

Medicalising Electricity in the Dutch Republic, 1745-1789

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This article sheds light on the processes and tactics used by eighteenth-century electricians in making medical electricity a legitimate remedy in the Dutch Republic. Electricity's medical value was by no means self-evident in the years following 1746, when the first Dutch patient was treated with it. Understandings of its effects on the body were still unclear and judgements on the efficacy of electrotherapy varied. The subsequent four decades saw the development of various theories, practices, and instruments of electrotherapy across Europe and North America. This development has thus far been little studied in the context of the Dutch Republic, despite the Republic's prominent role in the wider history of electricity. Understanding how electricity became a legitimate component of the Dutch *materia medica* provides an insight into the ways transnational scientific knowledge is translated in local contexts.

Dit artikel werpt licht op de processen en strategieën die achttiende-eeuwse experts op het gebied van elektriciteit in de Republiek der Zeven Verenigde Nederlanden aanwendden om de medische inzet van elektriciteit te legitimeren. De medische waarde van elektriciteit was geenszins vanzelfsprekend in de periode rond 1746, het jaar waarin de eerste Nederlandse patiënt met elektriciteit werd behandeld. Een duidelijk begrip van de invloed van elektrotherapie op het lichaam was er op dat moment niet en het oordeel over de effectiviteit ervan varieerde. In de vier daaropvolgende decennia werden diverse theorieën over, praktijken van, en instrumenten voor elektrotherapie ontwikkeld in Europa en Noord-Amerika. De bloei van elektrotherapeutisch onderzoek in de Nederlandse Republiek zelf is tot nu toe echter weinig bestudeerd, ondanks de prominente rol van de Republiek in de bredere geschiedenis van elektriciteit. Dit artikel reconstrueert hoe elektriciteit een legitiem onderdeel van de Nederlandse *materia medica* werd en biedt inzicht in de verschillende manieren waarop transnationale wetenschappelijke kennis in lokale contexten werd vertaald.

This article traces how electricity became a legitimate medical tool in the Dutch Republic during the second half of the eighteenth century.¹ The earliest ways of treating a patient with electricity – otherwise known as electrotherapy – involved having them sit on an insulated stool and electrifying their skin surfaces (the ‘electric bath’), doing this and bringing a conducting rod near their body (‘drawing sparks’), or momentarily passing a large amount of electric charge to them (giving ‘electric shocks’). Around the middle of the 1740s, as reports of spectacular electrical experiments started to circulate around Europe, so too did the first reports of ill persons cured via these methods, particularly in Italy and Germany.² Word spread quickly across Europe, including in the Dutch Republic, where in late 1745 the natural philosopher Pieter van Musschenbroek (1692-1761) had devised a way to store electric charge in water using a device called a Leyden jar (see Figure 1), enabling electricians to discharge electricity instantaneously and at will. Writers of the history of electricity in eighteenth-century Europe and North America have focussed mainly on developments in electrical instrument making and entertainment. Medical electricity received a burst of scholarly attention from historians about two decades ago, but, apart from a 1999 article by Lissa Roberts, little attention has been paid to its Dutch context.³

- 1 This article is adapted from my master’s dissertation, *Medicalising electricity in the Dutch Republic, 1745-1789* (MSc Dissertation; University of Oxford). For their assistance and support I would like to thank Dr. Stephen Johnston, Prof. Ludmilla Jordanova, and the two anonymous referees for their helpful comments. All translations are my own.
- 2 John Heilbron, *Electricity in the 17th and 18th centuries: a study of early modern physics* (University of California Press 1979) 261. DOI: <https://doi.org/10.1525/9780520334601>.
- 3 Lissa Roberts, ‘Science Becomes Electric: Dutch Interaction with the Electrical Machine during the Eighteenth Century’, *Isis* 90:4 (1999) 680-714. DOI: <https://doi.org/10.1086/384507>. The seminal volume on early medical electricity remains Paola Bertucci and Giuliano Pancaldi (eds.), *Electric bodies: episodes in the history of medical electricity*. *Bologna Studies in History of Science* 9 (Università di Bologna 2001). It includes contributions by Paola Bertucci, Oliver Hochadel, and James Delbourgo,

who were particularly active in this field during the 2000s. Their research is predominantly framed in national terms; English and Italian for Bertucci, German for Hochadel, and North-American for Delbourgo. Lissa Roberts’ contribution in this volume, on the history of amber, does not address the Dutch context. Dutch historiography on early electrotherapy is limited. For a brief and superficial account of eighteenth-century Dutch medical electricity, see Annemarie de Knecht-van Eekelen, ‘Geneeskundige Electriciteit: therapeutische toepassing van een achttiende-eeuwse vinding’, *Nederlands Tijdschrift voor Geneeskunde* 139:44 (1995) 2268-2275. For a more insightful but limited analysis of medical electricity in the context of a 1745 theatrical comedy, see Ben Peperkamp, “‘Bald wird komen das Feur!’ Over de representatie van natuurwetenschappelijke en medische kennis in de klucht *De electriciteit; of Pefroen met het schaepshoofd ge-electriceerd* (1746)”, *Gewina* 29:4 (2006) 77-100.

Given that ‘medical electricity was’, as Oliver Hochadel puts it, ‘a central pillar in the architecture of electricity as a public science’ in the eighteenth century, it deserves a more prominent place in the history of electricity in the Dutch Republic.⁴

Roberts’ article, which remains the most comprehensive account of medical electricity in the Dutch Republic, looks more broadly at the commercial-scientific nature of eighteenth-century electricity.⁵ If her study has a drawback, it is that it gives the impression that the value of electricity as a medical tool was self-evident and unchanging throughout the latter half of the century. This perspective obscures many of the processes through which electricity gained medical legitimacy. In this article, designed to complement Roberts’ work, I intend to elevate these processes, referring to them collectively as the ‘medicalisation’ of electricity. The term medicalisation has most commonly denoted the ways in which everyday aspects of human and social life are made into medical problems. Originally employed by critics of modern medicine in the 1960s and 1970s to denounce the overreach of medical authority, the term’s uses have multiplied over the past half century.⁶ In this article, I leave behind its socio-moral roots and use it solely as a catchall for the ways in which an object or phenomenon – in this case electricity – that is not inherently medical adopts medical value and status. By providing insight into this process, I intend to elucidate how electricity went from being unknown to medicine to becoming a legitimate component of the medical toolbox. My use of medicalisation corresponds to that of François Zanetti, who used it to denote the progressive inclusion of electricity in the *materia medica* – the body of knowledge concerning healing substances (i.e. medicines) – of *ancien régime* France.⁷ How something becomes part of the *materia medica* is a profoundly social process. During the 1770s and 1780s in particular, Zanetti argues that qualified physicians made electricity legitimate when they administered it in dedicated spaces, such as the physician’s home or the hospital, and according to specific standards, such as the use of precision instruments, dosage, and localised treatment. By making the practice of electrotherapy more conditional on the knowledge, skills, tools, and access to spaces required for administering it, non-medically-trained individuals were excluded from practicing it. As a result, electricity shed its

4 Oliver Hochadel, ‘“My patient told me how to do it”: the practice of medical electricity in the German Enlightenment’, in: Bertucci and Pancaldi (eds.), *Electric bodies*, 73.

5 Roberts, ‘Science Becomes Electric’.

6 Bjørn Hofmann, ‘Medicalization and overdiagnosis: different but alike’, *Medicine, Health Care and Philosophy* 19:2 (2016) 253-264. DOI: <https://doi.org/10.1007/s11019-016-9693-6>.

7 François Zanetti, ‘Curing with Machines: Medical Electricity in Eighteenth-Century Paris’, *Technology and Culture* 54:3 (2013) 503-530. DOI: <https://doi.org/10.1353/tech.2013.0102>; François Zanetti, *L’Électricité médicale dans la France des Lumières*. Oxford University Studies in the Enlightenment (Voltaire Foundation 2017).

status as a miraculous panacea, becoming an increasingly legitimate, albeit still controversial remedy. Zanetti's framework of medicalisation ultimately highlights how the medical use of electricity was by no means self-evident, a fact which remains true beyond the French context.

To demonstrate how electricity was medicalised in the Dutch Republic between 1745 and 1789, the heyday of static electricity, I begin by providing an overview of how electricity was thought to be medically useful between 1745 and 1770. I then examine how electrotherapeutic theory and procedures were formulated in the publications of three prominent Dutch authorities in the 1770s and 1780s: Jan Rudolph Deiman (1743-1808), a physician, Willem van Barneveld (1747-1826), an apothecary by trade, and Adriaan Paets van Troostwijk (1752-1837), a merchant and amateur chemist.⁸ Together these men outlined the theoretical and methodological foundations of medical electricity, including to what extent it affected the body, as well as how and when it could be employed. I also emphasise the prominent role collaboration played in the practice of electrotherapy, a feature of medicalisation in the Dutch Republic during the eighteenth century.

Their outlining work is akin to that of 'boundary-work', which refers to the process by which 'boundaries of science are drawn and defended in natural settings'.⁹ Hochadel uses boundary-work to describe similar processes happening in Germany in the second half of the eighteenth century.¹⁰ However, although appropriate when discussing the distinctions that were made between 'good' and 'bad' electrotherapeutic practice, the term also implies a deliberate effort to draw distinct boundaries of disciplinary authority. This is slightly problematic in the context of early Dutch electrotherapy, given that the organisation of scientific knowledge in eighteenth-century Europe was far less compartmentalised than it became throughout the following century. Indeed, electricity was not only being studied and used for medical purposes in the Republic, but also elsewhere in Europe and North America during this period, involving the interaction of actors from various backgrounds and with various motivations. Such a patchwork of historical actors invites us to look for outlines rather than boundaries. Looking at the writings of Deiman, Van Barneveld, and Paets van Troostwijk shows us how the entangled knowledge of medical electricity was being translated, materialised, and standardised in a Dutch context. I thereby

8 Jan Rudolph Deiman, *Geneeskundige proeven en waarneemingen omtrent de goede uitwerking der electriciteit in verscheiden ziekten* (Amsterdam: Pieter Hayman 1779); Willem van Barneveld, *Geneeskundige electriciteit I-III* (Amsterdam: Jan Barend Elwe and Dirk Meland Langeveld 1785-1789); Adriaan Paets van Troostwijk and Cornelis Rudolphus Theodorus Krayenhoff, *De l'application*

de l'électricité à la physique et à la médecine (Amsterdam: Changuion 1788).

9 Thomas F. Gieryn, 'Boundaries of Science', in: Sheila Jasanoff et al. (eds.), *Handbook of Science and Technology Studies* (SAGE Publications 1995) 394. DOI: <https://dx.doi.org/10.4135/9781412990127.n18>.

10 Hochadel, 'The practice of medical electricity', 74.



Figure 1 Leyden jar, 1775-1799. Materials are glass and boxwood. © Teylers Museum, Haarlem, FK 1152.

emphasise how understandings and practices of medical electricity are shaped as much by local as transnational processes of medicalisation.

When used in this article, the term ‘science’ signifies the contemporary Dutch notion of *wetenschap*, which encompassed all forms of academic knowledge.¹¹ Here, ‘academic’ refers to the manner in which knowledge is obtained – in a scholarly or systematic fashion – and not to the type of person who obtained it. This means not only the university professor, but also the artisan or amateur may be engaged in *wetenschap*. People in the Republic who were professionally engaged in the *wetenschap* of the natural world were commonly called ‘philosophers’ (*wysgeeren*). Hence, I will continue to use the Anglophone convention ‘natural philosophers’ to denote them. In the absence of a coherent and contemporary Dutch word which encompasses all those involved specifically with electricity, I will use Benjamin Franklin’s term ‘electrician’, coined in 1749, and used to describe someone who studied or was knowledgeable about the science of electricity.¹² In the context of medical treatment, an electrician may also be called an electrotherapeutic ‘practitioner’ if they routinely treated patients. Far from referring to well-defined vocations, these labels simply apply to individuals with a knowledge of electricity and the gestures involved in manipulating it. As such there were many types of electricians, including academics, instrument makers, entertainers, healers, and enthusiastic amateurs. This plurality of backgrounds should remind us that medical electricity represented a shared body of knowledge rather than a specialist trade.

Early responses to medical electricity

Historians usually point towards Jean Jallabert, Gianfrancesco Pivati, Giuseppe Veratti, and Johann Heinrich Winkler as the progenitors of electrotherapy, given that these men were the first to widely disseminate reports of their successful treatments in the 1740s.¹³ In fact, Dutch contemporaries believed the first deliberate and successful medical application of electricity was not performed in 1747 by Jallabert in Geneva, but by Jacob Herman Kleyn, an Amsterdam *gommer* (likely a hair product

11 Denise Phillips, ‘Francis Bacon and the Germans: Stories from when “science” meant “Wissenschaft”’, *History of Science* 53:4 (2015) 378-394. DOI: <https://doi.org/10.1177/0073275315597609>.

12 This definition is provided by the Oxford English Dictionary. See ‘electrician, n.’, *OED Online*, Oxford University Press, June 2020 www.oed.com/view/Entry/60258 (Accessed 3 August 2020).

13 Margaret Rowbottom and Charles Susskind, *Electricity and Medicine: History of Their Interaction* (San Francisco Press 1984) 15-18; Heilbron, *Electricity*, 354; Paola Bertucci, ‘The electrical body of knowledge: medical electricity and experimental philosophy in the mid-eighteenth century’, in: Bertucci and Pancaldi (eds.), *Electric bodies*, 50-53.

maker), in the previous year, when he cured a woman of her lame arm.¹⁴ However, as knowledge of this new therapeutic tool spread across the continent, there seemed to be a meagre response to it in the Dutch Republic. The first Dutch-language publication dedicated solely to the subject was a 1745 translation of a German tract by Christian Gottlieb Kratzenstein (1723-1795), then a young medical student at the University of Halle. In his work he confidently claimed that electricity could cure a variety of ailments, such as build-ups of blood, insomnia, illnesses caused by congestion (including headaches and colds), illnesses of a ‘sulphurous’ nature, and even fatness.¹⁵ Kratzenstein purported that it was electricity’s ‘driving force’ which gave it its healing powers. This was observed in its ability to increase blood circulation and push out disease-causing matter like sulphurous particles and alkaline salts through the skin; electrified persons were observed to sweat, for instance.¹⁶ A similar notion of electricity driving fluids around the body is clearly present in a 1752 newspaper report – the first mention of medical electricity in a Dutch newspaper – of several successful electrotherapeutic treatments delivered in Regensburg. The article noted how ‘bile, spread throughout the intestines, can be pushed back to its proper place by electricity’.¹⁷ These mechanisms clearly draw from humorism, the Hippocratic system of the four bodily fluids blood, yellow bile, black bile, and phlegm, which still provided the foundation for eighteenth-century medicine, demonstrating that early reports of medical electricity framed it in existing medical theory.¹⁸

But not all early commentators understood electrotherapy in humoral terms. The Frisian instrument maker and autodidact mathematician Wytze Foppes Dongjuma (1707-1778) included a short discussion of the medical virtues of electricity in his *Wonderwerken der natuur* (1756), in which he understood electricity to be a physical manifestation of the fire element.¹⁹ In arguing that ‘nature is bound to the fire element’, he drew heavily from the ideas of the famous Dutch natural philosopher Herman Boerhaave, who understood the world as saturated with a subtle matter called ‘Fire’. His

14 Hiëronymus David Gaubius and Jean-Nicolas-Sébastien Allamand, ‘Bericht der Geneezinge van een Meisken met een zeker soort van beroerdheid bezet, dewelke door hulp van de Elektriciteit hersteld is’, *Verhandelingen uitgegeven door de Hollandsche Maatschappij der Wetenschappen* 1 (1754) 493-496; Paets van Troostwijk and Krayenhoff, *De l’application*, 149.

15 Christian Gottlieb Kratzenstein, *Korte verhandeling van de oorzaaken der electriciteyt en derzelver nuttigheid met betrekking tot de geneeskunde* (The Hague: Pieter van Cleef 1745) 15-22.

16 Kratzenstein, *Korte verhandeling*, 15-16.

17 ‘Duytsland’, *Oprechte Haerlemsche Courant*, 27 July 1752, 1.

18 Dorothée Sturkenboom, *Spectators van hartstocht. Sekse en emotionele cultuur in de achttiende eeuw* (Uitgeverij Verloren) 248-260.

19 Wytze Foppes Dongjuma, *Wonderwerken der natuur, ofte eenige bedenkingen over ligt en duisternis, benefens vuur, lugt, water en aarde [...]* (Leeuwarden: Abraham Ferwerda 1756) 25.

ideas influenced various notable electricians of the second half of the century, including Franklin and the French clergyman and physicist Abbé Nollet.²⁰ Electrical phenomena were thus explicable in terms of this pervasive fiery matter; after all, popular electrical experiments demonstrated electricity's ability to ignite flammable material and generate fiery sparks from human fingers. Despite having a different understanding of how electricity worked, like Kratzenstein, Dongjuma too was highly optimistic about electricity's healing power, believing 'beyond doubt' that electrotherapy would lead to recovery in a sick patient.²¹ His words echo those of contemporaries who shared this conviction, such as the famous English cleric and electrician John Wesley (1703-1791), who promulgated the idea that in 'very many Cases, it [electricity FW] seldom or never fails'.²²

In contrast to these optimistic voices, the few university professors who contributed to early discussions about medical electricity generally erred on the side of caution, basing their judgements primarily on personal experience. It was initially the professor of medicine and chemistry Hiëronymus Gaubius (1705-1780) who, after hearing the rumour of Kleyn's treatment, sent him a letter asking whether the story was true. The professor of mathematics and philosophy Jean-Nicolas-Sébastien Allamand (1713-1787) wrote in 1754 that he encountered many difficulties whilst trying to replicate the successes of Italian physicians, although a recent positive result in the treatment of a girl who suffered from epilepsy revived his optimism.²³ Pieter van Musschenbroek, whose Leyden jar enabled these treatments, was markedly more severe in his assessment of this new form of medicine, suggesting that exalted claims about its efficacy could be fuelled by dishonest motives:

Many doctors have resorted to electricity for curing several diseases, and have thought this method of healing to be very advantageous to many desperate cases, and moreover have attributed several successes to it; I wanted to test the truth of this fact, knowing how much we are accustomed to taking advantage of the gullibility and trust of the public in order to take their money.²⁴

He found it hard to believe electricity had healing properties, especially given the bodily discomfort he and his wife often experienced after performing

20 Dongjuma, *Wonderwerken der natuur*, 12; Roderick Home, 'Nollet and Boerhaave: A note on eighteenth-century ideas about electricity and fire', *Annals of Science* 36:2 (1979) 173-174. DOI: <https://doi.org/10.1080/00033797900200471>.

21 Dongjuma, *Wonderwerken der natuur*, 25.

22 John Wesley, *The desideratum: or, electricity made plain and useful* (London: Bailliere, Tindall, and Cox 1760) v.

23 Gaubius and Allamand, 'Bericht der Geneezinge', 487-490.

24 'Comme plusieurs Médecins ont eu recours à l'électricité pour la cure de plusieurs maladies, & qu'ils ont cru que cette méthode de guérir seroit fort avantageuse dans plusieurs cas désespérés, & que bien plus ils lui ont attribué plusieurs succès; j'ai voulu éprouver la vérité de ce fait, sachant combien on a coutume d'abuser de la

electrical experiments, with aches and nausea usually lasting for more than 24 hours. He recalled that on three separate occasions around 1749, he was asked to electrify someone in order to heal them. None resulted in success. One of the paralysed patients did not respond to the drawing of sparks over a period of two months, whereas – Van Musschenbroek bitterly noted – other people present did respond to electrification.²⁵ He was a sceptic, not because he objected to the treatment of patients with electricity, but because he did not experience the same degree of success claimed by others.

Two decades after the first Dutch patient was treated with electricity, the few who commented on it made disparate claims about its efficacy. Such findings rested predominantly on limited personal anecdotes and speculation. Up to the mid-1770s, electrotherapy remained a peripheral topic of interest, even whilst rapidly gaining popularity in neighbouring countries. It is in this decade, however, that we see a clearer outline of electrotherapy starting to take shape.

Outlining medical electricity

In the 1771 entry on electricity in Egbert Buys' scientific dictionary, *Nieuw en volkomen woordenboek van konsten en wetenschappen*, its medical applications are only included as an afterthought. The entry casts doubt on the efficacy of electrotherapy, but notes that the pervasiveness of electricity in human bodies suggests it may at some point become useful, pointing towards a few individuals across Europe who have started to show limited success treating paralysed or lame patients.²⁶ By the end of the decade, these limited successes had expanded into a large corpus of case studies, allowing practitioners to make more confident statements on the efficacy of electrotherapy. Three of the most prominent authorities, known in the Republic and abroad, who helped compile this corpus and used it as the foundation for electrotherapeutic theory and practice, were the mentioned Jan Rudolph Deiman, Willem van Barneveld, and Adriaan Paets van Troostwijk. All three published handbooks for a general audience on medical electricity, in which they downplayed its status as a panacea. Drawing from various case studies, they defined ways in which medical electricity worked well and identified a range of diseases that it could treat, thereby also 'rescuing' its respectability.²⁷ Their publications, in which they outlined the value and practice of electrotherapy, were built on decades of medical and electrical research. Examining how they outlined medical electricity helps us understand how electricity became medicalised.

crédulité & de la confiance du public, pour lui tirer son argent'. Petrus van Musschenbroek, *Cours de physique expérimentale et mathématique* I. Translated by Joseph-Aignan Sigaud de la Fond (Paris: Bauche 1769) 428.

25 Van Musschenbroek, *Cours de physique expérimentale et mathématique* I, 429.

26 Egbert Buys, *Nieuw en volkomen woordenboek van konsten en wetenschappen* III (Amsterdam: S. J. Baalde 1771) 539.

Already in the 1740s, the effects of electricity on the human body were linked to the notion of a vital principle (the hypothetical life force that only living things possessed). This was becoming a popular topic of interest in the mid-eighteenth century. The influential Dutch scholar Wouter van Doeveren (1730-1783) based his understanding of the vital principle on the idea of irritability (*prikkelbaarheid*), and by virtue of electricity's ability to cause irritation it became closely associated with this life force.²⁸ Reflecting on this early association, the botanist and anatomist Adolf Ypey (1749-1820), who wrote a prize-winning essay on the vital principle, commented that this belief was fairly reasonable: electricity was observed to be subtle, quick, and produced tingling sensations.²⁹ The early 1750s saw a vogue for electrical experimentation in Europe, which were reported on in numerous newspaper articles from across the continent. In the Republic specifically, researchers from various backgrounds looked closely at the irritable effects of electricity on the body, especially the contractions of blood vessels and muscle tissue caused by electric sparks.³⁰ The science of medical electricity became intimately connected to the science of irritability. This connection lies at the heart of Paets van Troostwijk and Cornelis Rudolphus Theodorus Krayenhoff's (1758-1840) *De l'application de l'électricité à la médecine* ('On the application of electricity to medicine', 1788): 'the electric fluid, in whatever way it is administered, affects by irritation the vital principle of the animal body'.³¹

This period of investigation also coincided with heightened interest in practical forms of medicine in the Republic, championed by the prominent physician Petrus Camper (1722-1789). Drawing from Newtonian natural philosophy, Camper believed observation to be the foundation of knowledge and encouraged his students and other physicians to approach and examine illnesses using the senses, rather than thinking about the nature or *prima causa* of the illness.³² Academics like Van Doeveren and Camper were inspired by the surgical school of Paris, which sought to bridge the gap between 'craft and

27 Hochadel refers to a similar 'rescuing' of respectability amongst German practitioners. Hochadel, 'The practice of medical electricity', 74.

28 Frank Huisman, 'Medicine and healthcare in the Netherlands, 1500-1800', in: Klaas van Berkel, Albert van Helden, and Lodewijk Palm (eds.), *A history of science in the Netherlands: survey, themes, and reference* (Brill 1999) 267; Sturkenboom, *Spectators van hartstocht*, 249.

29 Adolf Ypey, *Antwoord op de vraag: Hangt het lighamelijk levensbeginsel (Vita Corporea) der dieren in zyn bestaan [...] daaruit te trekken?* (Rotterdam: Reinier Arrenberg 1783) 116.

30 Paets van Troostwijk and Krayenhoff, *De l'application*, 155-156.

31 'Le Fluide électrique, de quelque manière qu'on l'administre, affecte par irritation le principe vital du corps animal', cited in: Paets van Troostwijk and Krayenhoff, *De l'application*, 205.

32 Huisman, 'Medicine and healthcare', 270-271; Jan Klaas van der Korst, *Het rusteloze bestaan van dokter Petrus Camper (1722-1789)* (Springer Science & Business Media 2008) 35, 232-233. DOI: <https://doi.org/10.1007/978-90-313-6617-0>.

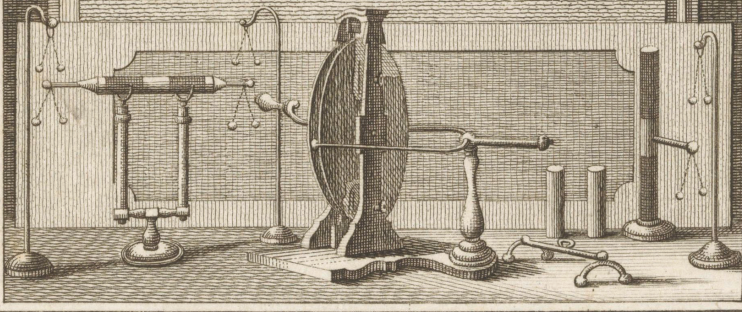
NATUUR GAAT VÓÓR,
KUNST VOLGT.

GENEESKUNDIGE
ELECTRICITEIT,

door

WILLEM VAN BARNEVELD.

*Lid van het
Provinciaal Genootschap
te V T R E G H T.
der Maatschapye
van den Land-bouw,
en APOTHECAR
Te Amsteldam.*



G. Philips jr.

TE AMSTELDAM
BY J. B. ELWE EN D. M. LANGEVELD
MDCCLXXXIX.

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academic surgery', and emphasised the practical aspects of healing.³³ As such, physicians became increasingly engaged in practical medicine like surgery during this period, challenging the traditional boundaries between academic physicians and practical healers.³⁴ This environment likely helped to open the way for electricity – which was understood primarily through tactile interaction and empirical experimentation – to enter the materia medica.³⁵

The theory of medical electricity which Deiman, Van Barneveld, and Paets van Troostwijk outlined, incorporated both older and contemporary medical theories. Its central component remained the humoral notion that motion of bodily fluids was critical to life, with stagnation being a cause of illness. In this context, electricity could enhance the working of the vital principle, increase blood circulation and perspiration (*uitwaaseming*), and cause shocks which could dislodge internal blockages.³⁶ But emerging neurophysiological concepts were also incorporated into this framework. For example, Deiman, Van Barneveld, and Paets van Troostwijk unanimously believed that electric fluid moved through the nervous system, claiming nerves conducted electricity as well as metals do, based on the results of the research frenzy of the 1750s and 1760s.³⁷ With this knowledge in mind, practitioners could employ theory-led therapeutic interventions. Electricity would, for instance, be most useful in treating illnesses caused by a retarded circulation (through obstruction or coagulation) of the vital principle as it

33 Frank Huisman, 'Civic roles and academic definitions: the changing relationship between surgeons and urban government in Groningen, 1550-1800', in: Hilary Marland and Margaret Pelling (eds.), *The task of healing: medicine, religion and gender in England and the Netherlands, 1450-1800*. Pantaleon 24 (Erasmus Publishing 1996) 86.

34 Huisman, 'Medicine and healthcare', 271-277.

35 Joost Vijselaar argues the same for animal magnetism, which started to become popular near the end of the period under examination. Joost Vijselaar, 'The reception of animal magnetism in The Netherlands', in: Leonie de Goei and Joost Vijselaar (eds.), *Proceedings of the 1st European Congress on the History of Psychiatry and Mental Health Care* (Erasmus Publishing 1993) 32.

36 Jan Rudolph Deiman and Adriaan Paets van Troostwijk, *Antwoord op de vraag: Welken invloed heeft de natuurlijke electriciteit en derzelver verschillende verdeeling [...] bedienen?* (Rotterdam: Dirk en Ary Vis 1787) 102-107; Paets van Troostwijk and Krayenhoff, *De l'application*, 205. The unblocking potential of electricity was well-known at the time. John Birch, *Considerations on the Efficacy of Electricity in Removing Female Obstructions* (London: T. Cadell 1779); Benjamin Martin, *The young gentleman and lady's philosophy* III (London: W. Owen and the author 1782) 261.

37 Sturkenboom, *Spectators van hartstocht*, 260; Deiman, *Geneeskundige proeven*, 3; Van Barneveld, *Geneeskundige electriciteit* I, 61-72; Paets van Troostwijk and Krayenhoff, *De l'application*, 154.



Figure 2 Frontispiece for Willem van Barneveld, *Geneeskundige electriciteit* (Amsterdam 1789), made by Caspar Philips Jansz., Rijksmuseum Amsterdam, object number RP-P-1982-1026, <http://hdl.handle.net/10934/RM0001>.

flowed through the nerves, an inhibition of perspiration, or illnesses caused by certain fluids being in the wrong place.³⁸ These categories were generally further divided into specific types of disease on a case-by-case basis. It is worth noting here that mental afflictions such as madness or melancholy were not (yet) included in these lists of disease types curable by electricity. However, the Dutch physician Jan Ingenhousz (1730-1799) did discuss this possibility in his correspondence with Franklin during the 1780s.³⁹

Figure 2 depicts the frontispiece of Van Barneveld's *Geneeskundige electriciteit* [Medical electricity] (1785-1789), which alongside his discussion of theory and procedure also includes numerous accounts of his electrotherapeutic treatments. Volume two lists 46 patients, of whom he claimed that he fully healed twenty, partially healed eleven, was unable to heal ten, and that five left him before treatment was completed.⁴⁰ A self-declared success rate – if we consider success to be complete recovery – of less than 50 percent for one of the country's foremost practitioners reveals the extent to which this remedy was by no means infallible. In fact, Van Barneveld concluded his work by expressing how he hoped his record of failures would help inform the public of the limitations of this kind of treatment.⁴¹ He was not the only practitioner to justify the importance of reporting failed trials. The London-based electrician Tiberius Cavallo, for instance, also noted in 1780 that 'in order [...] to give a proper estimate of the efficacy of a remedy, it is necessary to shew the proportion between the successful, and the unsuccessful trials; without being amazed at one case, and neglecting many others'.⁴² Van Barneveld's failures underline the fact that treatment was never certain to yield results, regardless of the practitioner's experience. This in a sense helped protect electrotherapy as a practice, since failures could be explained as being largely the fault of the insufficiently-trained practitioner, or of the inevitable variability between patient bodies, but not of the remedy itself. This is made evident in a passage recalling a mistake Van Barneveld made in 1777:

I admit freely, that at the time, due to lack of practice, I did not have enough knowledge to administer the required amount of electricity based on the circumstances in which the patient found themselves: [knowledge of, FW] the

38 Deiman, *Geneeskundige proeven*, 12; Paets van Troostwijk and Krayenhoff, *De l'application*, 209-210; Deiman and Paets van Troostwijk, *Antwoord op de vraag*, 107-130.

39 Sherry Ann Beaudreau and Stanley Finger, 'Medical electricity and madness in the 18th century: the legacies of Benjamin Franklin and Jan Ingenhousz', *Perspectives in Biology and Medicine* 49:3 (2006) 330-345. DOI: <https://doi.org/10.1353/pbm.2006.0036>.

40 Volume three lists more treatment accounts with a similarly mixed bag of results, but these were less detailed. Willem van Barneveld, *Geneeskundige electriciteit* III (Amsterdam: J.B. Elwe and D.M. Langeveld 1789).

41 Van Barneveld, *Geneeskundige electriciteit* III, 191.

42 Tiberius Cavallo, *An essay on the theory and practice of medical electricity*. Second edition (London: Tiberius Cavallo 1781) 55.

use of electricity on the human body is best acquired through experience; and since many lack this, even if they have an advanced knowledge in this branch of physics, this explains why often things go wrong, and many experiments fail [...].⁴³

Van Barneveld and his peers maintained that the most reliable way to determine the efficacy of medical electricity was by experiment. Together they therefore gathered a plethora of reports – over three hundred individual case studies – which in turn were collected by other practitioners from across the continent. This emphasis on reliable experiences relates to the importance practitioners ascribed to observational data and case studies to inform theory, but also arises from a history of contested authority and distrust across Europe with regard to electricity. For the German states, Hochadel has shown how electricians bemoaned the fact that many untrained hands were unsuccessfully treating people with electricity, providing fodder for medical electricity's critics.⁴⁴ Similarly, Van Barneveld commented that electricity was being used with far too much indifference by both 'noble and ignoble' people as a remedy.⁴⁵ He admitted many accounts rightfully elicit doubt, particularly those by the French electrician Pierre Bertholon de Saint Lazare (see Figure 3), whose often exalted claims Van Barneveld denounced as mere 'trifles' (*beuzelaryen*).⁴⁶ The Amsterdam doctor Jan Petersen Michell echoed this sentiment, writing to Van Barneveld that although electricity was beneficial in many cases as a cure, it could be considered 'poison' in the hands of an untrained practitioner, and should sometimes not be used at all even by a trained practitioner.⁴⁷ Paets van Troostwijk and Krayenhoff similarly argued that the '*charlatanerie*' of certain Italian physicians did more harm than good to the prospect of medical electricity in its early years, because they stifled more pragmatic approaches to its potential uses, delaying useful studies.⁴⁸ Overall, a great deal of effort was made by Deiman, Van Barneveld, and Paets van Troostwijk in distinguishing 'good' and 'bad' practices, within and outside the Republic.

43 'Ik beken gaarne, dat ik destyds, door gebrek aan oefening, geen doorzicht genoeg had, om met het vereischte overleg de electriciteit toetediene, naar den toedragt der omstandigheden, waarin de zieken zig bevonden; het gebruik van de electriciteit op het menschlyke lichaam, wordt best door ondervinding verkreegen; en alzo die aan veelen ontbreekt, schoon anders verre gevorderd in deezen tak van Natuurkunde, is dat dikwyls een reden, dat het niet naar behooren geschiedt, en dat veelal

de proeven niet slaagen'. Willem van Barneveld, *Geneeskundige electriciteit II* (Amsterdam: J.B. Elwe and D.M. Langeveld 1785) 312.

44 Hochadel, 'The practice of medical electricity', 74.

45 Van Barneveld, *Geneeskundige electriciteit I*, 54.

46 Van Barneveld, *Geneeskundige electriciteit I*, 56-57.

47 Van Barneveld, *Geneeskundige electriciteit I*, 104-106.

48 Paets van Troostwijk and Krayenhoff, *De l'application*, 153.

Instrument makers were key figures in the early development of electrical science, and this was no different in the Republic. The English-born instrument maker John Cuthbertson (1743-1821) was particularly influential in shaping Dutch medical electricity, and worked closely with Deiman, Van Barneveld, and Paets van Troostwijk. Soon after coming to Amsterdam in 1768, he introduced the superior English glass-disc design to the Dutch electrostatic generator market (see the machine on the table in Figures 4-6), which quickly replaced the globe and cylinder designs in use at the time.⁴⁹ His machines dominated the market for electrical instruments during the 1770s and 1780s, furnishing many prominent physical cabinets.⁵⁰ The large electrostatic generator he made for Teylers Museum in Haarlem (still the largest flat-plate static-electricity generator in the world) is arguably the museum's most famous showpiece since its creation and continues to attract visitors to this day.⁵¹ In addition to making instruments, Cuthbertson was also known for writing on the topic of electricity. He translated Joseph Priestley's influential *History and present state of electricity* (1769) into Dutch in 1773, and he produced a text on electrical theory and practice in 1782, *Algemeene eigenschappen van de electriciteit* [*General properties of electricity*], structured mainly around experiments and apparatus.⁵²

Despite mentioning the medical applications of electricity only sporadically in this work, and despite not practicing a medical vocation, Cuthbertson became a lynchpin in the medical electrical community by virtue of his extensive knowledge of electricity and skill in instrument making. Van Barneveld firmly endorsed the latter in his *Geneeskundige electriciteit*, writing that the instrument maker 'has excelled in the making of electrical machines for several years'.⁵³ In practical terms, the considerable size of the generators that Van Barneveld and Paets van Troostwijk prescribed for treatment favoured Cuthbertson's business, as he was known for making large machines. According to Deiman, Cuthbertson even administered treatment by himself to a girl with menstruation problems, and we know that Cuthbertson referred at least one patient to Van Barneveld, suggesting that the instrument maker

49 Peter de Clercq, 'The instruments of science: the market and the makers', in: Berkel, Helden, and Palm (eds.), *A history of science in the Netherlands*, 319; Willem Dirk Hackmann, *Electricity from glass: the history of the frictional electrical machine, 1600-1850*. Science in history 4 (Sijthoff & Noordhoff 1978) 147.

50 Willem Dirk Hackmann, *John and Jonathan Cuthbertson: the invention and development of the eighteenth century plate electrical machine* (Rijksmuseum voor de Geschiedenis der

Natuurwetenschappen 1973) 30; Hackmann, *Electricity from glass*, 156-161; De Clercq, 'The instruments of science', 320.

51 In total Cuthbertson supplied 12,000 guilders worth of equipment to the museum. Hackmann, *Electricity from glass*, 155.

52 John Cuthbertson, *Algemeene eigenschappen van de electriciteit, onderrichting van de werktuigen en het neemen van proeven in dezelve* (Amsterdam: Pieter Hayman 1780).

53 Van Barneveld, *Geneeskundige electriciteit* 1, 5.

may have been approached by members of the public seeking medical help or advice, possibly on the merit of his knowledge of electricity alone.⁵⁴ That an individual with no known medical training or institutional academic affiliation could become a key figure in the Dutch electrotherapeutic community shows us how closely linked theoretical, material, and commercial knowledge was at the time.

By the end of the 1780s a set of systematic electrotherapeutic procedures had been defined. Six different types of treatment had replaced the three existing types to date. These treatments ranged in increasing severity from positive and negative baths, to electric sparks, prickles, streams, and shocks.⁵⁵ Van Barneveld's book provides a comprehensive overview of these methods in visual form through three plates (see Figures 4-6).⁵⁶ The right amount of electricity supplied to the patient in each type of treatment depended on a multitude of factors, such as age, sex, and body structure.⁵⁷ It was impossible to determine beforehand the dosage required for each patient, hence the efficacy of treatment rested in large part on the practitioner's gestural and practical expertise, as is emphasised in Van Barneveld's admission of failure above. A number of guidelines, however, had to be respected at all times: the strength of the electrification always needed to be proportional to the severity of the disease (starting low and gradually building up strength); practitioners had to be aware that the patient's condition could worsen during treatment and had to react accordingly; and short but regular sessions of no longer than thirty minutes and with a frequency of two or three times a day were preferred over longer sessions to prevent exhaustion for the patient and practitioner alike.⁵⁸ Treatment was indeed often a long and laborious commitment for both individuals, lasting weeks if not months. This reality of electrotherapy could not have been more distant from the claim made in 1760 by Wesley, who deemed electricity to be an 'unexpensive and speedy Remedy [...] Restoring them to Ease, Health, Strength, generally in a few Minutes, frequently in a Moment!'.⁵⁹ That electric treatment lasted for so long

54 Deiman, *Geneeskundige proeven*, 15; Van Barneveld, *Geneeskundige electriciteit* II, 331.

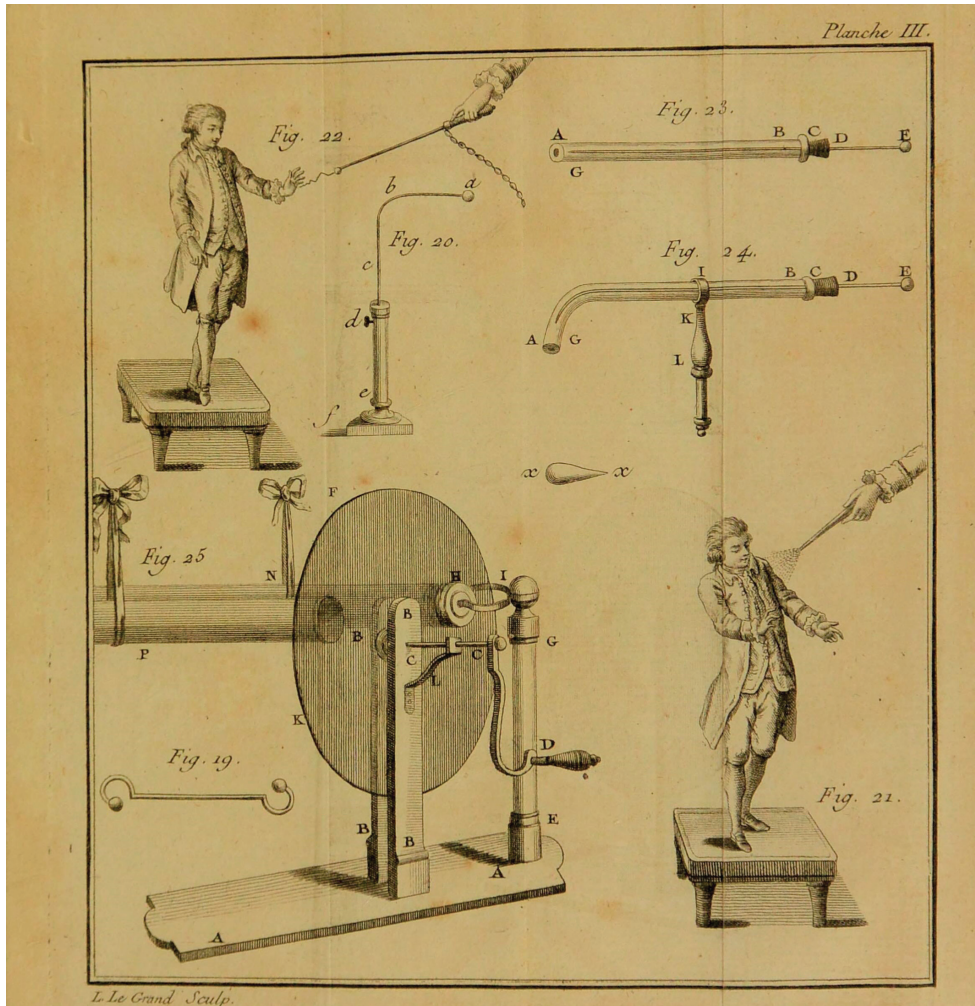
55 Van Barneveld, *Geneeskundige electriciteit* I, 107-111; Deiman and Paets van Troostwijk, *Antwoord op de vraag*, 131-133. A similar division of treatment techniques can be seen in George Adams, *An essay on electricity, explaining the theory and practice of that useful science; and the mode of applying it to medical purposes*. Second edition (London: George Adams 1785) 333-341.

56 Roberts offers an analysis of the visual iconography in these plates. See Roberts, 'Science becomes electric', 706.

57 Van Barneveld, *Geneeskundige electriciteit* I, 98; Deiman and Paets van Troostwijk, *Antwoord op de vraag*, 133.

58 Deiman and Paets van Troostwijk, *Antwoord op de vraag*, 146-148. In a similar vein Wesley included two guidelines in his *Desideratum*, namely that shocks should not be too powerful at first and shocks to particular body parts are preferred over shocks to the whole body. Wesley, *Desideratum*, 71.

59 Wesley, *Desideratum*, vi.



▲
Figure 3 L. le Grand, Plate III from Pierre Bertholon, *De l'électricité du corps humain dans l'état de santé et de maladie* (Paris: P.F. Didot le jeune 1780). Wellcome Collection, London.

was essentially built into these guidelines, with Deiman recommending that increases in severity – moving from electric sparks to shocks for example – should only be made after several days of no results, ensuring that the pace of electrical treatment remained relatively slow.⁶⁰ An underlying motivation for this convention would almost certainly have been the desire not to cause undue harm to the patient, which might discredited the practice. Like the acknowledgement of electrotherapy's fallibility, the extension of treatment over long periods of time was ultimately designed to help protect the practice.

Concurrent with the development of procedures in the 1780s was the development of specific tools, prominently displayed in Figures 4-6. Rather than being simply repurposed from experimental or show electrical apparatus as early electrotherapeutic tools often were, these instruments were made with specific theory and procedure in mind, thereby representing in a sense the material manifestation of medicalisation. Van Barneveld in particular provided detailed descriptions of the quality, materials, and dimensions of all the components he used, noting for example how he had Leyden jars of at least seven different sizes, with each producing sparks of different strengths, or how he used small, custom-made wooden blocks of exact lengths between three and twelve inches to precisely measure the distance between discharging points.⁶¹ At his disposal were also a number of different discharging rods, each made with varying lengths, tips, and materials. These differences helped administer particular types of treatment. Note, for example, how in Figure 3 the rod in the top-left corner has a metal, spherical tip, better for delivering electric shocks, whereas the rod in the bottom-right corner has a pointed end, better for delivering a stream of electricity. When streams delivered from metal tips were too weak, they could be replaced by wooden ones.⁶² Van Barneveld and his peers also specified that larger machines generated a more consistent stream of electricity than smaller ones, recommending machines with two discs of at least eighteen inches in diameter.⁶³ Any smaller size would not be able to affect all types of electrification. This ensured that Dutch practitioners following these handbooks did not adopt the peripatetic style of treatment like Wesley in England, who mostly used small, portable machines.⁶⁴ Indeed, portable machines are never mentioned by Deiman, Van Barneveld and Paets van Troostwijk, making it unlikely that Dutch practitioners travelled much to see their patients. This is one way in which the materiality

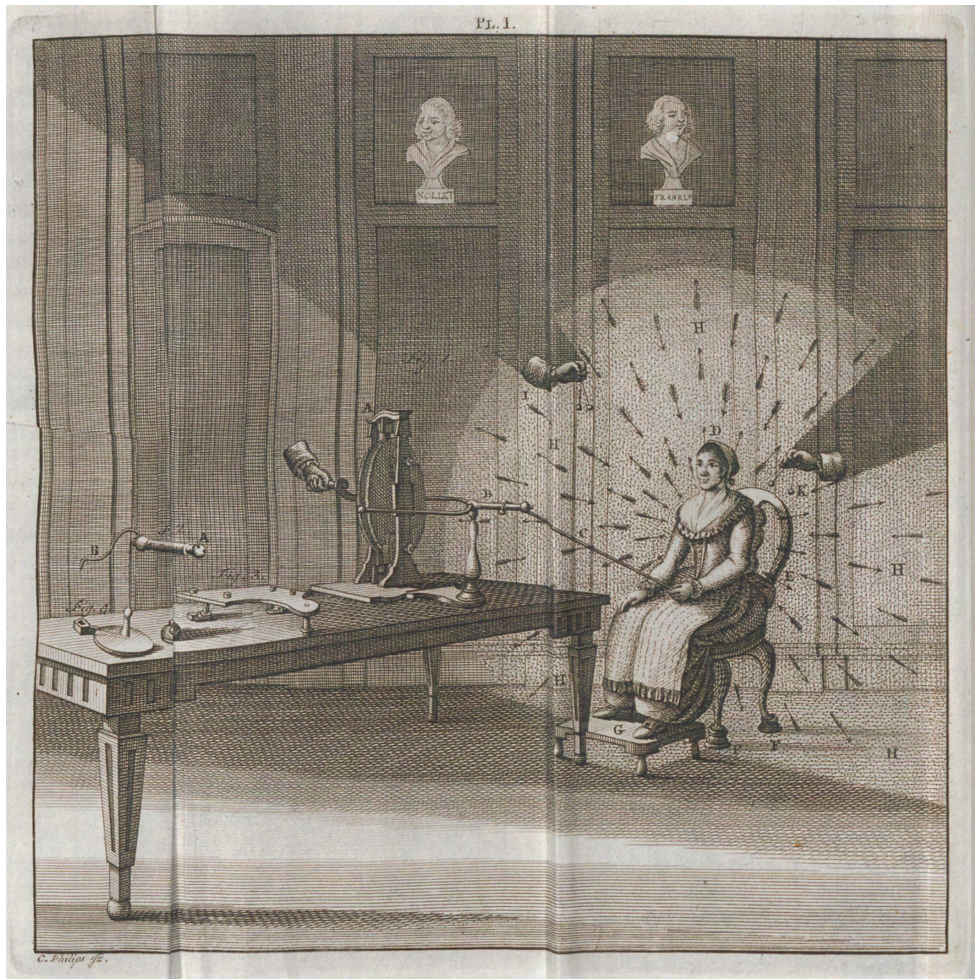
60 Deiman, *Geneeskundige proeven*, 14. Gentle procedures were also recommended by Cavallo and Franklin. Rowbottom and Susskind, *Electricity and medicine*, 24; Beaudreau and Finger, 'Medical electricity and madness', 343.

61 Van Barneveld, *Geneeskundige electriciteit* 1, 5-12.

62 Martin, *The young gentleman* III, 261.

63 Deiman and Paets van Troostwijk, *Antwoord op de vraage*, 133; Paets van Troostwijk and Krayenhoff, *De l'application*, 283.

64 Hackmann, 'The medical electrical machines', 269-274.



▲
 Figure 4 Caspar Philips Jansz., Plate I in Willem van Barneveld, *Geneeskundige electriciteit* (Amsterdam: Jan Barend Elwe and Dirk Meland Langeveld 1789). Universiteitsbibliotheek Amsterdam, <https://resolver.kb.nl/resolve?urn=dpo:903:mpeg21:0156>.

of treatment fundamentally shaped the practice in the Republic, and vice versa.

Superficially, these handbooks detailing instructions for how to electrify patients read like do-it-yourself manuals. But alongside providing a standardised body of knowledge for practitioners and even other members of the public to refer to, I believe the primary intention of these authors was to strengthen their claims to authority over medical electricity, in very much the same way historian of science Steven Shapin describes how natural knowledge was transferred from the private to the public sphere in seventeenth-century England.⁶⁵ In the Republic, electrical treatment was administered almost exclusively in private spaces (such as the practitioner's home), witnessed by limited audiences. For practitioners, publicising the apparatus, gestures, and techniques was a means of communicating their expertise and reliability to the public, allowing anyone to become 'virtual witnesses' to this form of treatment.⁶⁶ Through these texts practitioners could be seen to move between spaces of public knowledge and private practice, which was particularly important in the Republic. Although the methods of electrification are similar and drawn from the same body of theory, there is no evidence to suggest electrotherapy was as visible to the Dutch public as it was to English audiences.⁶⁷ Nor was there a central, reform-oriented institution like the Royal Society of Medicine in France where electrotherapeutic knowledge was openly discussed, ratified, and disseminated, providing an authoritative environment for French practitioners to operate in.⁶⁸ Indeed, as Zanetti argues, 'in France, the history of medical electricity is closely linked to that of the Royal Society of Medicine'.⁶⁹ Although Dutch practitioners were engaged in various scientific societies, evident in the fact that Deiman and Paets van Troostwijk's 1787 publication was a prize essay submission, the authority of their electrotherapeutic theory and practice lay primarily in the individual and their gestural knowledge and experience. As we will see below, access to this knowledge was gained through individual engagement with these authors or their publications, with little evidence of there having been public electrotherapeutic demonstrations in society lecture halls. This may

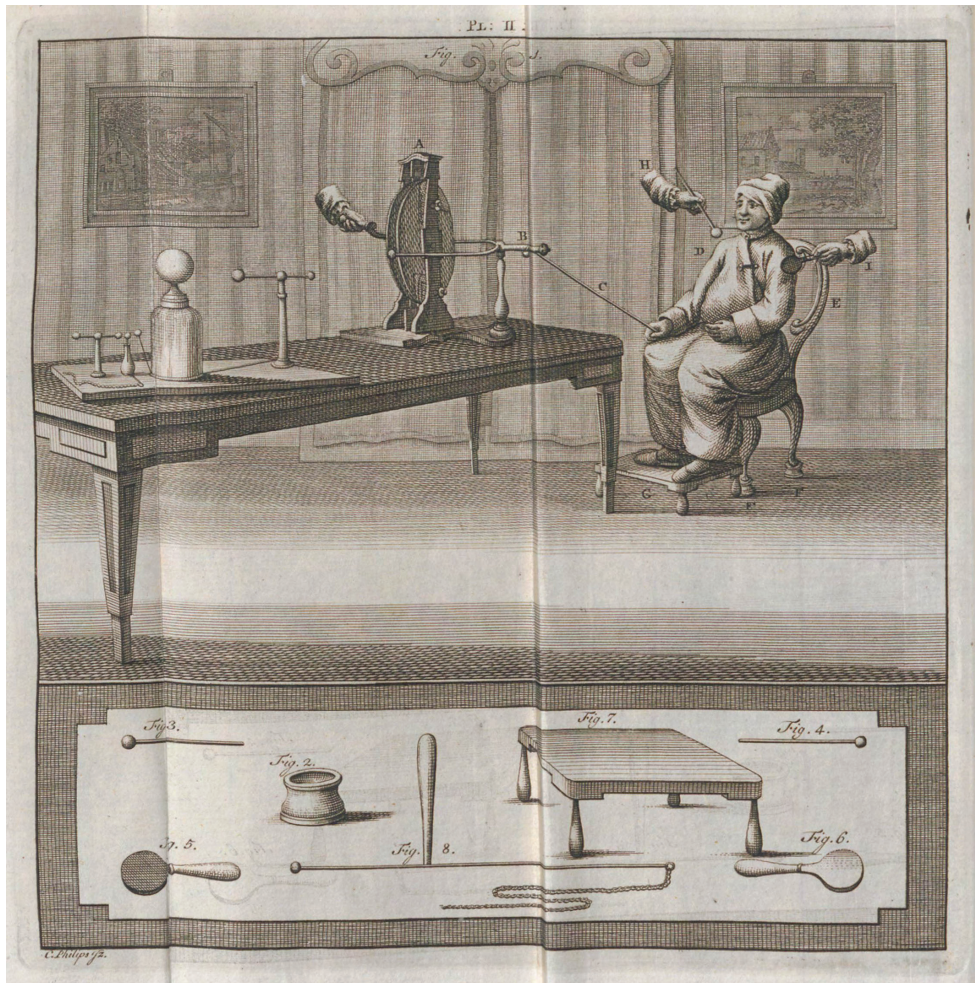
65 Steven Shapin, 'The House of Experiment in Seventeenth-Century England', *Isis* 79:3 (1988) 373-404. DOI: <https://doi.org/10.1086/354773>.

66 Hochadel, 'The practice of medical electricity', 72; Paola Bertucci, 'Shocking Subjects: Human Experiments and the Material Culture of Medical Electricity in Eighteenth-Century England', in: Erika Dyck and Larry Stewart (eds.), *The Uses of Humans in Experiment* (Brill 2016) 137. DOI: https://doi.org/10.1163/9789004286719_006.

67 Willem Dirk Hackmann, 'The medical electrical machines of John Wesley and John Read', in: Marco Beretta, Paolo Galluzzi and Carlo Triarico (eds.), *Musa Musaei: Studies on Scientific Instruments and Collections in Honour of Mara Miniati* (Olschki 2003) 261-278.

68 Geoffrey Sutton, 'Electric Medicine and Mesmerism', *Isis* 72:3 (1981) 375-392. DOI: <https://doi.org/10.1086/352788>.

69 Zanetti, *L'Électricité médicale*, 237.



▲
 Figure 5 Caspar Philips Jansz., Plate II in Willem van Barneveld, *Geneeskundige electriciteit* (Amsterdam: Jan Barend Elwe and Dirk Meland Langeveld 1789). Universiteitsbibliotheek Amsterdam, <https://resolver.kb.nl/resolve?urn=dpo:903:mpeg21:0158>.

also reflect the decentralised nature of the Republic's scientific societies, especially in comparison with France, which many historians of Dutch science have noted.⁷⁰

Collaboration

Perhaps the best testament to the successful incorporation of electricity in the Dutch materia medica is the striking extent of doctor-practitioner collaboration, most clearly visible in Van Barneveld's *Geneeskundige electriciteit*. Tellingly, he dedicated the first volume to the Amsterdam doctor Jacob Hovius (1710-1786), who frequently appeared in his treatment accounts in an assisting function. The second volume mentioned over half a dozen other doctors by name, mainly practicing in the Amsterdam area, including the well-known professor of anatomy and surgery Andreas Bonn (1738-1817).⁷¹

At times, we get a glimpse of a doctor's active role in the treatment. In the account of patient five, brought to him by Hovius, Van Barneveld wrote that the doctor drew sparks from the patient's neck and forehead.⁷² Whilst treating another patient, 'Mr. Hovius, seeing that the patient became more pained as the treatment went on, gave her, an hour before electrification, a [...] few drops of *laudanum liquidum*, to test if the pain [...] would be prevented or diminished by it'.⁷³ Here the doctor actively administered conventional remedies during electrical treatment, showing how these two types of medical intervention could also be combined. In another case, a paralysed man was brought to Van Barneveld by one doctor Oosterdyk, who subsequently gave him instructions on how to electrify the patient.⁷⁴ A further healer, doctor Hartjens, continued assessing his patient during electrification, making the combined decision with Van Barneveld to halt treatment when the man's pain became too great.⁷⁵

With much medical electrical knowledge being public, sometimes a recognised electrotherapeutic practitioner was not even required for

70 Wijnand W. Mijnhardt, "'Het Volk van Nederland eischt verlichting": Franse hervormingsijver en Nederlandse wetenschapsbeoefening (1795-1815)', in: Willem Pieter Gerritsen (ed.), *Het Koninklijk Instituut (1808-1851) en de bevordering van wetenschap en kunst* (Koninklijke Nederlandse Akademie van Wetenschappen 1997) 11-37; Klaas van Berkel, 'Science in the service of the Enlightenment (1700-1795)', in: Berkel, Helden, and Palm (eds.), *A History of Science in the Netherlands*, 82-94.

71 The two doctors remain connected through the oldest anatomical collection in Amsterdam,

started by Hovius and expanded by Bonn, on display in Museum Vrolik.

72 Van Barneveld, *Geneeskundige electriciteit* II, 184.

73 'liet de Heer HOVIUS, ziende dat de patiente hoe langer hoe aandoenlyker werd voor de electrike vloeistof, haar, een uurtje vóór de electriseering, [...] eenige droppels *laudanum liquidum* gebruiken, om te beproeven, of de aandoeningen [...] daardoor zouden kunnen voorgekomen, of verminderd worden'. Van Barneveld, *Geneeskundige electriciteit* II, 163-164.

74 Van Barneveld, *Geneeskundige electriciteit* II, 284.

75 Van Barneveld, *Geneeskundige electriciteit* II, 347-348.



▲
 Figure 6 Caspar Philips Jansz., Plate III in Willem van Barneveld, *Geneeskundige electriciteit* (Amsterdam: Jan Barend Elwe and Dirk Meland Langeveld 1789). Universiteitsbibliotheek Amsterdam, <https://resolver.kb.nl/resolve?urn=dpo:903:mpeg21:0160>.

treatments to take place, as doctors experimented with the treatment themselves or advised others. One striking account is given by Jean-Jacques Poncelet, a friend of Van Barneveld's, who owned an extensive collection of electrical instruments and toys. Defying his family doctor's advice, he used his own equipment and a copy of Deiman's *Geneeskundige proeven* to attempt to treat his spasmodic daughter in late 1780. Seeing no improvement after ten days, he enlisted the help of Bonn, who promptly observed that he was using too much electricity and was not applying it in the correct areas. Under Bonn's supervision, his daughter recovered after three months of treatment.⁷⁶ A similar account of someone putting Deiman's book to practical use is provided by the Haarlem doctor Willem Brouwer Bosch, who in 1781 reported in a popular literary magazine that he cured an elderly man of urinary incontinence using electricity as a last resort remedy. Again, following Deiman's book, he treated his patient for four weeks using electric shocks, taking careful note of the man's responses to the treatment.⁷⁷ Another account is given by Johannes Beeldsnyder, an Amsterdam magistrate and member of the city's Old Council, who probably owned his own electrical machine and sometimes electrified himself for ailments like the common cold – with little success. In this account, Beeldsnyder recalled being approached by a young man suffering from lame limbs, who had been advised by his doctor to be electrified after all conventional remedies failed. Given the severity of the case, Beeldsnyder asked this doctor to advise him during the treatment. Over the subsequent weeks the two men administered increasingly severe forms of treatment, but the patient showed no signs of improvement and the procedure was halted.⁷⁸ These accounts show how the practice of electrotherapy was open to the initiative of medical experts as well as amateur electricians, reinforcing the notion that medical electricity's intellectual and practical boundaries were porous.

Importantly, this extent of collaboration is not at all self-evident. Wesley, a self-declared man of the people, believed doctors in England were far too self-interested to incorporate electricity in their medical toolkit, and was convinced that its expeditious and inexpensive nature was in contradiction with the medical establishment's greed. He boldly predicted that by the end of the century, electricity would cure more people in one year than the entire English materia medica.⁷⁹ In German-speaking Europe, many itinerant lecturers and amateur practitioners claimed to always have a physician present during treatments; Hochadel suggests this was a precautionary measure rather

76 Van Barneveld, *Geneeskundige electriciteit* II, 378-386.

77 Willem Brouwer Bosch, 'Natuur- en geneeskundige waarneeming aangaande eene tegennatuurlyke en onwillige aflooping van de pis, door de electriciteit geneezen. Door Willem

Brouwer Bosch, *Med. Doct.*, *Vaderlandsche Letteroefeningen* (1781) 428-432.

78 Brouwer Bosch, 'Natuur- en geneeskundige waarneeming', 373-377.

79 Wesley, *Desideratum*, vi.

than a demonstration of genuine or equal collaboration.⁸⁰ The overwhelming majority of Van Barneveld's patients, on the other hand, were actually referred to him by a physician, sometimes even by multiple physicians. We clearly see the symbiotic relationship between electricians and doctors not just in practice, but also in theory. Deiman, one of the most respected doctors in Amsterdam, remarked that medical electricity was not only a matter of interest to natural philosophers, but particularly so for practitioners of medicine, 'who, experienced in this part of physics (*natuurkunde* FW), are best placed to investigate what the true effects of electricity on the human body are [...] and in which circumstances electricity can be used as a remedy on the human body'.⁸¹ Evidently, electricity had found a place in the Dutch *materia medica*, even if only a limited one, as suggested above by the uses of electricity as a last resort. The common narrative advanced by historians such as Paola Bertucci and Giuliano Pancaldi – that electrotherapy lacked a recognised field of expertise within the medical profession far into the nineteenth century, and that practitioners therefore battled to preserve their niche – obscures the fact that legitimate and productive collaboration was occurring between electricians and physicians by the end of the eighteenth century.⁸²

Conclusion

When it first entered the Dutch public sphere, the medical value of electricity was contested and unclear. By the end of the 1780s, a dominant theory of medical electricity had been defined, which was built on empirical case studies from across Europe and North America, along with guidelines for electrotherapeutic procedures and a set of standardised tools and instruments. This transformation may be understood as the medicalisation of electricity and occurred all across Europe and North America during the second half of the eighteenth century. How this transformation materialised, however, also depended on local factors. Historians have addressed these factors by exploring how electrotherapy took hold in French, English, and German contexts; in this entangled history we can now identify the shape of Dutch medicalisation.

Contrary to Roberts' statement that 'important treatises on the subject appeared throughout the second half of the century', we see that in the Republic, authoritative works on medical electricity only started to

80 Hochadel, 'The practice of medical electricity', 82.

81 '[de beoefenaars der Geneeskunde] die, ervaaren in dit gedeelte der Natuurkunde, het beste in staat zyn, om te onderzoeken: welke de eigenlyke uitwerkselen der Elektriciteit op het menschelyk

Ligchaam zyn, [...] en in welke omstandigheden de Elektriciteit als een geneesmiddel op het menschelyk Ligchaam kan aangewend worden', Deiman, *Geneeskundige proeven*, 2.

82 Bertucci and Pancaldi, 'Introduction', in: Bertucci and Pancaldi (eds.), *Electric bodies*, 14.

appear in the late 1770s and 1780s.⁸³ These works situated medical electricity in the frameworks of new and existing medical theories, acknowledged its limitations and the importance of the practitioner's expertise, and defined standardised equipment and procedures which complemented the theory and helped 'protect' the practice. A notable feature of Dutch electrotherapy was the extent of practitioner-physician collaboration, as well as the private nature of these treatments. Rather than through public demonstrations, as was for instance the case in England and Germany, Dutch practitioners shared their experiences through individual publications, allowing readers to virtually witness treatments carried out in the privacy of practitioner's homes – necessitated in part by the types of large machines used in the Republic. Electrical equipment still required purchasing, but in theory anyone with the means and a copy of an electrotherapeutic handbook could start practicing. That some individuals acted on this is evident in the cases of Poncelet, Bosch, Beeldsnyder, and probably many more.


Although I have focused on the medicalisation of electricity in the Dutch Republic during the eighteenth century, these processes are ultimately part of a wider history and therefore not specific to this place nor even this time. Looking at Victorian Britain in the latter half of the nineteenth century, Iwan Rhys Morus has shown how British electrotherapists and commentators sought to bolster the status of Victorian electrotherapy. They presented the practice as 'unsystematic and empirical' – meaning it was practiced by trial and error – up until the 1830s, when it began its transformation into a robust science. They aligned themselves with physicists to ground their theory in contemporary physics, rationalised electrotherapeutic practice by rooting it in (physiological) experimentation, and used their connections with the electrical community to develop new and easy-to-use devices.⁸⁴ Clearly, these tactics were similar to those used by the likes of Deiman, Van Barneveld, Paets van Troostwijk, and Cuthbertson a century earlier – when medical electricity was still, according to these Victorian commentators, in its 'dark age'. Morus' assessment, that 'by the 1850s, doctors and natural philosophers were sharing a material and intellectual technology', could very well have applied to the Dutch Republic of the 1780s.⁸⁵ Regardless of its local shape, medicalisation ultimately remains a transnational phenomenon.

83 Roberts, 'Science Becomes Electric', 703.

History 36:1 (1992) 34-52. DOI: <https://doi.org/10.1017/S0025727300054612>.

84 Iwan Rhys Morus, 'Marketing the machine: The construction of electrotherapeutics as viable medicine in early Victorian England', *Medical*

85 Morus, 'Marketing the machine', 52.



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