim to be the sole agency for the care of the mentally disturbed. They argued that electrical methods required a scientific discipline for their application and thus doctors, with their 'scientific' training, were the ideal candidates for administering electrical therapy. The literature frequently warned against the mere dabbler, and emphasised the complexity and technical nature of the subject. The pursuit of electric treatments was also consistent with the asylum doctors' view of madness as a disease of the brain, which required physical interventions.

Asylum doctors in the 19th century had very little in the way of effective remedies to treat the ever-growing number of patients admitted to their hospitals. Their pharmacopoeia was limited, and drugs were used for their sedative rather than curative properties. Thus they were keen to employ any new therapy that seemed to offer therapeutic success. Electricity appeared to hold such a promise, and reports from Europe and America were encouraging. Two French clinicians, Teilleux and Auzouy, were credited by Tuke (1892) for giving "electricity a prominent place in psychiatry". The *Journal of*

*Mental Science* contained regular accounts of clinical practice abroad and British doctors became aware of the work of the other European and American physicians such as Arndt (Anon, 1871*a*), Erb (Anon, 1874), Hitzig (Ireland, 1875), Benedikt (Tuke, 1892) and Beard & Rockwell (1871).

### The asylum doctors' use of electricity in clinical practice

Victorian asylum doctors had three main types of electricity at their disposal: galvanism or the 'continuous current'; faradism or the 'induced current'; and 'frictional' or 'static' electricity, which had been in use since the 18th century, and which involved either giving the patient a shock by means of a Leyden jar, or insulating the patient, electrifying him, and then drawing sparks from the affected part. By the second half of the 19th century, 'frictional' electricity was being used infrequently, and asylum doctors tended to favour galvanic and faradic means of therapy (Stainbrook, 1948). Opinions differed as to the relative merits of each method, and the clinical accounts suggest a trial-and-error approach with a great variation in the number of treatments given (Anon, 1871*b*; Allbutt, 1872; Newth, 1873; Anon, 1883*b*; Robertson, 1884; Wiglesworth, 1887). The length of a course of treatment ranged from a few days to several months. Electricity was usually applied in daily or alternate daily sessions, lasting from 10 to 20 min (Stainbrook, 1948). During the session, it was common practice for the electrode to be maintained in a constant position during the period of electrical stimulation. Stainbrook (1948) observed that over the 19th century, there was a gradual "cephalic shift" in the placement of the electrodes which paralleled changes in neurophysiological theories of mental illness. In the early years of Victorian electrotherapy, stimulation of the skin was the therapeutic goal, and electrodes were placed on the hands. However, by the latter half of the 19th century, doctors sought a more direct influence on the brain, and consequently, electrodes were applied to the head. The following accounts of the use of electricity by three clinicians working in different asylums in Britain during the second half of the 19th century serve to illustrate the diverse approaches pursued.

Dr Newth (1873), of the Sussex Asylum, employed a Stohrer's battery and described his technique as follows: "In some cases the hands or feet were placed in a basin of acidulated water with one of the electrodes dripping in it, the other being applied to the head or spine; this increased the receptivity, and by having both hands and feet in the water it was

possible to send a current up or down both extremities at the same time". He described 15 cases, 9 of whom were said to benefit from electrotherapy. In one case history, he described the treatment of a patient with "melancholia":

"Case 3 - Melancholia - A.A., female, 26, single, farmer's daughter. History - has been insane for 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 needle work; 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."

In 1884, Dr Alexander Robertson, Physician to the City Parochial Asylum in Glasgow, published a further example of the successful treatment of a mentally ill patient using electricity. The patient had been ill for 7 years, was melancholic, had delusions of suspicion, and also heard voices. She was given galvanic treatment from the end of October, every second day until February, with apparent beneficial results. Robertson wrote: "So convinced is she of the benefit that she is deriving from the battery that she asks to have her hair cut very short again in order that the current may produce its full effect".

Three years later, Dr Wiglesworth (1887) from the Rainhill Asylum, described 11 female cases that he had treated with galvanism. Three were reported to be "cured", three were "improved", and in five there was no apparent benefit. He described one of his cases as follows:

"No. 1, married; aged 23. Acute dementia of six months' duration. Medium size plates used; kathode to forehead, anode to nape of neck. A current strength of 3 milli-amperes was used to begin with, and this was gradually increased to 25, the average being 15 milli-amperes for ten minutes. Usually there

was a daily sitting, but sometimes a rest was given of one or more days, so that 60 applications were spread over a period of three months. After 27 applications the patient became brighter, and in another three weeks had improved considerably; from this time the patient continued to progress, gradually but steadily to complete recovery."

Wiglesworth concluded that galvanism was especially indicated in cases of "melancholia attonita" and "acute dementia".

The results of attempts to treat asylum patients with electricity were inconsistent, but it is striking how often cases of melancholia were said to benefit from this form of treatment. As early as 1849, Bucknill (Berlié, 1849) was reporting the successful treatment of melancholia with galvanic electricity and potassium iodide. Newth (1873) observed that "in those cases where there seems to be a want of tone in the nervous system (i.e. in melancholia), the continuous electric current has in the majority of cases a most marked beneficial effect". Wiglesworth (1887) also felt that "cases of mental depression, stupor, and torpor" responded well to electrotherapy. In his fascinating review of the use of electricity in psychiatric treatment during the 19th century, Stainbrook (1948) also concluded that people with depressive symptoms benefited most from this form of therapy. Hysterical reactions were also commonly reported to be improved by electrotherapy. From the clinical accounts, it appears that it was predominantly female patients who were given electric treatments, although of course there were more female than male patients in Victorian asylums.

Interestingly, several clinicians observed that electrical treatments, and more specifically, galvanic therapy, were capable of inducing epileptic convulsions if too strong a current was used (Althaus, 1873; Wiglesworth, 1887). Such convulsions were considered to be undesirable and to be avoided (Stainbrook, 1948), and 19th-century asylum doctors were agreed that better therapeutic results were obtained with weak currents rather than with more powerful ones (Althaus, 1873; Newth, 1873; Stainbrook, 1948).

A later variation which appeared to combine the apparent therapeutic benefits of hydrotherapy and electricity was the 'electric bath' which enjoyed a brief popularity (Steavenson & Lewis Jones, 1892). It consisted of "an earthenware or wooden bath in which the patient can recline. Metal plates at the two ends of the bath are connected with the source of current and the patient lies in the bath of warm water for ten or fifteen minutes" (Lewis Jones, 1901).

### Theoretical justifications for the use of electricity in mental disorder

In the journals and textbooks of the day, doctors speculated as to the possible effects of electricity on the brain (e.g. Newth, 1878). The nature of electricity was not completely understood, and medical theorising reflected popular conceptions of the mysterious new power. Thus electricity was frequently thought of as a 'fluid' (Anon, 1874), despite Maxwell's warning that the concept of electric 'fluid' was only a model to further understanding (Steavenson & Lewis Jones, 1892). The 'fluid' was thought to enter blood vessels and then exercise some benefit on the brain (Anon, 1874), but there were conflicting assessments as to its precise effects. Electricity was considered to be "stimulating" but also "sedative" (Beard & Rockwell, 1871). Some authorities believed that it increased the blood flow to the brain (De Watteville, 1885), while others claimed the reverse (Beard & Rockwell, 1871). Beard (1873) suggested that electricity acted by improving the nutrition of nervous tissue, whereas Newth (1884) speculated that it was capable of "removing a morbid condition of the tissues", as well as having antispasmodic, antiparalytic, restorative, and tonic qualities.

Such medical theorising served to emphasise the intricacy of the subject, and the erudition demanded of its exponents. Many of the articles that appeared in the journals of the time stressed that electricity should not be used by anyone, but only by an individual (a doctor, it went without saying) who had studied the subject in great detail. As George Beard tetchily observed "... There is a vulgar error abroad, both in England and the United States, that any 'Old Granny' can make applications of electricity. . . . No man can apply electricity with the highest success until the details of the applications have become to him a matter of routine, so that he can use any one of the methods on any kind of patient without fear or doubt. Skill of this sort, in any art, cometh not of observation, it is acquired only by careful, studious and repeated experience" (Beard, 1873).

Even among the ranks of doctors, the mere dabbler was warned against using electricity (Newth, 1874). Only the serious student was allowed to employ such demanding therapy, and articles frequently criticised fellow colleagues for a superficial knowledge of the subject. The reasons for the conflicting and often disappointing results of electrotherapy were usually blamed on a lack of understanding of its principles. It was argued that if a doctor followed the guidelines and applied electricity to the correct patients in the proper way, then success would ensue. Unfortunately, medical electricity's august authorities

agreed about the clinical indications for electric treatment, and the precise technique to adopt. Althaus (1857), for example, recommended the use of the induction current, and advised that neither electric electricity nor galvanism should be used. In contrast, Arndt favoured the use of galvanism, and that the induced current was of limited application (Anon, 1871*a*). Newth (1873) felt that galvanism especially useful in cases of melancholia, whereas Allbutt (1872) found it of little benefit in melancholia therapeutic in "acute dementia".

#### The decline in the use of electricity to treat mental disorder

In addition to the reports of the successful use of electricity to treat mental illness, a few clinicians such as Clouston (Anon, 1883*c*), Ireland (Anon, 1883*c*) and Urquhart (Wiglesworth, 1887) began to raise doubts about the efficacy of this form of therapy, and there was concern that it might only work by the powers of suggestion (e.g. Sainsbury, 1893). Even a zealous advocate of electrotherapy as Arndt (1892) had to admit that there were some difficulties associated with this treatment. He wrote: "The electric current is a two edged sword . . . it may aggravate some forms of mental derangement and can make them incurable . . . great care, patience and confidence are required, qualities only found in a man convinced of the final effect of his treatment. The attendants, nurses or assistants, who simply do what they are told, and because it is their duty, will never have the success of a medical man convinced of the efficiency of electricity". Lewis (1901), another committed practitioner of electrotherapy, also complained:

"The employment of electricity in medicine has passed through many vicissitudes, being at one time recognised and employed at the hospitals, and again being neglected, and left for the most part in the hands of ignorant persons, who continue to perpetrate the grossest impositions in the name of electricity. As each fresh important discovery in electrical science has been reached, men's minds have been turned anew to the subject, and interest in its therapeutic properties has been stimulated. Then after extravagant hopes and promises of cure, there have followed failures, which have thrown the employment of this agent into disrepute, to be again after a time revived and brought into popular favour."

Perhaps one of the extravagant hopes to which Lewis alludes referred was Althaus's (1899) contention "that old people receive about the sixtieth or sixty-fifth part . . . proper and faultlessly carried out electricity to the brain, either daily or every other day, for some

time, they may keep their faculties fairly well until the age of eighty or ninety"!

Failure to replicate the results of previously reported successful treatments with electrotherapy, and grandiose claims such as those of Althaus (1899), inevitably led most British clinicians to become disenchanted with this form of treatment of mental illness by the end of the 19th century. Interest was not to be reawakened until the introduction of electroconvulsive therapy almost half a century later.

#### Conclusions

In the latter half of the 19th century, British asylum doctors began to use various electrical methods to treat their patients. Several factors appear to have contributed to this period of clinical enthusiasm for electricity. Major developments in electrical science took place during the Victorian era, which subsequently had a major impact on the everyday lives of the populace. Doctors in general were keen to harness this exciting new force for therapeutic purposes, especially asylum doctors, who were faced with the increasing numbers of patients being admitted to their institutions, and a lack of effective chemotherapies.

Also, during this period, asylum doctors were working hard to establish their professional credentials and social standing, with the general public, and with their medical colleagues in other specialties. By espousing electrotherapy, asylum doctors stood to distinguish themselves as serious men of science, which perhaps also had the effect of strengthening their claim to be the rightful agents to supervise the care of the mentally ill. However, the clinical application of electricity produced inconsistent and often disappointing results, and by the closing decade of the 19th century, the original optimism about this form of treatment had given way to pessimism and eventual loss of interest. British psychiatry was not to regain interest in electrical methods of treatment until 1938, when Cerletti and Bini introduced electroconvulsive therapy (Cerletti, 1950).

#### Acknowledgement

We are very grateful to Dr Roy Porter for reading an earlier draft of this paper.

#### References

- ALLBUTT, C. (1872) *The West Riding Lunatic Asylum Reports*, vol. 2.
- ALTHAUS, J. (1857) On the therapeutical use of electricity by induction. *The Lancet*, ii, 162-164; 187-190.
- (1873) *A Treatise on Medical Electricity*. London: Longmans, Green & Co.
- (1899) Treatment of old age. *The Lancet*, i, 151-152.

- ANON (1863) A mirror of the practice of medicine and surgery in the hospitals of London: Guy's Hospital. *The Lancet*, *i*, 62-63.
- (1866) A mirror of the practice of medicine and surgery in the hospitals of London. National Hospital for the Paralyzed and Epileptic. *The Lancet*, *ii*, 576-577.
- (1871a) Psychological retrospect. *Journal of Mental Science*, *17*, 423-425.
- (1871b) Review of *A Practical Treatise on the Medical and Surgical Uses of Electricity, including Localized and General Electrization* by George M. Beard & A. D. Rockwell (1871). *Journal of Mental Science*, *17*, 266-271.
- (1874) Psychological retrospect. *Journal of Mental Science*, *20*, 130-131.
- (1883a) Review of *A Practical Treatise on Electro-Diagnosis in Diseases of the Nervous System* by Hughes Bennett (1882). *Journal of Mental Science*, *29*, 106-108.
- (1883b) Review of *Behandlung der Psychosen mit Elektrizität*. Von Dr Tigges, in Sachsenberg (*Zeitschrift für Psychiatrie*, xxxiv., Band, 6 Heft). *Journal of Mental Science*, *29*, 415-424.
- (1883c) Notes and news. *Journal of Mental Science*, *29*, 318-319.
- (1888) Review of *Electro-therapeutics* by Wilhelm Erb (1887). *The Lancet*, *i*, 75.
- (1889) An exposure of electrical quackery. *The Lancet*, *i*, 949-950.
- (1895) Electricity in medicine. *The Lancet*, *ii*, 587-588.
- ARDNT, R. (1892) Electricity. In *Dictionary of Psychological Medicine* (ed. D. H. Tuke). London: J. & A. Churchill.
- BARTHOLOMEW, R. (1887) *Medical Electricity*. Edinburgh: Young J. Pentland.
- BEARD, G. M. (1873) The treatment of insanity by electricity. *Journal of Mental Science*, *19*, 355-360.
- & ROCKWELL, A. D. (1871) *A Practical Treatise on the Medical and Surgical Uses of Electricity, Including Localized and General Electrization*. New York: William Wood & Co.
- BERLIÉ, M. A. (1849) Du traitement de l'aliénation mentale dans les asiles d'Angleterre. *Annales Medico-Psychologiques*, *5*, 224-244.
- BEVERIDGE, A. W. & RENVOIZE, E. B. (1988) A brief history of the use of electricity in the treatment of mental illness. *British Journal of Clinical and Social Psychiatry* (in press).
- BOWERS, B. (1982) *A History of Electric Light and Power*. Stevenage: Peter Peregrinus Ltd.
- CERLETTI, U. (1950) Old and new information about electroshock. *American Journal of Psychiatry*, *107*, 87-94.
- COLWELL, H. (1922) *An Essay on the History of Electrotherapy and Diagnosis*. London: Heinemann.
- DE WATTEVILLE, A. (1884) *A Practical Introduction to Medical Electricity*. (2nd edn). London: H. K. Lewis.
- (1885) Practical remarks on the use of electricity in mental disease. *Journal of Mental Science*, *30*, 483-488.
- DIGBY, A. (1985) *Madness, Morality and Medicine*. Cambridge: Cambridge University Press.
- DUCHENNE, G. (1855) *De l'Electrisation localisée et de son Application à la Physiologie, à la Pathologie, et à la Thérapeutique*. Paris: J. B. Baillière.
- DUNSHEATH, P. (1962) *A History of Electrical Engineering*. London: Faber and Faber.
- HORDER, T. G. (1891) Marvellous cures by electricity (letter). *The Lancet*, *ii*, 746.
- IRELAND, W. W. (1875) Psychological retrospect. *Journal of Mental Science*, *20*, 615-626.
- LEWIS JONES, H. (1900) On the application of electricity in medical and surgical practice. *The Lancet*, *i*, 695-699.
- (1901) The use of general electrification as a means of treatment in certain forms of mental disease. *Journal of Mental Science*, *47*, 245-250.
- MAXWELL, J. C. (1873) *A Treatise on Electricity and Magnetism*. Oxford: Clarendon Press.
- MEYER, M. (1869) *Electricity in its Relations to Practical Medicine*. Translated by William A. Hammond. New York: D. Appleton & Co.
- NEWTN, A. H. (1873) The galvanic current applied in the treatment of insanity. *Journal of Mental Science*, *19*, 79-86.
- (1874) Review of *A Treatise on Medical Electricity* by Julius Althaus. *Journal of Mental Science*, *20*, 99-111.
- (1878) The electro-neural pathology of insanity. *Journal of Mental Science*, *24*, 76-82.
- (1884) The value of electricity in the treatment of insanity. *Journal of Mental Science*, *30*, 354-359.
- POORE, G. V. (1874) Abstract of *Lectures on Electro-Therapeutics*. *The Lancet*, *ii*, 3-5; 300-302.
- (1875) Abstract of *Lectures on Electro-Therapeutics*. *The Lancet*, *i*, 115-117.
- ROBERTSON, A. (1884) Case of insanity of seven years' duration: treatment by electricity. *Journal of Mental Science*, *30*, 54-57.
- RUSSELL REYNOLDS, J. (1870a) Lectures on the clinical uses of electricity. *The Lancet*, *i*, 331-333; 367-368; 539-540; 575-577.
- (1870b) Lectures on the clinical uses of electricity. *The Lancet*, *ii*, 109-110; 321-323; 529-532.
- RUTHERFORD, W. M. (1871) Lectures on experimental physiology. *The Lancet*, *i*, 75-78.
- SAINSBURY, H. (1893) Therapeutic retrospect. *Journal of Mental Science*, *39*, 449-450.
- SCULL, A. (1979) *Museums of Madness*. London: Allen Lane.
- STAINBROOK, E. (1948) The use of electricity in psychiatric treatment during the nineteenth century. *Bulletin of the History of Medicine*, *22*, 156-177.
- STEAVENSON, W. E. & LEWIS JONES, H. (1892) *Medical Electricity: A Practical Handbook for Students and Practitioners*. London: H. K. Lewis.
- TALBOTT, J. (1970) *A Biographical History of Medicine*. New York: Grune and Stratton.
- TUKE, D. H. (ed) (1892) *Dictionary of Psychological Medicine*. London: J. & A. Churchill.
- WIGLESWORTH, J. (1887) On the use of galvanism in the treatment of certain forms of insanity. *British Medical Journal*, *ii*, 506-507.

\*A. W. Beveridge, MB, ChB, MPhil, MRCPsych, *Consultant Psychiatrist, West Fife District General Hospital, Dunfermline, formerly Senior Registrar in Psychiatry, Bootham Park Hospital, York*; E. B. Renvoize, MD, DPM, MRCPsych, *formerly Consultant Psychiatrist, Bootham Park Hospital, York*

\*Correspondence: *West Fife District General Hospital, Bellyeoman, Whitefield Road, Dunfermline, Fife KY12 0SU*