Transit of knowledge and de-centred science

The journeys of the Swedish physician Ernst Georg Åberg

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Introduction

For many years, the circulation, transit, assimilation, and appropriation of science and technology were approached from the so-called 'centre-periphery' perspective. This conceptual model assumes that global exchanges are characterised by an unequal relationship that goes from political and economic centres to subordinate, dependent areas. On these grounds, entire systems were developed to define what 'centres,' 'peripheries,' 'semi-peripheries,' and even 'remote peripheries' are. This view was criticised for reproducing paradigms based on power relations and subordination, while a new approach, with focus on local science, has gained in relevance.[1] In turn, the notion of 'de-centred science' emerges as a possibility to understand the transit of science and technology among sites which produce scientific and technological knowledge but cannot be subsumed under the category of 'centres' of knowledge. This is the case, for example, of European regions which were not colonial metropolises, as well as of former European colonies. In such cases, one may say that the circulation, or transit, of knowledge is geographically decentralised.

To contribute to the study of this process, I focus on the life and work of a Swedish physician who settled in Argentina in 1855, Ernst Georg Åberg (1823–1906). According to recent trends in the writing of history of medicine, one might learn much by approaching individuals within a definite historical context and their surrounding social reality as products of their time, as actors who plan and develop actions based on their interests and

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ideologies. Life stories thus may become methodological instruments for historical reflection.[2] Åberg's trajectory affords a glimpse into fruitful exchanges between two geographically distant and culturally distinct sites: Sweden and Argentina, Buenos Aires and Stockholm. While neither country can be qualified as a 'centre,' they cooperated and enriched one another in the second half of the nineteenth century.

About Åberg

Ernst Georg Åberg was born in Stockholm, Sweden, on 18 August 1823, being the third son of Martin Fredrik Åberg (1795–1869) and Brita Catharina Vingren. His father served as secretary of the Negotiating Commission with Norway (1815) and as secretary to the Ministry of Finance (1831). Martin and Brita were married on 1 August 1818, and had six children: Hjalmar Fredrik, royal steward; Axel Reinhold, doctor of law, who worked at the Criminal Law of the Municipal Court of Stockholm; Ernst Georg, with whom I deal in the present study; Otto Julius; Hildur Vendela; and August Martin Åberg. Ernst Åberg studied medicine at University of Uppsala and graduated in 1850 with a thesis on chronic arsenic poisoning. That same year he married Evelina Maria Heap, who although she died already in 1852 gave birth to a son, Lawrence Heap Åberg (1851–1895) who devoted himself to philosophical studies. Ernst Georg continued his studies at the Karolinska Institute, and earned the degree of *Chirurgiae Magister*, after which he began practicing his profession in Stockholm. In 1855 he published *Statistics and Treatment of Typhus and Typhoid Fever, from Twelve Year's Experience Gained at the Seraphim Hospital in Stockholm, (1841–1852)*, a translation of the original book in Swedish by Magnus Huss (1807–1890).[3]

By this time, Åberg contracted tuberculosis, and in 1855 he decided to emigrate to Argentina, with the idea of finding an adequate climate that could help in the cure of his disease. He obtained the revalidation of his medical degree at the School of Medicine of University of Buenos Aires the following year, with a dissertation entitled *Causas, naturaleza y tratamiento de la gota*.[4] The dissertation, as its title indicates, deals extensively with the aetiology, clinical manifestations and treatment of gout. In the light of subsequent events which made Åberg earn a special place and that I discuss later on, the following paragraph from the section on treatment deserves particular attention:

> 3. METODIC GYMNASTICS. We already had occasion to take into consideration the influence that muscle actions have in using the animal substances of food, and the tonic effect that they must necessarily produce.

> A facility to put this great physiological law into practice, or to cure a variety of diseases, by means of systematic muscle movements, created by the inventor of this method, Professor LING, has been in operation for many years in Stockholm. There are currently similar facilities in all the major cities of Europe. It would take us too far from our purpose if we were to undertake a special explanation of this healing method; it suffices to say that it has also been used with the greatest success for the treatment of gout.[5]

This paragraph anticipates an important aspect of Åberg's ideas, i.e. the use of movement as a therapeutic resource.

The following ten years Åberg worked as a physician in the city of Buenos Aires. In time, he met Dolores Cobo Lavalle (1844–1907), a 21-year-old girl from a traditional family of the Buenos Aires elite, who had come to see him for a pulmonary problem. Åberg and Cobo Lavalle married in the San Miguel parish on 11 April 1867. They had many children: Axel, Arturo, Hialmar, Ricardo, Augusto, Dolores, Ernestina, and Iver Åberg Cobo. This marriage apparently (or at least we may assume) gave Åberg access to the Buenos Aires elite.

Åberg, the hygienist

Located on a plain, Buenos Aires did not have a good drainage system, except for the areas where the wealthiest lived. The situation for the rest of the population was very precarious. Many, especially poor European immigrants and descendants of slaves in the colonial era, lived in the so-called *conventillos*,[6] under crowded conditions and without the most elementary standards of hygiene. Another focus of infection was the Riachuelo—a short river on the southern boundary of the city—turned into a sink for the sewage and waste thrown from salting- and slaughterhouses located on its margins. For lack of any sewage system, the human waste ended up in wells which contaminated a large part of the drinking water. A second source of drinking water was the Rio de la Plata. The water from the river was extracted close to the contaminated riverbank and distributed by means of carts without being subjected to any process of purification. All kinds of residues were used to level lands and streets. The streets were narrow, there were no avenues,[7] and squares were few, almost devoid of vegetation. The population had grown rapidly, mainly as the result of considerable foreign immigration, to the point there were as many Argentinians as foreigners, and the latter would come to surpass the former in a short period of time. The first Argentinian census, from 1869, recorded 177,787 inhabitants in Buenos Aires, 88,126 (49.6%) of whom were foreigners, being 44,233 (half) Italians and 14,609 Spaniards.[8]

In addition to the conventillos, from 19,000 urban dwellings, 2,300 were made of wood or mud and straw.[9]

Several outbreaks of cholera took place in 1867 and 1868, in association with the Triple Alliance War, between Argentina, Brazil and Paraguay (1864–1870), both series of events taking the lives of thousands of people.[10] Against this scenario, according to the aforementioned census, there were only 160 physicians in the city, i.e. less than one for every 1,000 inhabitants, while the public institutions were not prepared to meet the consequences of the deplorable hygienic conditions. In March 1870, the city government sent a note to the provincial Ministry of Finance reporting its lack of resources for sanitary works.

On 27 January 1871, the most aggressive epidemic of yellow fever ever in Buenos Aires broke out. Businesses were closed. The streets became deserted. There were too few physicians, and many among them became infected and died. Cadavers were not collected. The government left the city. According to some estimates, about 14,000 people died until 20 May, corresponding to 8% of the population, more than 500 on any single day. Most of the dead were Italian, Spanish and French immigrants.[11] A Popular Committee was assembled, including representatives of the civil society, to re-establish the social order. Åberg moved his family to a villa in Ramos Mejia, in the suburbs, to protect them from the epidemic, while he commuted frequently to Buenos Aires to contribute to the combat of disease.

This epidemic made the authorities aware of the urgent need to improve the hygienic conditions of the city, establish a network to distribute the drinking water, and build sewers and drains. The following year, Åberg was appointed to the Waters, Sewers and Paving Committee, which was charged of planning the largest sanitation works carried out in the city until then. Åberg believed this committee would facilitate decision making on substantial public health works, with an eye on the future geographical and demographic expansion of the city. During his term in office, the first cement factory in the country was built, a brick factory was installed in San Isidro (province of Buenos Aires), and the ceramic industry was launched. These were years of intensive work, with health care as the main focus of the attention and efforts of the committee members.[12]

Along this time, Åberg published several articles on health planning in the newspapers *El Nacional* and *La República*.[13] In the latter, he entered in public controversy with Eduardo Wilde (1844–1913) a pioneer of hygienist medicine in Argentina. These articles mainly discussed the works in progress, the brick factory in particular. Åberg summarised his interests in detail in a publication entitled *Irrigación y eucalyptus* (1874).[14] On the cover, Åberg is presented as "M. D. Cir. M.," academic member of the

School of Medical Sciences, and member of the Waters, Sewers and Paving Committee. In this text, he reviewed the committee's achievements in the period from 1872 to 1874, including water provision and the sewage system, studies on paving, cement manufacture, acquisition of land for public works, the purchase of the brick factory in San Isidro, the development of a railroad line for the transport of materials, the construction of housing for the factory workers, and of springs on the Riachuelo. In his words:

> Among many other issues which still remain, none has, in my opinion, the same relevance as that which is the subject of these pages, neither by its magnitude, nor by the results might it bear. If BUENOS AIRES, through my project, comes to carry out—for the first time in the world—the beautiful ideal of sanitation works, this is to say, besides improving the state of hygiene, the cost will be paid by the product itself; this fabulous fact will be my single, but large reward. After having written the explanation, political events of the most serious importance have unfortunately come to disturb and to annihilate the golden dreams of peace, tranquillity and progress of the true friends of the country. I express, together with them, my most sincere vows that this deplorable state of affairs will not have a duration and nature likely to interrupt the large [public] health works, which should protect the city against the horrors of future epidemics, which we are not even allowed to imagine.[15]

On 31 December 1874, Åberg left the committee and was appointed member of the Academy of Medicine.[16] On 26 August 1875, he became a member of the Municipal Council Committee, a position of which he took profit to promote, among others, the embellishment of the Paseo de Marte, the future San Martín Square. Yet, between 14 and 15 May 1877, he resigned both positions to travel back to Sweden.[17]

During his stay in his native country, Åberg attended the Second International Penitentiary Congress, held in Stockholm in 1878, as the Argentinian representative. There is indirect evidence that he participated in the medicine and surgery section of the XII Congress of Scandinavian Naturalists, in 1880, in Stockholm, when he delivered a lecture on the treatment of tuberculosis.[18]

Åberg, the kinesiotherapist

In 1884 or 1885—the exact date is uncertain—Åberg returned to Argentina to develop a novel therapeutic resource of Swedish origin: the Zander method of kinesiotherapy. But, who was Zander, and what was the method that bore his name? Jonas Gustav Vilhelm Zander (1835–1920) was a physician born in Stockholm known as the creator of mechanotherapy, which consisted in exercises performed with special machines he himself

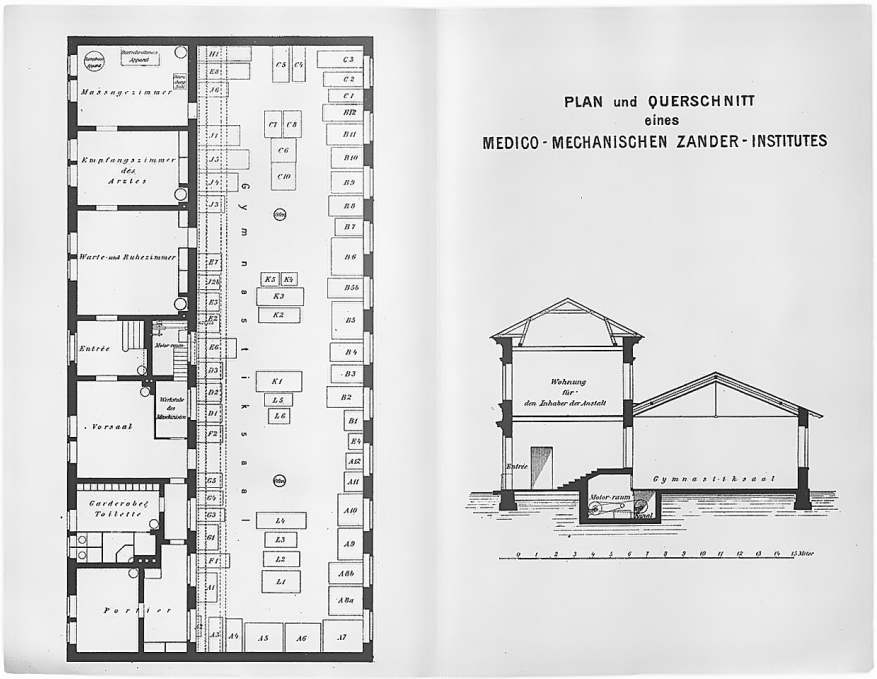

Fig 1. Floor plan and cross-section of Zander's Medico-mechanical Institute. Source: Hagströmerbiblioteket, KIB collection of offprints; Zander, A-F.

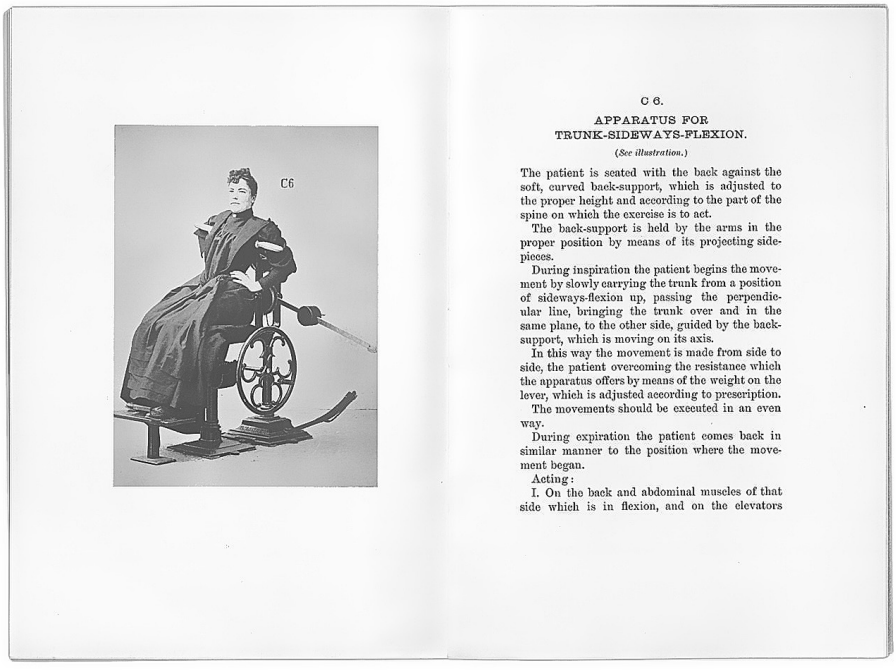

Fig. 2. Example of Zander's equipment, "Apparatus for trunk-sideways-flexion." Source: Anon., *Some information about Dr. G. Zander's method for dietetics and medical gymnastics* (New York: The De Vinne press, 1901), p. 30. Photo: Hagströmerbiblioteket.

designed.[19] Beginning this work in the 1860s, in time he founded the Zander Therapeutic Institute, in Stockholm. In 1880, he became a lecturer at the University of Stockholm, and in 1896 he was elected member of the Royal Swedish Academy of Sciences. One of Zander's interests was in expanding the geographic reach of his method through the issuance of licenses for use in different countries (Figure 1 and 2). By 1906, several institutes had been established, indeed, in many countries, and equipment was also installed in health resorts, spas, and some private properties.[20]

A booklet published by Åberg in Stockholm 1884, *El método Zander de gymnasia mecánica*, describes Zander's method.[21] In this booklet Åberg detailed the operation of each machine, which he classified as intended for active or for passive exercise. The former required users to perform active movements against a resistance, and comprised 12 exercises for the arms, 12 for the legs, and 10 for the trunk. The passive exercise equipment, which enabled 19 different actions, was activated by engines, and thus did not demand any voluntary effort from the users. The booklet further included illustrations of 22 different machines.

One may wonder why a book in Spanish was published in Stockholm, where the Spanish-speaking population was rather small in 1884. It seems safe to assume that Åberg was preparing his return to Buenos Aires, bringing the innovative kinesiotherapy method of his compatriot, Zander, with him. Upon his arrival in Buenos Aires, Åberg entered in a partnership with Dr José A. Ayerza to establish a treatment facility, namely, the Therapeutic Institute of Mechanical Gymnastics. This institute followed Zander's teachings for mechanical gymnastics, and was the first in South America to use this type of machines; from the 76 devices created by Zander, Åberg used 52. In 1888, Åberg published a second edition of *El método Zander de gimnasia mecánica*,[22] in which he introduced some changes. Of particular interest is the new preface, in which Åberg explicitly acknowledged the worth of Pehr Henrik Ling's (1776–1839) ideas on the effectiveness of muscle exercise to heal diseases.

One needs to situate these developments within the context of the changes in the notion of exercise which took place along the nineteenth century. Gymnastics appeared in Europe in the beginning of the century as an autonomous discipline with allegedly scientific bases, to then disseminate quickly across medical academies and institutions. While physicians first timidly regarded it as a therapeutic resource, the overall population saw it as a practice centred on balance, movement, and even acrobatic games, more characteristic of a circus art than of a scientifically based discipline. Part of the process of medicalisation of gymnastics involved the inclusion of physicians in the supervision of exercises to adjust them to the nature of the disease of each individual patient. Gymnastics was

understood as the part of physics that could be methodically and orderly applied to the human body, and consequently enabled physicians to enhance the forces and movements necessary to maintain health and combat disease. Towards the mid-1800s, some treatises on therapeutics published in Europe began including chapters on the powerful curative and preventive applications of gymnastics and physical exercise to some diseases, a process that gained momentum starting 1860. By the last quarter of the century, three approaches to therapeutic gymnastics prevailed: Ling's manual gymnastics, mainly consisting of passive movements and mechanical manipulations against a resistance. Second, Zander's method, which was the main interest of Åberg—and of the present study—known as mechanical therapeutic gymnastics, because it had resource to mechanical devices to determine the type and intensity of exercises, and the muscles involved. Finally, the German therapeutic gymnastics, which against Ling's view, was based on active movements without any external help, and thus could be performed by the patient alone.[23]

What were Ling's main ideas, which Åberg echoed with such strong emphasis? Ling's academic experience in medicine and in physical education helped him develop a programme of physical education grounded on scientific knowledge of the human anatomy and physiology. According to him, each and every physical educator should have thorough understanding of the morphological (anatomical) and functional (physiological) effects of exercise. Ling believed that these sciences could help students understand better the human body, and thus select physical activities wisely and prudently. Although he did not conduct scientific research to demonstrate his theory, he postulated that physical education would enable individuals to develop musculoskeletal skills, including muscle strength and tolerance, stamina, and certain motor skills, such as agility. The study of anatomy and physiology enabled Ling to perform a theoretical analysis of how the human body works optimally during sports and exercise; his goal was to determine the effects of physical activity on a variety of organs, such as the cardiovascular and musculoskeletal systems. Ling believed that physical education was necessary for the entire population, no matter whether weak or strong. He observed that exercise should be prescribed taking individual differences into account, and that the mind and the body interact in a coordinated and harmonious manner. Ling also contributed to the design of several devices, such as fixed bars, hoops, rocking ladders and climbing ropes. While in Ling's Royal Central Institute of Gymnastics, in Stockholm, students received training in one of three possible approaches—educational, military and medical gymnastics, in time his physical education system was adopted in Swedish schools.[24]

Coming back to Åberg: what did he think of Ling's method, and what differences did he find regarding Zander's? The answer to these questions can be found in the preface to the second edition of *El método Zander*:

> It was in Sweden that the immortal Ling had the brilliant idea of using muscle exercises to cure diseases; the great truth had been revealed, [i.e.] that scientifically directed and carried out against resistances, they had to constitute one of the most powerful means that science may have to influence the general nutrition of organs and tissues. The results he obtained were brilliant and many [of them] entirely unexpected.[25]

However, Åberg also found a serious flaw: "that of being manual, performed by people expressly taught, who after applying the exercises to a few, got tired; in addition, they could not exhibit the [same] degree of strength that had been applied to each individual case one day to the next."[26]

Differently, Zander's method, argued Åberg, avoided such shortcomings for using machines—counterweights and graduated levers—to provide the resistance required. Obviously, machines do not become tired, and further allowed measuring, grading, and recording the strength applied in each exercise. Åberg explains that the system worked

> in complete harmony with the physiology of muscle contraction [. . .] you must be aware of the physiological need for muscle exercises; they are called hygienic, and are considered to be highly hygienic, because they fill a need for life and health; preventive and prophylactic, *par excellence*, of diseases; but since they are subjects [i.e. human beings] or need an effort of their own will, and the consequences of neglecting them are not as compelling and obvious as those of lack of breathing or eating, few [people] comply with the wise prescriptions; this is one of the reasons why *ad hoc* facilities are highly convenient.[27]

> Lack of exercise translates, in these cases, as general weakness, anaemia, chlorosis, hysterical or nervous affections of various kinds, all of which, as daily experience teaches us, are very resistant to the common treatment, and this because the effective cause is always in force. A further example, if necessary, is provided by scoliosis, or the lateral deviation of the spine, which brings real opprobrium into the modern education system, by exposing girls, whose beauty and natural grace should be the main object to preserve, to horrible disfigurements, at an age in which these charming gifts are about to develop. As you can see, the vulgar error is very expensive, [i.e. to consider] that piano lessons or literary or intellectual education are more necessary than the physical development of the body; what good is a girl whose deformity or bad health does not inspire but pity? The proofs of this error are unfortunately frequent everywhere.[28]

Åberg advocated this method for the treatment of a variety of diseases, including "mania, insomnia, amblyopia, chorea, paralysis in different degrees, neuralgia, hysteria, anaemia, chlorosis, scrofula, rickets, general weakness, obesity, asthma, chronic bronchitis, early tuberculosis, organic heart defects, dyspepsia, stomach catarrh, *ulcus ventriculi simplex*, chronic constipation, intestinal dystonia, permanent diarrhoea, diabetes mellitus, albuminuria, uric diathesis, cerebral syphilis, menstrual cramps, uterus deviations, chronic oophoritis, scoliosis, rheumatisms, old dislocations and several joint affections."[29] He argued it was the single method based on scientific principles, and thus exalted it over other approaches to gymnastics and exercise, such as fencing, ball games, the "English games" (cricket and lawn tennis), riding, exercise on foot, and rowing, which according to him lacked any foundation, tended to exaggerations, demanded forceful work of definite muscles, while leaving others in complete inactivity, and did not allow quantifying resistance mathematically. Åberg recommended Zander's method to both the sick and the healthy, the strong and the weak, the obese and the thin, the old and the young of both sexes, including pregnant women. In particular, he stressed the usefulness of the method for girls, who would obtain "beauty and symmetry in shape," as well as "lucidity of the spirit."

Åberg first communicated the results of his work in the Therapeutic Institute of Mechanical Gymnastics in 1885, in a booklet entitled *Resultados del tratamiento obtenidos en el Instituto Terapéutico de Gimnasia Mecánica*.[30] Zander's method was unknown to Buenos Aires residents, while Åberg claimed it could heal diseases considered incurable until then. He characterised Zander's method as "a slow and gradual development of physical forces, promoted by moderate muscular exercises, well adapted to and calculated for each individual case."[31] In the booklet he listed the diseases for which the method was recommended, maintained it had better effects on women than on men, and highlighted its utility for the treatment of scoliosis, as shown by eight cases, two of them quite serious. This experience allowed him conclude: "I believe I have the right to congratulate myself on the results obtained in such a short time; results which I had hardly dared to hope, and which certainly would not have been achieved through any other therapeutic means."[32] The booklet continues describing successful cases of shoulder dislocation, pseudo ankylosis of the knee, gouty rheumatism, chronic knee synovitis, obesity, incipient tuberculosis, chronic bronchitis, and various cardiovascular, gastrointestinal and nervous system diseases. This essay was also published in the respected medical journal *Revista Médico-Quirúrgica* that same year.[33]

In March 1887, Åberg published a work specifically devoted to scoliosis. As in the case of the previous one, it appeared both in a journal and as a

booklet.[34] It concerned a 23-year-old female patient, who had been diagnosed with scoliosis at age 9, and was considered incurable. Åberg described the outcomes after 6 months of treatment, illustrated with kormometric measurements—Zander's kormometer was an instrument able to measure and record monthly advances with millimetre precision. Åberg's essay included colour tables and measurements of angles, height and eccentricity. These measurements were made on the vertical and horizontal planes, and were plotted on graph paper, which enabled easy comparisons of the progression of the spine condition over time. Here Åberg also made a strong statement on what he believed to be the contribution of Zander's method to human wellbeing:

> It is therefore with intimate conviction that I say, once these admirable machines are more generally known, once they trigger a revolution in the currently dominant ideas about this disease [i.e. scoliosis] and its origin, which must take place, once there is no city of importance lacking facilities of this kind, how many blessings the future generations of scoliotic girls will not lavish on this modest inventive genius, who will have freed them, one may say, from the true moral and physical martyrdom which science, in its ignorance, has imposed on their ancestors.[35]

That same year witnessed the publication of another booklet, *Causas, naturaleza y tratamiento de la scoliosis*.[36] This long booklet (103 pages) dealt in detail with the topics described in its title, and clearly described the cases of two female patients, aged 18 and 14 years old, treated along eight months. Incidentally, this booklet led to an interesting development: Åberg illustrated case #1 (corresponding to case #345 in his patient registry) with graphs. Researchers at Karolinska Institute located in the Hagströmer Library a folder entitled *Original teckningar i naturlig storlek af planscherna till Causas, Naturaleza y Tratamiento de la Scoliosis utförda i Buenos Ayres år 1887 Ernst* Åberg *M.D.K.M.* One of the drawings in the section on figures of chest measurements precisely corresponds to this case. Probably Åberg donated this and the other figures to the Karolinska Institute during one of his trips to Sweden.

In 1890, the Academy of Medicine of Buenos Aires granted Åberg the title of honorary academician. That same year he published in Buenos Aires a study of the treatment of pulmonary tuberculosis and other chest diseases, *De la curabilité de la phtisie pulmonaire*. This was a French version of the lecture he had delivered at the Congress of Scandinavian Naturalists in Stockholm 1880, in which he described his experience and the most relevant outcomes of 22 years with a "special therapy" in Buenos Aires.[37] Such "special therapy" consisted in treating certain chest diseases with cold water, which he then compared to the results of some experiments performed at the Sabbatsberg hospital in Sweden.[38]

Åberg travelled to Sweden in 1890, where he remained for nine years. Yet his interest in Zander's method and in the treatment of scoliosis did not decline, as is shown by the publication, in Stockholm 1893, of the booklet *Om användandet af "traitement forcé" vid skolios*.[39] In the booklet Åberg described his experience with the treatment of scoliosis at his institute in Buenos Aires. He also published a booklet on empyema, in Swedish, in 1892,[40] where he described the results of cold water treatment of men and women with pulmonary diseases (tuberculosis and chronic bronchitis) at the Sabbatsberg hospital in Stockholm. Åberg returned to Argentina in 1899, where he died on 30 May 1906.

Åberg and de-centred science: final remarks

The life story of Ernst Georg Åberg provides a good example of what may be seen as decentralised science. Educated in Sweden in northern Europe, away from the main centres of medical thought of his time (Paris, London, Vienna, Berlin, the United States), his life circumstances led him to settle in Argentina, in the southern end of the American continent.

At that time, Argentina was a question yet to be answered. Having recently emerged from bloody civil wars and postcolonial political conflicts, a process of national organisation had begun to transform it into a modern state. With an immense, but sparsely populated geography, Argentina afforded countless opportunities to learned and entrepreneurial Europeans. By marrying into a traditional family, Åberg gained access to the salons of the wealthy and learned society of Buenos Aires. He actively collaborated in environmental sanitation works, and in the combat against yellow fever. With plenty of ideas and initiatives, he soon became an asset to the local society.

Years later, Åberg brought Zander's method of therapeutic gymnastics to Buenos Aires, and with it kinesiotherapy, or therapy by movement. He teamed up with another physician, Dr Ayerza, and founded a treatment institute based on the use of machines, to which reputed physicians of the time used to refer patients. Similarly, also some of the most important local politicians sought his services.[41] As a result, science and technology originated in Sweden found their path into the Argentinian health care system. And Argentina benefited from the Swedish input.

Yet there are many more layers to explore. While developing a successful medical career in Argentina, Åberg periodically returned to Sweden to present the results of his work in Buenos Aires to his compatriots. This is evidenced by the publications which describe the outcomes of his activity as kinesiotherapist at the institute he had established in Buenos Aires.

Indeed, he did not publish only in Spanish to share his achievements with Argentinian colleagues, but also in Swedish, his mother language, perhaps hoping to be acknowledged by his compatriots, and in French, seemingly to acquire an international reputation. The same is the case of the outcomes of his treatment of patients with pulmonary diseases, published in French—at that time, the universal language of science: while they bore witness to the science made in Argentina, these publications also intended to universalise the resulting knowledge. Science originated in Argentina could thus contribute to universal science.

Åberg's was a two-way road: his repeated journeys from Sweden to Argentina, and from Argentina to Sweden allowed him transfer knowledge from one continent to another, from one hemisphere to the other. Åberg published in Buenos Aires, and also in Stockholm. The recent finding by Swedish researchers of Åberg's original materials at the Karolinska Institute is perhaps a hint of Åberg's belief in the relevance of the circulation of scientific and technological knowledge between both extremes of the world. De-centred science, indeed, in which both eccentric extremes cooperated and fertilised one another. International collaborations involving European and South American researchers, such as the project that led to this special issue, are necessary to explore more thoroughly this type of powerful links which were invisible until recently.

Notes

1. Ana M. Alfonso-Goldfarb, Hasok Chang, Marcia H.M. Ferraz, Jennifer M. Rampling & Silvia Waisse, "Chemical knowledge in transit" in *Ambix* 62:4 (2015), 305.

2. Adriana Álvarez & Adrián Carbonetti, "Introducción" in Adriana Álvarez & Adrián Carbonetti (ed.), *Saberes y prácticas médicas en la Argentina: un recorrido por historias de vida* (Mar del Plata, 2008), 11–12. On this methodological approach, see also Emilio Quevedo, "¿La salud de los sujetos o los sujetos de la salud? Hacia el rescate del papel de los individuos en la historia de la salud pública" in Álvarez & Carbonetti (ed.), *Saberes y prácticas*, 19–45.

3. The biographical information on Åberg was taken from Vicente O. Cutolo, *Nuevo diccionario biográfico argentino (1750–1930)* (Buenos Aires, 1968).

4. Ernst Åberg, *Causas, naturaleza y tratamiento de la gota*, thesis, 1856. Central Library, School of Medicine, University of Buenos Aires, Section Theses, ID 20832.

5. Åberg, *Causas, naturaleza*, 42.

6. Large and old buildings, with many rooms, used to lodge people with limited economic resources.

7. The first one was Avenida de Mayo, inaugurated in 1894.

8. Juan Carlos Veronelli & Magalí Veronelli Correch, *Los orígenes institucionales de la salud pública en la Argentina* 1 (Buenos Aires, 2004), 218.

9. Diego G. de la Fuente, *Primer censo de la República Argentina verificado en los días 15, 16 y 17 de setiembre de 1869* (Buenos Aires, 1872).

10. Abel L. Agüero & Edmundo Cabrera Fischer, *Manual de historia de la medicina argentina* (Buenos Aires, 2014).

11. Rafael Berruti, "La epidemia de fiebre amarilla de 1871." Academia Nacional de Medicina de Buenos Aires, separata, vol. 49, 1971.

12. Ernst Åberg, *Irrigación y eucalyptus: bases del proyecto presentado en la sesión de la comisión el día 8 de abril de 1874* (Buenos Aires, 1874).

13. Vicente O. Cutolo, *Nuevo diccionario*.

14. Åberg, *Irrigación y eucalyptus*, v–ix.

15. Ibid., ix.

16. Fernández Pereiro, *Datos biográficos de doctor Ernesto Aberg* (Buenos Aires, 1943).

17. The reasons for Åberg's return to Sweden are unclear, and I still did not have opportunity to examine archives in Sweden. Meanwhile, Hjalmar Fors located a letter Åberg sent to Carl G. Santesson in 1862 that might shed some light on this matter. According to this letter, Åberg still had some business or economic interests in Sweden, as suggested by a notion to his brother "A.R." [Axel Reinhold?] a notary and his economic commissioner in Sweden. Åberg further wrote (p. 2) "I have decided to wait [to send the money] for yet a few months, not to lose my 45% on [. . .] for a much more significant amount that I will simultaneously will for the upkeep of my little boy"— probably Lawrence Heap Åberg, the first son he had left in Sweden. Homesickness might also had been a reason: "An exceptionally strong, no! of lately an almost irresistible homesickness has come over me, and as I now believe, as a consequence of my improved health, I can now think seriously about this." See letter from Ernst Åberg to Carl Gustaf Santesson, Hagströmerbibliotek, Karolinska Institutet, Shelf Mark 715:32, signed in Buenos Aires on 27 May 1862, arrived in Stockholm on November 1862. I am truly grateful to Hjalmar Fors for kindly locating and translating this letter. There seem to be another letter dated 7 August 1877, from Åberg to his son, deposited at Kungliga Bibliotekets arkiv, Stockholm, but I have not yet had access to it.

18. This lecture was delivered in Swedish, and was published 10 years later in Buenos Aires in French. See Ernst Åberg, *De la curabilité de la phtisie pulmonaire et de quelques autres maladies chroniques de la poitrine par l'eau d'une base température: conférence faite* à *la Section de Médecine et de Chirurgie du XII Congrès des Naturalistes Scandinaves,* à *Stockholm, 1880, suivie de quelques observations faites douze ans plus tard sur les cas référés* (Buenos Aires, 1890).

19. See Marian Fournier, *The medico-mechanical equipment of Doctor Zander* (Leiden, 1989). There are two more recent studies of the history of Swedish gymnastics: Anders Ottosson, *Gymnastik som medicin: berättelsen om en svensk exportsuccé* (Stockholm, 2013); Hans Bolling & Leif Yttergren (eds.), *200 år av kroppsbildning: Gymnastiska centralinstitutet/Gymnastik- och idrottshögskolan 1813–2013* (Stockholm, 2013). Both books are in Swedish; again, I thank Hjalmar Fors for his contributions in this regard.

20. In Spain, for instance, several physiotherapy establishments were opened, such as *Instituto de Mecanoterapia*, in Barcelona (1907), and the Cestoma spa installed a Zander cabinet. *Instituto de Mecanoterapia*, following Zander's guidelines, was created in the Archena spa in 1912. Åberg's work became widely known in Spain; he and Georges Dujardin-Baumetz (1833–1895) were the introducers of Zander's methods in this country. On the arrival of these ideas in Spain, see Xavier Torrebadella Flix, "La influencia de la profesión médica en la educación física española del siglo XIX y principios del XX: análisis social del Manual Popular de Gimnasia de Sala Médica e Higiénica del Dr. Schreber" in *Cultura, ciencia y deporte* 9:26 (2014), 163–175.

21. Ernst Åberg, *El método Zander de gymnasia mecánica, siendo una descripción de todos sus aparatos, su uso y su acción terapéutica reunida y traducida por Ernst Åberg, M. D. CH. M. Miembro Académico de la Facultad de Ciencias Médicas en Buenos Aires* (Stockholm, 1884).

22. Ernst Åberg, *El método Zander de gimnasia mecánica: descripción de todos sus aparatos, su uso y su acción terapéutica por Ernst Åberg* (Buenos Aires, 1888).

23. Torrebadella Flix, "La influencia de la profesión médica."

24. Samantha Melnick, "Per Henrik Ling—pioneer of physiotherapy and gymnastics" in *European Journal of Physical Education and Sports Science* 1:1 (2015), 13–18.

25. Åberg, *El método Zander* (1888), iv.

26. Ibid.

27. Ibid.

28. Ibid., v.

29. Ibid., vii.

30. Ernst Åberg, *Resultados del tratamiento obtenidos en el Instituto Terapéutico de Gimnasia Mecánica en los cuatro primeros meses mayo-setiembre* (Buenos Aires, 1885).

31. Ibid., 3.

32. Ibid., 9.

33. Ernst Åberg, "Instituto Terapéutico de Gimnasia Mecánica. Resultados obtenidos por el tratamiento" in *Revista Médico-Quirúrgica* XXII:13 (1885), 200–209.

34. Ernst Åberg, "Un caso de joroba escoliótica tratado en el Instituto Terapéutico de Gimnasia Mecánica" in *Revista Médico-Quirúrgica* 23 (1887), 359–365; and *Un caso de joroba escoliótica tratado en el Instituto Terapéutico de Gimnasia Mecánica* (Buenos Aires, 1887).

35. Åberg, *Un caso de joroba*, 5.

36. Ernst Åberg, *Causas, naturaleza y tratamiento de la scoliosis, ó sea de la curvatura lateral de la columna vertebral* (Buenos Aires, 1887).

37. Åberg, *De la curabilité*, 6.

38. Ibid., 13.

39. Ernst Åberg, *Om användandet af "traitement forcé" vid skolios* (Stockholm, 1893).

40. Ernst Åberg, *Empyem* (Stockholm, 1892).

41. For instance, Domingo Faustino Sarmiento (1811–1888), one of leading politicians and president of Argentina, according to Carlos Åberg Cobo, personal communication.

Abstract

Transit of knowledge and de-centred science: the journeys of the Swedish physician Ernst Georg Åberg. Jaime E. Bortz, MD, MA, PhD, Professor of History of Medicine, University of Buenos Aires, Argentina, jaimebortz@yahoo.com.ar

Ernst Georg Åberg (1823–1906) was a Swedish physician who, after falling ill of tuberculosis, moved to Argentina in 1855, where he obtained the revalidation of his medical degree. In subsequent years, he integrated into Buenos Aires society, and was appointed to a number of important positions before travelling back to Sweden. In 1884, Åberg founded in Buenos Aires the Therapeutic Institute of Mechanical Gymnastics or Kinesiotherapy Institute, following the principles of the mechanical gymnastics developed by the Swedish author Gustav Zander (1835–1920) and innovative by virtue of its application of gymnastics machines to therapeutic purposes. That same

year he published *Zander's Mechanotherapy*, which is considered the first publication on the therapeutic virtues of exercise in the Americas. His work made Argentina one of the pioneering countries in the training of physical therapists in the region. The aim of this paper is to explore the role Åberg played in the implementation of the Swedish science of movement, gymnastics, and physical treatment as an innovative therapeutic option, and also to explore a model of circulation of knowledge between two 'de-centred countries,' Sweden and Argentina, at the end of nineteenth century.

Keywords: Gustav Zander, mechanotherapy, Swedish medicine, Argentinian medicine, nineteenth century, decentred science