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Changing objects of therapeutics – how neurasthenia affected scientific transfer between Germany and Sweden

Abstract

This paper discusses the transfer of knowledge between Germany and Sweden within the therapeutics of neurasthenia around 1900. The latter was a worldwide spread disease phenomenon and involved such a variance of symptoms that it is retrospectively considered a cultural condition that was strongly linked to medical fashions.

As causes of transfer and change in therapeutics, cultural movements have been little explored in research so far. Based on the analysis of transfers and an evaluation of medical objects, the following text aims to show the entanglement between Germany and Sweden on both a scientific and societal level as well as their impact on the therapy of neurasthenia. In the popularity of the Swedish medical treatment method of medicomechanics in Germany, this connection becomes particularly obvious. The enhancements and imitations of the objects used in mechanical gymnastics represent a scientific transfer on the level of medicine, which took place in parallel with cultural trends, political changes and technological knowledge.

The constant change which the objects of neurasthenia therapy were subject to, was marked by the paradoxical use of a technology-affine medicine to treat a technology-induced disease. With the rediscovery of naturopathic methods within the new body culture, however, the Zander

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apparatuses underwent an evolution. The Swedish objects have been adopted by users from merely medical technology into new contexts of action – for example, as tools for self-optimisation of the body.

Keywords: scientific transfer, circulation of knowledge, material culture, late 19th / early 20th century.

At the end of the 19th century, a disease phenomenon emerged in the western world that mainly manifested itself in nervous states of exhaustion and weakness, but whose former name is largely forgotten today – neurasthenia. Its manifold symptoms, ranging from general weakness to headaches, insomnia, impotence and digestive disorders, were interpreted as a psycho-somatic reaction to the upheavals of modernity.² This very non-specific diagnosis of neurasthenia made her extremely adaptable regarding social-cultural developments and contemporary medical fashions. It is therefore not surprising that neurasthenia was at the time a very common diagnosis in America and Europe across all social classes and was therefore widely discussed in medical circles and the population in general. In retrospect, neurasthenia is therefore considered not only a disease, but also a cultural condition. In the cultural movement of the fin de siècle, which was characterised by over-refined sensibility and weariness with life, it was considered quite chic in upper social circles to be a little neurasthenic.³

Faced with a mass phenomenon and in fear that the functional disorder could develop into a mental illness, scientists shared their knowledge about the disease and the used methods of treatment. Neurasthenia is therefore particularly suitable for demonstrating the entanglement

² Marijke Gijswijt-Hofstra and Roy S. Porter, eds., *Cultures of neurasthenia. From Beard to the First World War*, *Clio medica* 63 (Amsterdam, New York: Rodopi, 2001); Kristine Lillestøl and Hilde Bondevik, “Nevrasteni i Norge 1880–1920,” *Tidsskrift for den Norske laegeforening. Tidsskrift for praktisk medicin, ny raekke* 133 no. 6 (2013): 661–665.

³ Joachim Radkau, *Das Zeitalter der Nervosität. Deutschland zwischen Bismarck und Hitler* (München: Hanser, 1998); Heiner Fangerau, “Zwischen Kur und “Irrenanstalt”. Die “Volksnervenheilstättenbewegung” und die Legitimation eines staatlichen Sanatoriumsbetriebs am Beispiel der “Rasemühle” bei Göttingen” in *Abweichung und Normalität. Psychiatrie in Deutschland vom Kaiserreich bis zur Deutschen Einheit*, eds. C. Wolters, C. Beyer and B. Lohff (Bielefeld: Transcript 2013), 25–42; Karin Johannisson, *Den mörka kontinenten. Kvinnan, medicinerna och fin-de-siècle* (Stockholm: Norstedts, 2013).

between Germany and Sweden on both a scientific and societal level. Medicomechanics was only one of the therapies used at the time, but it is precisely here where particularly strong links between Germany and Sweden can be identified.

Introduction and background

As a result of industrialisation, the introduction of new technologies such as the railway, automobile and telephone, and increasing urbanisation, established social and spatial structures had been broken up. The accelerated pace of everyday life made people feel increasingly stressed.⁴ This was expressed in a manifold complex of symptoms, which was first summarised in 1880 by the American neurologist George M. Beard (1839–1883) using the diagnosis neurasthenia.⁵ The treatment of neurasthenia was aimed at strengthening the weakened nerves and relied on rest, massage and light gymnastic exercises, hydrotherapy in spas and sanatoriums, change of diet and the use of medication. Therapy, however, was to undergo a change that was marked by the conflict between the concept of medicine at the time and a newly emerging body culture.

The exhaustion states of neurasthenia were contrary to the idealised image of the body in medicine, which was characterised by scientific knowledge and an enthusiasm for new developed technologies – such as electricity and steam power. In it, the human body was conceived as a physical system that works strictly by the laws of nature and was compared with contemporary achievements – such as a machine or a battery.⁶ Accordingly,

⁴ Michael J. Cowan, *Cult of the will. Nervousness and German modernity* (Pennsylvania: State Univ. Press, 2008); Gijswijt-Hofstra and Porter (2001).

⁵ George Miller Beard, *A practical treatise on nervous exhaustion (neurasthenia). Its symptoms, nature, sequences, treatment* (New York: W. Wood & Company, 1880).

⁶ Uwe Heyll, *Wasser, Fasten, Luft und Licht. Die Geschichte der Naturheilkunde in Deutschland* (Frankfurt, New York: Campus, 2006), 111; Peter Tauber, “Die Leibesübungen sind eine besondere Art des Kampfes ums Dasein” – Popularisierter Darwinismus in der Auseinandersetzung um die Körperkultur um die Jahrhundertwende,” in *Wissenspopularisierung. Konzepte der Wissensverbreitung im Wandel*, Wissenskultur und gesellschaftlicher Wandel 4, ed. Carsten Kretschmann (Berlin: Akademie, 2003) 293–307, here 294; Heinz-Peter Schmiedebach, “The public’s view of neurasthenia in Germany. Looking for a new rhythm of life,” in *Cultures of neurasthenia from Beard to the First World War*, *Clio medica* 63, eds. Marijke Gijswijt-Hofstra and Roy S. Porter (Amsterdam 2001), 219–238, here 230.

in physical therapy, formerly naturopathic procedures were mechanised and were thus intended to use natural remedies more efficiently.⁷ It seems paradoxical, especially for neurasthenia therapy, that doctors used just such curing concepts and devices that could easily be associated with what was suspected as the cause of the disease in the first place (modernity). Nevertheless, the conception of medicine at the time explains the decisive role played by therapies using electricity or mechanically operated fitness apparatuses.⁸

On the other hand, a new body culture emerged in the last third of the 19th century. Its beauty ideals were associated with thinness and elegance in women, and with muscles and fitness in men. As a way to achieve these goals, athletic exercises became fashionable. In particular, therapy in the field of gymnastics and massage was linked to this body culture. In response to the negative effects of modern daily life, exercises should avoid any overexertion and be based on the individual's personal condition. Parallel to this, the new body culture should initiate a renunciation of technology-based therapies in favour of the rediscovery of naturopathic procedures – personality development in nature should become the new ideal.⁹

Medical objects as media of scientific transfer

The theoretical framework of this study is the analysis of transfers. This serves to investigate interactions between different nations and thus mutual observation as well as the productive appropriation and adaptation of new concepts. In this way it can be traced how knowledge was acquired, translated, and applied and reinterpreted in new contexts of action.¹⁰

At the end of the 1980s, with the so-called 'spatial turn' in the social and cultural sciences, a stronger consideration of geographical space began.

⁷ Heyll (2006), 109–111.

⁸ Fangerau, Kur (2013); Noyan Dinçkal, "Medikomechanik. Maschinengymnastik zwischen orthopädischer Apparatebehandlung und geselligem Muskeltraining. 1880-1918/19," *Technikgeschichte* 74 no. 3 (2007): 227–250.

⁹ Tauber (2003), 294; Cowan (2008), 111–121.

¹⁰ Hartmut Kaelble and Jürgen Schriewer, eds., *Vergleich und Transfer. Komparatistik in den Sozial-, Geschichts- und Kulturwissenschaften* (Frankfurt et al. Campus, 2003); Johannes Paulmann, "Internationaler Vergleich und interkultureller Transfer. Zwei Forschungsansätze zur europäischen Geschichte des 18. bis 20. Jahrhunderts," *Historische Zeitschrift* 267 no. 3 (1998): 649–685.

The approach of cultural transfer that emerged with this development in historical research no longer understands national cultures as a fixed entity, but rather as historical processes that emerged through exchange and demarcation and are subject to permanent further development. Early studies regarding these ‘spaces of exchange’ placed a clear focus on Franco-German relations.¹¹ Out of the cultural transfer research, a modified research model has been developed with the concept of the ‘histoire croisée’, which is intended to analyse transfer processes beyond the bi-national level while keeping the country-specific perspectives in mind.¹² This example shows that transfer research itself is subject to permanent change – indeed, there are various concepts under the term cultural transfer, some of which overlap. However, what they all have in common is a look at the different levels on which cultural exchange takes place. The emphasis is on persons, institutions, medical practices, objects and the public sphere. Institutions or scientists are seen as intermediaries.¹³

In this line stands also a new history of science, which examines less the one-sided transmission of knowledge from a producing circle of experts to an audience, but rather the mutual circulation of knowledge between different actors. Representatives of this principle of the ‘circulation of knowledge’ consider knowledge to be a form of communication situated in a perpetual cycle.¹⁴ The term network is often used in this context – as an explanatory model for the interaction of scientists as well as for the reception and dissemination of new research approaches.¹⁵

¹¹ Michel Espagne and Michael Werner, “Deutsch-französischer Kulturtransfer im 18. und 19. Jahrhundert. Zu einem neuen interdisziplinären Forschungsprogramm des C.N.R.S.” *Francia. Forschungen zur Westeuropäischen Geschichte* 13 (1985): 502–510.

¹² Michael Werner and Bénédicte Zimmermann, “Vergleich, Transfer, Verflechtung. Der Ansatz der *histoire croisée* und die Herausforderung der Transnationalen,” *Geschichte und Gesellschaft* 28 no. 4 (2002): 607–636.

¹³ Paulmann (1998), 677–681.

¹⁴ James A. Secord, “Knowledge in Transit,” *ISIS. Journal of the History of Science in Society* 95 no. 4 (2004): 654–672; Johann Östling et al., “The history of knowledge and the circulation of knowledge. An introduction,” in *Circulation of knowledge. Explorations in the history of knowledge*, eds. Johann Östling et al. (Lund: Nordic Academic Press, 2018), 9–33.

¹⁵ Heiner Fangerau, “Evolution of knowledge from a network perspective. Recognition as a selective factor in the history of science,” in *Classification and evolution in biology, linguistics and the history of science. Concepts – methods – visualization*, Kulturamnesen 5, eds. Heiner Fangerau et al. (Stuttgart: Steiner, 2013), 11–33.

Processes of knowledge transfer are also reconstructed at the object level. At the end of the 20th century, cultural history research increasingly turned to such objects as well as to the appropriation practices of their users, after having long been based only on written sources.¹⁶ This so-called ‘material culture’ assumes a permanent interaction between material and immaterial culture. According to this, objects are not only passive projection surfaces of human ideas. They receive an active character as soon as meanings that go beyond pure utility or originally unintended properties are ascribed to them.¹⁷ Transferred to the devices used in the therapy of neurasthenia, these were initially developed and applied in medicine on the basis of the state of knowledge at the time and newly emerging technologies. But their users were soon to use the devices outside the medical context as a tool for self-optimisation and to fill them with a symbolism of social participation and modernity that went beyond their pure function. Objects are to be considered in their role as transfer media because they materialise the state of existing knowledge within their respective social context.¹⁸

Germany and Sweden are suitable for this transfer approach, as the two countries were already closely connected on the scientific sector back then. Many Swedish researchers published their studies in German. The Swedes were strongly influenced by German psychiatrists, especially in the field of psychiatry. In the field of physiotherapy, however, it was the Swedish inventions that were to influence German research. The apparatuses developed by the Swedish physician Gustaf Zander for mechanical therapy can be seen as such media transfer devices. As causes of transfer and change in therapeutics, cultural movements have been little explored in research so far. This context can be shown especially in the objects of medicomechanics, which were exposed to the conflict between efficient-technology-based, modern medicine and rediscovered naturopathic methods within the new body culture.

¹⁶ Wolfgang J. Mommsen, “Kultur und Wissenschaft im kulturellen System des Wilhelmismus. Die Entzauberung der Welt durch Wissenschaft und ihre Verzauberung durch Kunst und Literatur,” in *Kultur und Kulturwissenschaften um 1900. Bd. 2: Idealismus und Positivismus*, eds. Gangolf Hübinger and Rüdiger vom Bruch (Stuttgart: Steiner 1997), 24–40. See also Elisabeth Tietmeyer et al., eds., *Die Sprache der Dinge. Kulturwissenschaftliche Perspektiven auf die materielle Kultur* (Münster, New York: Waxmann, 2010).

¹⁷ Stefanie Samida, Manfred K. Eggert and Hans Peter Hahn, eds., *Handbuch materielle Kultur. Bedeutungen, Konzepte, Disziplinen* (Stuttgart: Metzler 2014).

¹⁸ Samida, Eggert, Hahn (2014).

Medicomechanics – a modern tool both suitable and troublesome to ideas of medicine and body culture

Medicomechanics was a therapy developed in Sweden that made it possible for the first time to perform gymnastic movement and strength exercises without the assistance of a physiotherapist. Its inventor, the Swedish physician Gustaf Zander (1835–1920), had since the mid-1850s developed therapy machines, which were later set up in so-called medico-mechanical institutes.¹⁹ The name originated in the first institute Zander founded in Stockholm in 1865 and which he called ‘Medico-mekaniska institutet’.²⁰

These so-called Zander machines were complex mechanical constructions on which isolated muscle groups could be trained with active or passive exercises. Overall Zander developed four series of apparatuses where weight resistance could be precisely adjusted and dosed in terms of extent and intensity. There were apparatuses for active exercises in which the patient moved the resistances with his own muscle power, which were adjustable by weights. Then there were passive apparatuses, which were set in motion either by the patient’s own muscle power or by a steam, gas or electric motor. Thirdly, there were motor-driven apparatuses for massage manipulation and vibration, in which the patient’s body was affected by friction, flexing, tapping or shaking. There were also orthopaedic and measuring devices – such as for the treatment of scoliosis.²¹

In addition to muscle and joint diseases, the main illnesses treated were those resulting from a modern lifestyle. So cardiovascular diseases, overweight and nervousness.²²

¹⁹ Alfred Levertin and Franz Staffel, “Gustaf Jonas Wilhelm Zander,” in *Archiv für Orthopädie, Mechanothérapie und Unfallchirurgie* 10 (1911): 15–25; Thomas J.A. Terlouw, “Aufstieg und Niedergang der Zander-Institute in den Niederlanden um 1900,” in *Die Contergankatastrophe. Eine Bilanz nach 40 Jahren*, eds. Michael A. Rauschmann, Ludwig Zichner and Klaus-Dieter Thomann (Darmstadt: Steinkopff, 2005), 149–190.

²⁰ Anders Ottosson, *Gymnastik som medicin. Berättelsen om en svensk exportsuccé* (Stockholm: Atlantis, 2013), 171.

²¹ Gustaf Zander, *Die Apparate für mechanisch heilgymnastische Behandlung und deren Anwendung*, 5. Aufl., (Stockholm: Göransson, 1898); Alfred Levertin, *Die Grundzüge der Dr. G. Zander’schen medico-mechanischen Gymnastikmethode und deren Anwendung in vier besonderen Darstellungen* (Stockholm: Norstedts, 1894).

²² Hans Christoph Kreck, *Die medico-mechanische Therapie Gustav Zanders in Deutschland. Ein Beitrag zur Geschichte der Krankengymnastik im Wilhelminischen*

Exercise therapy was not new. It was based on a manual gymnastics system that had been developed in Sweden by the fencing teacher and physiotherapist Pehr Henrik Ling (1776–1839) in the early 19th century – the so-called Swedish remedial gymnastics. Ling’s whole system encompassed several areas – educational, military and aesthetic gymnastics as well as medical gymnastics. With medical gymnastics, which would later become known as Swedish remedial gymnastics, he developed a new way of treating the sick, based on precise anatomical knowledge of the human musculoskeletal system. It included many different individual exercises which were assigned to isolated muscle groups and were reproducible. The idea was that every movement had an effect not only on the muscles, but also on the entire human organism, including the blood circulation, the internal organs and the nervous system. The primary aim was to maintain, strengthen or even restore the health of patients.²³ Ling divided his gymnastic exercises into three groups – active exercises, passive exercises where gymnastics guided the movements and duplicated exercises where the patient had to apply a resistance of muscle strength.²⁴ In Ling’s exercises, at least one therapist had to be present at all times, and in some exercises the patient’s body was even set in motion by up to five gymnasts.²⁵ The Swedish remedial gymnastics were effective, but due to a lack of medical expertise, they were repeatedly criticised by doctors. Besides its effectiveness, however, it was precisely the fact that it had been conceived by a medical layman that was to contribute to the methods’ popularisation.

Kaiserreich (Frankfurt a. M., 1988), 54–72; Michael A. Rauschmann et al., “Aufstieg und Niedergang der mediko-mechanischen Institute nach G. Zander im frühen 20. Jahrhundert in Deutschland,” in *Die Contergankatastrophe. Eine Bilanz nach 40 Jahren*, eds. Michael A. Rauschmann, Ludwig Zichner and Klaus-Dieter Thomann (Darmstadt: Steinkopff, 2005), 137–148; Ottosson (2013).

²³ Hans Ferdinand Maßmann, *Ling’s Schriften über Leibesübungen* (Magdeburg: Heinrichshofen, 1847); Terlouw (2005), 151; Anders Ottosson, “Gym machines and the migration of medical knowledge in the nineteenth century,” in *Explorations in Baltic medical history, 1850–2015*, Rochester studies in medical history 44, eds. Nils Hansson and Jonatan Wistrand (Rochester: University of Rochester Press, 2019), 15–40, here 18.

²⁴ Maßmann (1847); Hermann Nebel, *Bewegungskuren mittelst schwedischer Heilgymnastik und Massage* (Wiesbaden: Bergmann, 1889); Terlouw (2005), 157–160; Rauschmann et al. (2005), 137/138.

²⁵ Ottosson (2019), 18. A lot of illustrated material on this can be found in Ottosson (2013).

Ling's concept was therefore attributed to naturopathy.²⁶ The approach of naturopathy to extract remedies only from the natural environment was not conceived as a fundamental opposition to scientifically based medicine and has been used by some medical practitioners in a technified form within physical therapy.²⁷ Parallel to this, the manual Swedish remedial gymnastics persisted, because many doctors and gymnasts had visited Ling's gymnastics institute in Stockholm, which was founded in 1813, had recognised the methods' effectiveness and had transferred it to their practices. In this context, however, Ling's system competed with other systems of physical training. For example, with representatives of the German 'Turnerbewegung', in relation to both efforts to professionalise and institutionalise vocational training, as well as with the movement of modern, competition-oriented sport, which was expanding at the end of the 19th century.²⁸

Zander transferred the manual handles from Ling's therapeutic gymnastics to mechanically constructed apparatus. His principle was based on the so-called 'double-loaded lever'. The patient's force was transferred to the machine via a lever, on which different resistances could be set. Gustaf Zander was already interested in medical gymnastics as a medical student and learned the Ling method. He criticised the Swedish remedial gymnastics that the gymnast could only feel the patient's reaction to the exercises without being able to make reliable statements about their over- or understraining. In addition, manual remedial gymnastics would be a very exhausting activity for the gymnast, so that his performance would inevitably decrease during the day. Replacing the gymnast with a machine, on the other hand, guarantees absolute uniformity and regularity and avoids human factors such as insecurity, carelessness or simply fatigue.²⁹

²⁶ Heyll (2006), 75.

²⁷ Ibid., 109–111.

²⁸ Julia Helene Schöler, *Über die Anfänge der Schwedischen Heilgymnastik in Deutschland. Ein Beitrag zur Geschichte der Krankengymnastik im 19. Jahrhundert* (Münster: Diss. med., 2005); Doris Schwarzmann-Schafhauser, *Orthopädie im Wandel. Die Herausbildung von Disziplin und Berufsstand in Bund und Kaiserreich (1815–1914)*. Sudhoffs Archiv, Beiheft 53 (Stuttgart: Steiner, 2004); Michael Krüger, "Turnen und Turnphilologie des 19. Jahrhunderts als Vorläufer moderner Sportwissenschaft," *Sportwissenschaft. The German Journal of Exercise and Sport Research* 30 no. 2 (2000): 197–210.

²⁹ Gustaf Zander, *Die Zandersche Gymnastik und das Mechanisch-Heilgymnastische Institut in Stockholm* (Stockholm: Högström, 1879).

Gustaf Zander's technified version fit well with the modern age for several reasons. The apparatus met the at that time expectations of scientific medicine for accuracy and measurability. Accordingly, medicomechanics should have a primarily vitalising effect on neurasthenics through light, gymnastic exercises. The repetitive movements of the machine were intended not only to reduce the mental overstimulation of the nerves of the nervous people, but also to encourage them to exercise consistently and to strengthen their resistance in everyday life. Neurasthenia patients who are considered difficult should be gently introduced to physical activity. The training on the medico-mechanical apparatus was proclaimed by Zander and his followers as the mildest form of exercise and was intended to prevent nervous patients from dropping out of the therapy prematurely.³⁰

The exercises could be done independently and at any time without the assistance of a therapist. Because the weight resistances on the machines were individually adjustable, the increase in physical fitness was also easy to track. This fit well with the desired personal fulfilment and individual body improvement within the new body culture. Thus, medicomechanics quickly became popular. The imposing mechanical constructions were found around 1900 in spas and specially founded Zander Institutes all over Europe. However, because of the long therapy time, as well as the expensive access to a Zander Institute via membership or a stay at a health resort, only better-off circles could afford it. The attraction of so-called "zandern" thus resulted from the fact that, although it ostensibly served therapeutic purposes, it was initially practiced primarily by members of the upper classes as an exclusive, sociable recreational sport. Just as it was considered fashionable in the upper circles at the time to be a little neurasthenic, Zandern was en vogue too.³¹

In Germany, medico-mechanical therapy became particularly widespread. This was due to the fact that the introduction of statutory accident insurance in 1884 expanded the target group of patients. The Zander apparatuses were increasingly used for rehabilitative-functional aftercare of

³⁰ Nebel (1889), 95; Arnold Obkircher, "Die Bedeutung medikomechanischer Apparate für größere Kurorte," *Archiv für Orthopädie, Mechanotherapie und Unfallchirurgie* 10 (1911): 55–66, here 64; Cowan (2008), 111–121.

³¹ Noyan Dinçkal (2007) in particular has dealt with medicomechanics as a technique between medical therapy and exclusive leisure sports.

accident victims. This was due to the fact that the Swedish apparatuses were considered to be particularly standardised and efficient, and it was hoped that this would also expose possible simulators. In the process, the employers' liability insurance associations (the *Berufsgenossenschaften*) paid the costs for their workers. They wanted their members to return to work as quickly as possible and avoid any pension payments in the event of occupational disability.³²

First transfer objects or from horseback riding machine to electric camel

Due to these developments the mechanical devices were subject to constant change. In the beginning the Zander apparatuses were exclusively produced and sold by the Swedish company *Göranssons Mekaniska Verkstad* in Stockholm. Their sales strategy was to deliver the complete product range to a new institute to be established. In return, the institute received a monopoly on the Zander apparatuses for the respective location. Accordingly, the equipment of the Zander institutes was similar everywhere. The equipment of the practice rooms, the so-called Zander-rooms, was initially functional and resembled more a factory hall with their closely placed and, in addition, steam and gas-operated apparatuses. At the turn of the century, a change took place that can be explained by the dynamics of therapeutic change due to the influence of the new body culture. Attempts were made to avoid the atmosphere reminiscent of machine halls by reducing noise and hiding technology – the engines were laid under the floor of the training hall and increasingly electrically operated. The technical character was to be covered by decorative elements such as seating with plush and cushions and a centrally located fountain.³³ The Swedish manufacturing company was taken over in 1905 by the German company *Rosell, Schwarz und Co* from Wiesbaden, which from then on had the monopoly on the production of the Zander apparatuses. Transfer objects can already be seen in their product range – especially within Zander's apparatus series for massage manipulations, which were intended to strengthen the muscles and nerves of the patients through vibration.

³² Ottosson (2019), 18; Dinçkal (2007), 240; Rauschmann et al. (2005); Terlouw (2005).

³³ Dinçkal (2007).

For the reinterpretation of a Zander apparatus as a tool for physical self-optimisation in an exclusive setting stands the transfer of Zander's horseback riding machine. Gustaf Zander developed the motor-driven apparatus F2 'Vibrations in the riding saddle'. This generated 180 vibrations per minute and was intended to strengthen the muscles and nerves of patients by vibrations. At the same time, Apparat F2 contained a symbolism of exclusivity and luxury that went beyond pure function – as an ultra-modern, mechanised version of elite equestrian sport. There was also a version with a ladies' seat, which certainly had no therapeutic use, but rather reflected social chic. Rossel Schwarz & Co took these tendencies to the extreme with the construction of the so-called 'electric camel', which also went under the product name F2. The camel was not yet in Göransson's Mekaniska Verkstad's catalogue and was therefore a further development of the German company's F2 riding apparatus. This apparatus shows the significance openness with regard to its use, which was probably designed less for the medical-technical aspect and more to satisfy the wishes of an upper-class clientele for a special, exotic version. The 'electric camel' was then also used to equip Zander rooms on luxury ships like the Titanic.³⁴ The Zander apparatus F1 'vibration of entire limbs' has also been further developed. The company Rossel, Schwarz und Co distributed the vibration device by Seist. For finer vibrations it would have followed the F1 apparatus by Zander.³⁵

Competing systems as transfers

The success of the Zander apparatuses led to other doctors and physiotherapists joining the the road to success anticipated from mechanised gymnastics and massage and also developing mechanical apparatuses. Last but not least, the monopoly of the Zander institutes meant serious competition

³⁴ The Zander apparatuses were housed in the so-called gymnasium of the Titanic, which was located in the middle of the boat deck in the immediate vicinity of the Grand Staircase and was only accessible to first class passengers. See N. Pierce, *Titanic. True stories of her passengers, crew and legacy* (Dublin: The O'Brien Press 2018).

³⁵ Karl Hasebroek, "Die Mechanotherapie der Nervenkrankheiten," in *Handbuch der Therapie der Nervenkrankheiten. Bd. 1: Die Methoden*, ed. Heinrich Vogt (Jena: Fischer 1916), 326–363, 351. The apparatus is shown in: J. Kowarschik, *Physikalische Therapie* (Wien: Springer 1948), 351.

for the other local doctors and gymnasts, who also offered gymnastic therapies there. They tried to attract people to their own practices by developing new, cheaper and usually simpler systems. Until the First World War, they were no real competition for Zander.

The German surgeon Hermann Krukenberg (1863–1935) developed pendulum apparatuses whose main focus was on the mechanical, passive support of the exercises performed by the patient. During these support movements, the patient had to push a swinging pendulum. The pendulum oscillation was used for muscles that were only capable of extremely slight contraction. Over time, the small active movements accumulated and resulted in more energetic, passive movements.³⁶

Otto Thilo (1848–1917), a physician from Leipzig, constructed in contrast only apparatuses for active movements. His pulley machines were intended to strengthen the arms and legs, but there were also devices explicitly for the fingers. Weights that had to be lifted by a pulley lifting tackle served as resistors. The resistance changed with the angle at which the pull cord was pulled.³⁷

Burlot constructed a resistance apparatus on which several exercises could be performed at once, either sitting or standing. His apparatus essentially consisted of a cabinet with pull cords attached to it, through which weights could be pulled in different directions.³⁸

The physician David Hönig speculated with his apparatuses clearly on customers due to injured workers. Their employers' liability insurance associations had to provide the rehabilitative-functional aftercare of accident victims, after the statutory accident insurance had been introduced in 1884. On the one hand Hönig's apparatuses consisted partly of cheaper and simplified imitations of the Zander machines. With drilling and sawing apparatus, pile drivers, lathes, hammers, anvils and trucks, Hönig also constructed devices that were intended to imitate people's professional work.³⁹

³⁶ Hermann Krukenberg, *Lehrbuch der mechanischen Heilmethoden* (Stuttgart: Enke, 1896).

³⁷ Otto Thilo, *Übungen*, Sammlung klinischer Vorträge nr. 176 (Leipzig: Breitkopf und Härtel, 1897).

³⁸ Illustration and description of Burlot's apparatus in Krukenberg (1896), 152, 159/160.

³⁹ David Hönig, *Ueber mechanische Behandlung der nach Unfällen zurückgebliebenen Funktionsstörungen. Mittheilungen aus dem Breslauer medico-mechanischen Institute*

The doctors of the time criticised Hönig's apparatuses, saying that the people who were injured in an accident should not carry out such work on the apparatuses which had already caused a one-sided strain on their muscles in their profession.⁴⁰

Nevertheless, Hönig's apparatuses were at that time wrongly advertised as Zander apparatuses in German health resorts. For example the then German naturopath Friedrich Eduard Bilz used in his sanatoriums in 1900 devices that imitated classical handicraft work. Falsely he advertised them as Zander apparatuses.⁴¹

Medicomechanics in World War I and after

The numerous imitations, of which I could only mention a few concise examples here, had never really posed a danger to the machines designed by Gustaf Zander until the First World War. The original apparatuses were still considered the best method. During the First World War, the mechanical apparatuses were completely reinterpreted and underwent a profound change in its objectives. Whereas the focus of treatment had previously been on diseases related to modern lifestyles – in addition to neurasthenia, especially obesity and heart disease – the therapy was now geared towards restoring the labour power of soldiers injured on the battlefield for use in wartime and in later civilian life.⁴²

In view of the large number of wounded, this method was resorted to not only for the quick recovery of the soldiers, but also to limit the amount of pension payments to the war-disabled. With regard to neurasthenia, the handling of the subcategory of traumatic neurosis or accident neurosis, which had already been introduced as a medical diagnosis in connection

(Breslau 1890); David Hönig, *Ueber ein neues mechano-therapeutisches System zur Behandlung der nach geheilten Verletzungen zurückgebliebenen Funktionsstörungen* (Wien: Urban & Schwarzenberg, 1894).

⁴⁰ For example Krukenberg (1896), 156–159.

⁴¹ See Friedrich Eduard Bilz, *Das neue Naturheilverfahren. Lehr- und Nachschlagebuch der naturgemäßen Heilweise und Gesundheitspflege* (Leipzig: Bilz, 1900). Illustration as insert without pagination.

⁴² Relevant to medicomechanics in war is the book by Gunnar Frostell, *Kriegsmechanotherapie. Indikation und Methodik der Massage, Heilgymnastik und Apparatebehandlung samt deren Beziehungen zur Kriegsorthopädie* (Berlin, Wien: Urban & Schwarzenberg, 1917).

with accidents and other traumas before the First World War, is particularly significant for the period of the First World War. With the beginning of the war, discourses on nerves were conducted on the assumption that the nervous disorders that had been occurring in broad sections of the population since the turn of the century would decrease due to the ‘Stahlbad des Krieges’. Contrary to expectations, soldiers suffered increasingly from functional, traumatic neuroses.⁴³ The right of the sufferer to apply for an accident pension, which was linked to the diagnosis of traumatic neurosis, had already encouraged attempts at fraud in the pre-war period. Even then, insurance companies used medicomechanics to detect such imitations. Following this example, the military doctors in the First World War also used medico-mechanical devices to check the fitness of the numerous war-disabled soldiers for the front. It must be taken into account that in view of the sheer mass of injured soldiers, compensation for soldiers unfit for war was only granted at the beginning of the war. In the further course of the trench warfare – and with it the phenomenon of the so-called ‘Kriegszitterer’ – the state endeavoured to keep the number of pension recipients as low as possible.⁴⁴

The complexly constructed, heavy and expensive Zander apparatuses were out of the question. Only the principle considered efficient was used. For military hospitals and barracks, doctors developed makeshift constructions. Their advantages over the complexly constructed, heavy and expensive Zander apparatuses lay in their cheap manufacture and easy transportability. Everything that was available was used: hospital beds, wooden boards, wooden chairs, steel springs or bicycle parts.⁴⁵ Moreover, it was entirely in the interests of the ‘Oberste Heeresleitung’ to treat as many soldiers as possible at once. Accordingly, the pulley lifting tackle apparatus constructed by the orthopaedic surgeon Fritz Lange was considered an achievement because up to 10 patients could perform active and passive exercises with weight pulls on it at the same time.⁴⁶ Even calisthenics, such

⁴³ Fangerau, Kur (2013), 33/34; Joachim Radkau, “Die wilhelminische Ära als nervöses Zeitalter, oder: die Nerven als Netz zwischen Tempo- und Körpergeschichte,” in *Geschichte und Gesellschaft* 20 no. 2 (1994): 211–241.

⁴⁴ Radkau (1998), 367–369; Fangerau, Kur (2013), 34–36.

⁴⁵ Noyan Dinçkal refers to further instructions for the construction of such improvised apparatuses, which were printed in many medical papers from 1915/1916 onwards: Dinçkal (2007), 245.

⁴⁶ Rauschmann et al. (2005), 145; Kreck (1988), 132.

as lifting a bucket filled with water with an outstretched arm, were classified as medicomechanics in wartime.⁴⁷

For better-off circles, medicomechanics had lost its glamor during the First World War. Due to its use for the convalescence of war-disabled persons, the method was now no longer associated with sociable physical exercise in a fine ambience. Since the war, it has been seen primarily as a way to reintegrate injured people into society.⁴⁸

After the war, the method also experienced a rapid decline in medical therapy for economic, technical and ideological reasons. The maintenance of the Zander-Institutes was associated with high costs and increasingly fewer patients could afford this treatment. This was accompanied by a loss of significance of a mechanical-technical, purely scientific view of the human body. The mechanical physical exercises of the Zander apparatuses were now countered by the new ideal of personality development in nature. People increasingly wanted to escape the cramped living conditions of their small apartments in the cities. The new body culture focused on outdoor exercises, rhythmic gymnastics or even nude gymnastics among the life reformers.⁴⁹ The diagnosis of neurasthenia also increasingly merged with other clinical pictures such as depression, which necessitated psychological therapy and made mechanical therapy obsolete. On the other hand, new surgical options – such as tendon transplantation or the severing of bones and muscles – were created for postural defects and post-accident care with ether anaesthesia, asepsis, antisepsis and blood transfusion in the field of surgery, and these were preferred to the more protracted physiotherapeutic therapy.⁵⁰

By these developments the mechanical apparatuses lost their medical significance at that time but have survived in the field of fitness. The Zander Institutes were the precursors of today's fitness studios. Even vibration was rediscovered there as a tool to support muscle contraction in form of so-called power plates. The mechanical devices were the techniques

⁴⁷ In 1915, the orthopaedist Alexander Ritschl praised such exercises as belonging to medicomechanics: Alexander Ritschl, *Leicht und billig herstellbare mediko-mechanische Einrichtungen zum Gebrauch in Lazaretten und Hospitälern sowie in der ärztlichen Hauspraxis* (Stuttgart: Enke, 1915).

⁴⁸ Dinçkal (2007), 247–249; Rauschmann et al. (2005), 146/147.

⁴⁹ Terlouw (2005), 179/180.

⁵⁰ Dinçkal (2007), 249; Ottosson (2019), 34; Kreck (1988), 137.

of the early 20th century to measure physical performance and gain control over the body. Today, we track physical functions with the help of digital technology. For example, by wearing fitness bracelets while jogging.

Conclusion

Neurasthenia is a prime example of a disease pattern that was extremely linked to medical fashions and whose symptoms were pre-existing and subsequently merged into other diagnoses. The worldwide spread of the medicomechanics developed by Gustaf Zander stands for the scientific exchange of medical treatment methods in the late 19th and early 20th centuries. In the popularity of the Swedish method in Germany the scientific entanglement of both countries becomes particularly obvious. The enhancements and imitations of the Zander apparatuses represent a scientific transfer on the level of medicine, which took place in parallel with cultural trends, political changes and technological knowledge.

The objects of neurasthenia-therapeutics were subject to a change that was marked by the conflict of a technology-affine medicine to treat a technology-induced disease. The Zander apparatuses also underwent an evolution that was related to the new body culture. Formerly medical technology, users acquired the devices as tools for self-optimisation of the body. Strengthened nerves and muscles were supposed to protect people against the influences of the accelerated, modern everyday life. So there were new contexts of action and reinterpretations of the Swedish objects. Not only as a tool for self-optimisation, but also with its use in German post-accident care in the First World War.

Terapijas objektu maiņa: kā neirastēnija ietekmēja zināšanu pārnesei starp Vāciju un Zviedriju

Kopsavilkums

Šajā publikācijā ir analizēta zināšanu pārnese starp Vāciju un Zviedriju neirastēnijas terapijā ap 1900. gadu. Neirastēnija bija pasaulē plaši izplatīta slimība, kurai bija novērojama tik liela simptomu dažādība, ka, raugoties

retrospektīvi, tas ir uzskatāms par kultūras stāvokli, ko ļoti ietekmēja medicīnas “mode”.

Kultūras kustības kā terapijā novērojamās pārneses un pārmaiņu cēloņi līdz šim pētījumos ir maz izziņātas. Balstoties uz pārnešu analīzi un medicīnas aparātu novērtējumu, šīs publikācijas mērķis ir parādīt starp Vāciju un Zviedriju pastāvošo saikni gan zinātniskā, gan sabiedrības līmenī, kā arī tās ietekmi uz neirastēnijas terapiju. Šī saikne kļūst īpaši pamanāma, pateicoties Zviedrijā izstrādātās biomehāniskās ārstniecības metodes popularitātei Vācijā. Mehāniskajā vingrošanā izmantoto objektu uzlabojumi un imitācijas atspoguļo zināšanu pārnesi medicīnas līmenī, kas norisinājās paralēli kultūras tendencēm, politiskajām pārmaiņām un tehnoloģiskajām zināšanām.

Nemitīgajām pārmaiņām, kurām bija pakļauti neirastēnijas terapijā izmantotie priekšmeti, bija raksturīgs ar tehnoloģijām saistīts medicīnas paradokssālais izmantojums – lai ārstētu tehnoloģiju izraisītu slimību. Tomēr, no jauna atklājot naturopātijas metodes jaunajā ķermeņa kultūrā, evolūciju piedzīvoja Zandera aparāti. Lietotāji ir pārņēmuši un pārveidojuši zviedru izveidotos aparātus, tos lietojot ne tikai kā parastas medicīniskas tehnoloģijas, bet arī jaunos darbības kontekstos, piemēram, kā ķermeņa pašoptimizācijas rīkus.

Atslēgvārdi: zinātniskā pārnese, zināšanu aprīte, materiālā kultūra, 19. gadsimta beigas un 20. gadsimta sākums.

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