Mobilising skill and making skill mobile

Crafoord's surgical tours in South America, 1950–1965

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Introductory letter

On 23 February 1949, the 31-year-old Argentinian physician Rafael Alascio Escobar wrote a letter to the Swedish professor of thoracic surgery Clarence Crafoord (1899–1984). Alascio had graduated from Universidad Nacional de Córdoba, Argentina, in 1942, to begin his surgical training with Professor Juan Martín Allende (1895–1990), a respected thoracic surgeon in Córdoba,[1] followed by general surgery practice at a military hospital under the supervision of Dr Oscar Ivanissevich (1895–1976).[2] With Allende, Alascio specialised in thoracic surgery, which he further developed at Instituto de Tisiología and the British Hospital in Buenos Aires, and the San Juan Hospital in the city of La Plata.[3] Alascio was therefore an active surgeon when he wrote to Crafoord. However, to improve his skills he desired to travel abroad, and requested to be allowed to work under the supervision of the Swedish professor in his ward at the Sabbatsberg Hospital in Stockholm.

Initial contacts and introductory letters seldom reveal the trajectory and outcomes of relationships and ensuing actions. Alascio's is no exception in this regard. Still, this apparently simple request might be also regarded as the starting point of the story I tell in this paper: how the Swedish surgeon Clarence Crafoord made four tours to South America. My overall goal is to unveil aspects of the design and execution of those tours, which partly planned, partly *ad hoc*, represent an effort to make learning and teaching skill mobile. As such, the trips present us a series of

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questions about skill: how is it entrenched in different cultures and places, while embodied into the practices of individuals? How is it passed to others close to masters and virtuosos? What transpires between masters and disciples? More specifically, what can be exchanged between well-established professionals in definite fields? What is exchanged? How much work does the transfer of skill from one individual to another, or even from one continent to another, require? Crafoord's tours, arguably intended to achieve such aims, might indeed reveal interesting aspects of our understanding of skill.

These tours were insistently described as a success: the press actively reported on their contributions to both patients and surgeons.[4] However, they do not seem to have left significant imprints on historical accounts of the development and expansion of thoracic and cardiovascular surgery in the visited countries.[5] This is to say, they do not appear to have been regarded as pivotal for the expansion of these medical specialties. Instead, histories of surgery in these countries have had a preference for a diffusionist and biographical perspective. They have focused on trips abroad and formative stories which may have influenced key actors and institution builders. This, I argue, makes Crafoord's trips even more interesting from a historical perspective, as a clue to understand the transfer of knowledge and skill, while also revealing the current historiography on the performance of skill.

Mobility of skill: skill on the move

What is skill and how can it travel? How do the embodied traits of a practice, such as surgery, cross borders? The questions I address in this paper are by no means straightforward or simple. To answer them, I adopt an empirical approach, and thus focus on an example—or eventually an invention—of how the subjects (i.e. the surgeons) tried to practically amend the difficulties associated with the attempts at making skill travel, this is to say, training tours as a solution to the problem posed by the situatedness of skill.

In a seminal keynote address from 2006, the historian James A. Secord argued that one may study "science as a form of communication," and that diverse challenges within the history of science converge on a common interest in the circulation of knowledge.[6] While this shift of focus explicitly or implicitly depends on the variant of communication theory one adopts,[7] this approach has been particularly fruitful to understand science as a practice, i.e. as a situated accomplishment, whereby it becomes locally bound and contingent. Thus, "to make knowledge move is the most difficult form of power to achieve."[8] The travelling of science,

knowledge or skill then becomes a phenomenon, a mystery, in need of explanation; the mobility of knowledge needs to be explained. Bruno Latour argued in an article from 1986 that there are two models to "explain the spread in time and space of an order, of a claim, of an artefact"[9]: as an inner force (inertia) or as something that is actively accomplished by external actions. According to the first explanation, the diffusion model, mobility is self-explanatory, it is included as the inertia of the truth of science or the utility of innovations. In this case, the acceleration of, and the resistance to diffusion need to be explained and analysed. If instead one explains mobility as a consequence of actions, which Latour described as a translation model (later called the interessement model), then any form of temporal or spatial movement has to be explained, it "is in the hands of people,"[10] so to speak. According to the translation model, circulation is the result of chains of negotiations and translations by which knowledge, or skill, passes on from one actor to another; it no longer is an energy that can be capitalised, but something that is actively passed, and as such, also transformed in line with the actors in the chain.

Science and technology studies have emphasised the interactional collective dimension within the exchange of knowledge and skill. For example, Harry Collins and colleagues argued: "The only known way to become a socially competent entity is by going through a process of socialisation."[11] This is particularly apparent in discussions on the role of apprenticeship intertwined with the notion of skill.[12] Skills "can be mastered only through the embedding of the learner in the relevant social group. The coordination of polymorphic actions depends on the kind of understanding of the relationship between observable behaviour and meaning that comes with socialisation."[13] The authors argue that although such learning process might be guided by instructions, the latter are not sufficient to define what is learned, neither can directives replace the experiences acquired while mastering a skill. This also makes skill vulnerable and dependent on the social activities of practitioners. A skill that loses its context cannot resurface: it can only deteriorate and disappear.[14] Hence, when referring to skill, as e.g. surgical skill, many scholars describe it as tacit knowledge, i.e. a type of knowledge that cannot be formalised.[15] However, as Rachel Prentice pointed out, understanding that surgery is tacit does not limit us in our effort to illuminate a variety of aspects, such as socialisation, embodied physical elegance, situated knowledge, and intuition, which sometimes are lumped into all forms of non-formalisable knowledge.[16]

While sociological studies of skill struggle with its illusive nature,[17] historical studies can point out national styles and differences which appear when time and space are stretched. The significance of skill is particularly apparent in the history of medicine, especially in the history

of surgery, since "skills are at the heart of modern medicine [...]. Impossible to deny, yet notoriously hard to define, skills in medical history are everywhere and nowhere at once, persistent through its sources and yet rare as organising principles of scholarship."[18] The historian Thomas Schlich, for instance, provided several accounts of surgical skills and how they are "embedded into wider cultural expectations and evaluations, which changed over time."[19] Seeing surgery as a performance, Schlich outlined different styles of surgery which changed over time, and were assessed differently in different times and places. As performance, surgery may be studied as an embodied practice, as an accomplishment, as an enactment, in which something is staged with an audience in mind.[20] Referring to Michael Worboys, Schlich argued that performance also highlights the interdependence and co-production of theories, meanings and practices in a setting within which actors assemble available elements, new and old, from various fields.[21]

This theoretical outline enabled Schlich to study performances of surgical skills, and show how the notion of skill changes in relation to the socio-cultural settings in which audiences of peers assess these 'abilities.' In what follows, I shall look into the abilities which were communicated between surgeons in Argentina, Brazil and Sweden, by focusing on Clarence Crafoord, a thoracic surgeon who undertook four tours to South America between 1950 and 1965 to teach to colleagues in Brazil, Argentina, Uruguay and Chile. These tours were conducted to transmit the skill of this famous Swedish surgeon, who was *skilled* in his work. They were also an instance of socialisation beyond borders of nations, which made the participating surgeons members of a select group within the physician's profession that adhered to the skills manifested by the performing surgeon. Crafoord was engaged in teaching a specific and complicated skill.

The thoracic surgery ward at Sabbatsberg

Clarence Crafoord was regarded by contemporary physicians as one of the pioneers of modern surgery, particularly cardiovascular and pulmonary surgery, i.e. thoracic surgery. He was a skilled surgeon, as in the adjective form of the term: to have acquired mastery of or skill in something, such as a technique of a trade.[22] He was also acknowledged within the high social circles of the Swedish capital; he was a member of the Swedish Prime Minister Per Albin Hansson bridge club, and a hunting partner of the royal family.[23] He was nominated three times (1948, 1951, 1953) by five different nominators to the Nobel Prize in Physiology or Medicine.[24] This assessment by colleagues was earned though his actions in the operating theatre, namely, the place where the surgeon played out his repertoire.

And by performing successful operations, some of them ground-breaking, his reputation grew. Activities in the operating theatre have been the main focus of studies on surgeons' skill and on the continuous negotiations between understandings of bodies and the anatomy of the patient in question.[25]

One of the performances (stories) which contributed to create Crafoord's reputation as a skilled surgeon was his successful Trendelenburg operations.[26] Pulmonary embolism is a fatal process by which clotted blood goes to the heart, to then move along the bloodstream up to the pulmonary arteries, thereby killing the patient. In 1908, Friedrich Trendelenburg (1844–1924), in Dresden, demonstrated a procedure to remove emboli from the pulmonary artery.[27] This procedure was regarded as rather uncomplicated with regard to incisions, but required speed and individual skill from the surgeon to be successful. Trendelenburg himself performed this procedure with patients without success. In 1924, Martin Kirschner (1879–1942), in Königsberg, became the first surgeon to perform a successful embolectomy. Two years later, Crafoord and Knut H. Giertz (1876–1950) attempted it, but failed. Nevertheless, Crafoord was willing to try again, and in 1927 he could save the lives of two patients on the verge of dying by pulmonary embolism. They were, respectively, the third and fourth cases of successful Trendelenburg operations worldwide, this is to say, the patients survived the procedure. By this time, Crafoord was not yet the head of the ward, which made his feat even more impressive. Crafoord performed a total of 22 operations, with three survivors;[28] a small rate, indeed, but a major accomplishment by comparison to the caseload of other surgeons across the world. Indeed, surgeons in the United States had practically abandoned this technique by the early 1940s as a function of its high failure rate. As the North-American surgeon E. D. Churchill observed, "the procedure could perhaps be more properly termed an immediate post-mortem examination than a surgical operation."[29] The first successful operation in the United States was performed in 1958.[30] In hindsight, this technique pushed the limits of, and perhaps exceeded, what the contemporary surgical skills and medical knowledge could achieve within thoracic surgery.

The fascinating feature of the Trendelenburg operation is not so much the surgical technique as such, but the performative tale of prowess and reputation it created. As a signifier indicating that Crafoord was one of few surgeons who had succeeded in saving lives through a complicated method,[31] it became a way of communicating skill that was comprehensible to a wider community. Hence it was a part of establishing Crafoord's reputation as a top performing surgeon beyond the professional group of peers that otherwise assess the quality of a performance.[32]

It also marked the beginning of a golden era for thoracic surgery in Stockholm. Crafoord was behind a number of national and international achievements in this field, while he built a specialised clinic for patients requiring thoracic surgery. He often collaborated with engineers and chemists to improve surgical resources, for example, in the development of the spiropulsator, to wit, a machine that administered oxygen and narcosis to the patient on the operating table.[33] Further examples are Crafoord's collaboration with the biochemistry professor Erik Jorpes (1894–1973), the purification and administration of the anticoagulant heparin in 1935,[34] and a Swedish version of the heart-lung machine.[35] Crafoord further earned a reputation through the development of new surgical procedures, for example, coarctation of the aorta repair (1944).[36] The combination of technical tinkering, laboratory experimentation and surgical brilliance became the sign of Crafoord's success, as someone signing as 'Malice' wrote in the Swedish newspaper *Dagens Nyheter* in 1949:

> The revolutionary (the term is right!) aspect of Clarence Crafoord is that he did not choose to become a surgeon or a scientist, but he chose to become both at the same time, out of the essential conviction that this is the only right way to do things if you really want to achieve therapeutic results. He has always built his practical surgical activities on previous year-long experimental research.[37]

Most of these accomplishments took place at the Sabbatsberg Hospital in Stockholm, where Crafoord was in charge of an operating theatre and a ward, while in the basement of the pathological department he conducted experiments together with his students and staff. After 1945, the government made significant investments in medical research and education, and in 1948 Crafoord was appointed the first professor of thoracic surgery in Sweden.[38] This appointment came with a promise to build a thoracic surgery clinic next to the state hospital Karolinska Sjukhuset, inaugurated in 1940. In 1957, the new thoracic surgery clinic opened, with a state-of-the-art operating theatre and a top floor for experimental work, financed by the Rockefeller Foundation in New York.

Historical and sociological studies of surgery tend to focus on these sites, as well as in the situated practices which unfolded in the operation theatre. As the latter's name indicates, the operating theatre provides an educational opportunity to gaze, to see the surgical performance. Like a play, surgical incisions are staged, enacted in every sense of the word. It is also a stage with restricted access, high levels of sterility, and only available to a selected audience. The amount of people is also limited by the space that the surgeon needs, and the restriction of the 1:1 scale of the

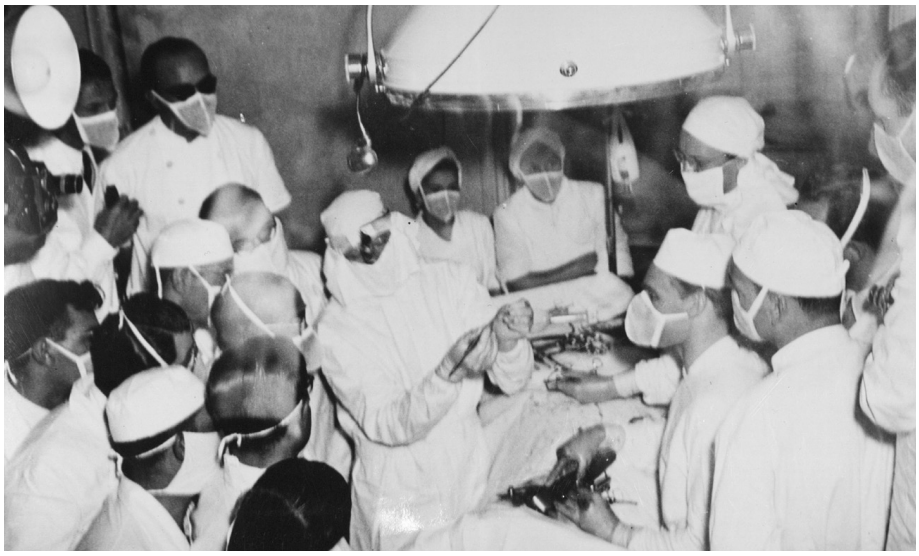

Fig. 1. A group of physicians in Córdoba observing Crafoord in action. Source: Medhist arkiv KI, Clarence Crafoord.

body itself (Fig. 1). Through his surgical triumphs, Crafoord attracted an international audience. Which takes us back to the letter sent by Raphael Alascio Escobar.

Visiting Sabbatsberg: foreign apprenticeship

In many ways, Alascio's letter resembled many requests by physicians all over the world, asking to attend Crafoord's clinic. The reasons for these requests varied, but at least according to Crafoord, there was a general perspective of welcoming openness to most physicians interested in his work. Thus Alascio was not subjected to any specific vetting to be invited to the operating theatre at Sabbatsberg.[39] As Crafoord pointed out in a letter to the Swedish ambassador in Brazil, Knut Thyberg,[40] the medical professors in Stockholm welcomed foreign physicians to attend the clinic.[41]

Although Crafoord's letter describes visits in general terms, it can be regarded as an account of the—*ad hoc*—practical arrangements for visiting apprentices. There were no explicit obligations from either part. Visitors could attend, but at their own expense, and with no resource other but their own ability to ask questions and participate in procedures, practices and discussions. There was also some support available through the Svenska Institutet. Yet Crafoord's response betrays some degree of hesitation: the lack of formal structures could mean that poorly qualified physicians would attend the clinic without learning anything, to then cite the surgeon's name (here, Crafoord's) as a means to attract fame—and patients—

in their own countries, without having acquired the skill associated with the visited clinic (i.e. Crafoord's).[42] To minimise this risk, Crafoord (and also other professors at Karolinska Institutet) relied on recommendations made by people they knew or knew of (in the letter to Thyberg, Crafoord mentions renowned surgeons in Brazil who could vouch for the potential visitor, including Jorge de Moraes Grey and Edmundo Vasconcelos).[43] Alascio came with a recommendation by the Argentinian physician Prof Dr Alfredo Givré, who described his friend as an "industrious man, very intelligent, and who will make good profit of his time."[44] While not an authority in thoracic surgery, but a neurologist, Givré had met Crafoord while working as an assistant to Professor Herbert Olivecrona, a Stockholm neurosurgeon contemporary to Crafoord, and as famous, if not more, as him.

On 11 March 1949 Crafoord wrote back to Alescio, inviting him to attend the clinic. Right away, he pointed out:

> If you intend to stay for so long a time as ½–1 year, you must immediately start to get some training in the Swedish language. For shorter periods of time, knowledge of the Swedish language is not necessary, but to benefit properly from such a long stay, it is necessary to be able to follow conferences, to be able to talk with patients and the female personnel and to read, and also to take case histories, and direct investigations, and so on. For shorter periods, it is quite enough to watch what is going on, and to ask questions to get the full value out of the time spent, but direct contact is very important in order to absorb everything concerning diagnosis and aftertreatment.[45]

While the letter can be mainly seen as an invitation to participate in the ward activities, Crafoord simultaneously revealed some aspects of the cultural entrenchment of skill and learning practice. Crafoord distinguished between watching a surgical operation and understanding the treatment system from case histories and patient experiences, the ward organisation, meetings and preparations at the hospital. To understand the latter, one had to master the language and be able to communicate, instead of observing only. Linguistic competence, and the doors it opens, were thus valuable for the procurement of skill—a two-sided token: how visiting physicians in Stockholm should learn, and how Crafoord should teach abroad. Yet, Crafoord's remarks were not restricted to language alone, but indicate that the achievements in the operating theatre were embedded within the hospital care system, from patient history and patient interaction to aftertreatment and collaboration with the entire staff. Therefore, to understand the surgery virtuoso, one had to follow and understand the ensemble, or assemblage, that enabled success, and the

entire system at Sabbatsberg, which was part of the success. Crafoord hinted at this aspect in his remarks: during a short stay, a visiting physician could just be dazzled by the performance in the operation theatre, but for a longer stay, the visitor needed to learn the trade, enrol in the system, in the assemblage that created the performance of skill.

Preparations in Sweden: the promise of a training tour

Alascio accepted Crafoord's conditions and prepared to learn some initial Swedish prior to his visit; then he travelled to Stockholm and began his training. During his time in Sweden, Alascio received a letter from the Minister of Social and Public Health of the Buenos Aires province, Carlos Alberto Bocalandro, dated to 20 September 1949, in which he told Alascio that Senator Mauricio A. Scatamacchia was willing to purchase medical equipment from Sweden, up to a cost of 20,000 Swedish crowns, for surgical use.[46] Apparently, Bocalandro's letter was part of a larger exchange, as it refers to a previous proposal. The minister observed that Alascio was expected to travel across Argentina to demonstrate how the equipment was to be used. He further stated that were it possible to encourage Crafoord to participate in these demonstrations, the deal would be even better, for which purpose he could have "*pesos en la maleta*" (some money in his suitcase) were he would not be kicked out of office before that.[47] The implication was that there were financial muscles twisting the political landscape, regardless whether the money was used to develop business contacts, for bribery or other uses. In a later letter, Bocalandro pointed out difficulties to send the instruments, but also added that Alascio should obtain the addresses of Swedish physicians to officially invite them to visit and work for some time in Argentina.[48] The money from Argentina, and Alascio's prospect of returning to his country accompanied by such a renowned authority in surgery as Crafoord, spurred the planning activity that resulted in the latter's first trip to South America. This trip had four separate, but interrelated agendas: to display, and possibly sell, new surgical instruments imported from Sweden; to learn from Crafoord through the performance of surgical operations in Argentina; to attract about 20 Swedish physicians with stipends to Argentina for two years at least; and celebrate Alescio's triumphal return to the country.

This was not the first time Crafoord would travel abroad to perform surgery. He had been one of 15 teaching staff members who, in the aftermath of World War II, visited Poland and Finland under the coordination of the Unitarian Universalist Service Committee and the World Health Organisation (WHO). The programme consisted of conferences, lectures

and operations, performed in both countries from 1 July to 27 August 1948.[49] Based on letters exchanged between Dr Erwin Kohn (WHO) and Crafoord,[50] the participants began discussing the possibility to create 'WHO Congenital Heart Disease teams.' In a letter dated 30 August 1949, Kohn described the composition of such teams:

> The team would possibly consist of a surgeon and of his assistant, an anaesthetist, operating room nurse, and a cardiologist with particular experience in this field. The duration of the team's activities may not exceed one month. During this time, therefore, a number of important surgical centres of one larger country may be visited, or perhaps two smaller countries could be covered by visits of two weeks each.[51]

In a later letter (from 26 October 1949), besides promising funds for such teams, Kohn also described ideas for activities, including surgical operations, lectures, panel discussions, and educational agreements between local authorities and the team leader. Kohn promised that WHO would provide the necessary surgical equipment, and that these technologies would then be donated to the surgical operating theatres in the targeted countries, as a means to help the participating surgeons to continue the learnt practices. The experience gained in the trip to Poland, and the discussions held with Kohn and Dr Edgar Mannheimer[52] influenced Crafoord's demand for an entire team, i.e. an entourage, to accompany him on the trip to Argentina. The team thus recruited included the cardiologist Johan Karnell, the surgeon Lennart Johansson, the anaesthesiologist Olle Friberg, the operating room nurse Hellevi Camp, and Crafoord's secretary, Margareta Hammarberg.[53] The original plan was to visit Argentina only, with a group that Crafoord trusted and could perform the type of surgeries for which he was famous.

The tour in Argentina

On Saturday 11 March 1950, the airplane departed at 8:45 from the Bromma airport in Stockholm, Sweden. The flight took ample of time. The group flew first to Copenhagen, Denmark, then to a military airport in Frankfurt, Germany, and to Geneva, Switzerland, before landing in Lisbon, Portugal, at midnight. In Lisbon, beds were made in the airplane to enable the passengers to sleep during the flight to Dakar, Senegal. The flight landed in Dakar at 5:00, to then continue over the ocean and the equator. The passengers ate lunch only when the airplane landed in Recife, Brazil, and then departed to Rio de Janeiro. It was raining heavily in Rio de Janeiro, but a Finnish physician who had worked at Sabbatsberg hospital, Dr Erik Unonius, travelled from São Paulo, where he lived, to meet the

delegation. In Rio de Janeiro, the group also met one Dr Nicolaeff.[54] By midnight, the trip continued to Montevideo, Uruguay, before the airplane finally reached Buenos Aires.[55] This lengthy trip reminds one of the tedious and dull tasks embodied within the practice of mobility: Alascio's travelling time to Sweden, and the exhausting flight of Crafoord's team were prerequisites for skill to move. The trips as such are part of the performance and materialisation of mobility and of the work necessary to accomplish this translation of skills.

The reception on arrival was spectacular: a large delegation met the group at the airport, then led them to their lodgings at Instituto de Tisología in La Plata, about 58 km away from Buenos Aires. This hospital was new, and presumably part of Senator Scatamacchia's investments in the local healthcare system. Margareta Hammarberg described the hospital as so new, that "nothing seemed to have been used ever."[56] It became obvious that Crafoord's visit was a means to foster the new hospital's reputation. Later on, however, this choice proved to be a miscalculation. In a letter the secretary of the Swedish embassy, Carl-George Crafoord (a relative of Clarence Crafoord) described the rise and fall of this clinic: the season weather had destroyed the paintwork and part of the construction, making it look run down just a few months after the visit. To make things worse, the building had been erected on top of a termite mound, and the ants had destroyed the lower floors.[57]

Crafoord also performed surgical procedures in Buenos Aires. Some preparations had been made through letters, especially concerning patients to be prepared for Crafoord's visit. Thus, on 25 February Dr Isidro Perianes, a surgeon working with the renowned cardiologist Pedro Cossio, in Buenos Aires, had sent a letter in which he told Crafoord:

> We are anxiously waiting for your visit, as we have known you so much through your valuable works in the cardiac surgery field. I expect you remember me by the letters I wrote to you some time ago, about problems of experimental cardiac surgery. We shall be happy if you, and your coworkers operate according to the following plan:
>
> 1) an anastomosis carotid-y[/j]ugular for convulsivant oligophrenic cerebropat[h]ies, in the Service VI of Pediatrics (Hospital de Clínicas)
> 2) a ses[s]ion of coronary and brain perfus[s]ion with completely interruption of circulation, in the F[Phy]isiological Institute (based on your experiments)
> 3) a coar[c]tation of aorta or a mitral valvulotomy, in the Service II of surgery (Hospital de Clínicas)
> 4) examination of some patients with tricuspid valvulotomy and ligature of the inferior cava vein for heart failure, in the Service IV (Hospital de Clínicas).

> It will be a great honour for us if you accept at least only one point of those suggested, although we expect you will accept all. We shall be waiting for your arrival.[58]

This letter reveals some aspects of the organisation of training tours, namely, the relevance of finding educational cases, patients who could represent the performance the surgeon was about to put on stage (or operating theatre). The various hospitals Crafoord visited were part of the organisation and utilisation of his time during his stay in the country. The hospitals in La Plata and Buenos Aires were part of the setting for the local politics of both physicians and politicians in Argentina, namely the hosts to the tour in which Crafoord had little leverage to meddle in.

The journey to Brazil was not part of the original plan, but resulted from the meeting with, and the powers of persuasion of Dr Nicolaeff at Rio de Janeiro airport while on the way to Argentina. The Swedish general consul in Rio de Janeiro, and also representative of the medical companies AB Stille-Werner and Schönanders,[59] Tor Janér, was enrolled to make the practical arrangements.[60] The Brazilians' objective was to ask Crafoord to visit the new State Civil Servants Hospital (Hospital dos Servidores do Estado, HSP) hospital, under the supervision of Dr Raymundo de Britto.[61] The surgeries were scheduled, and prepared by de Britto, and included one heart- and one lung-disease case. Crafoord was also expected to deliver a lecture, preferably in French or English, on a subject of his choice. Professor Edmundo Vasconcelos wanted Crafoord to visit and deliver a lecture in São Paulo but Janér suggested he should fly to Rio de Janeiro instead.

A more critical insight into the degree of medical proficiency, and also of the moral standards in Brazil was provided by the Finnish surgeon Erik Unonius, a former Crafoord's apprentice at Sabbatsberg hospital, who had moved to São Paulo in the second half of the 1940s. By 1949, Unonius worked for the Swedish pharmaceutical company Vitrum (Apovitrum Ltda.) which sought to open a Brazilian market for their products. Letters exchanged between Unonius and Crafoord make clear that Unonius's goal was to establish a private thoracic surgery practice, which required money. Furthermore, Unonius was sceptical as to the conditions of the medical profession in São Paulo: according to him, surgical procedures, diagnosis and anaesthesia were too primitive, and thoracic surgery had a too high mortality rate.[62] Nevertheless, he came to assist as translator during the surgical demonstrations which Crafoord performed in Brazil.

A second trip?

In many ways, the first tour to South America was considered a success. Or at least, it did not take too long for Clarence Crafoord to consider another trip to Brazil and Argentina. Alascio, together with 40 other physicians, had created a private sanatorium that was going to be inaugurated in November 1950, and wanted Crafoord to work in it, for which he offered a salary of 200,000 pesos/year, a house, servants, and paid trips for the surgeon and his family.[63] On 10 July 1950 Crafoord declined the offer, but suggested an alternative, since "I have had a very generous offer from Brazil and I have promised that if it is possible I might perhaps come for some time in March-April 1951."[64] Crafoord's required from Alascio to provide competent personnel, and different types of patients for his demonstrations and lectures, who should also be able to pay sufficiently large fees to be transferred to Crafoord's bank account in the United States.

Crafoord's final demand perhaps echoed some conflict during the first tour: "I would also like to have some sort of personal note from dr Boccalandro and dr Carillo that they are in agreement with your plans so that there will not arise any unpleasantness between you and me on the one side and the authorities and your colleagues on the other."[65] It seems that in the end, this was the reason for Crafoord to postpone any plans to visit Argentina again. Alascio cryptically responded: "The pig man that you know is always the same kind of pig. I am very sorry because he obstaculized all my work, and now he pretend[s] to do disturb[ed]among Bocalandro and I."[66]

While the visit to Argentina was declined, the idea to visit Brazil remained on the table longer. It was raised during the first tour, in a conversation between Tor Janér and Crafoord. The idea was for him and Olivecrona to travel to Rio de Janeiro and establish two departments, one for neurosurgery and the other for thoracic surgery.[67] Both professors were initially interested, besides the fact this would allow them "earn large sums of money," as Tor Janér wrote.[68] Yet political uncertainties made Janér have some doubts. First of all, Britto, who was assigned a central role, was planning to resign his position as hospital director. Then, Olivecrona and Crafoord had a second plan, namely, to establish those departments in a private clinic run by Dr Fernando Paulino. Janér consulted Britto in this regard, who, however, hesitated, since this type of endeavours had to be mandatorily reported to the authorities, which could make the project expensive and with serious implications. Finally, the presidential election to be held in October 1950 could substantially affect Britto's connections.[69] As a result the second Brazilian tour too was postponed.

From a trip to a learning model

Despite many proposals and suggestions to repeat the experience, it took three years before Crafoord and his team visited South America again. As in the first occasion, the main organiser of the trip was a South American physician who had received longer training in Sabbatsberg and accompanied his mentor. This was Dr Alberto Barcia[70], from Montevideo, Uruguay, who coordinated most of the trip together with the Uruguayan embassy. The cost was split with Chile, since three Chilean physicians, Dr Pedro Uribe Concha, Dr Svante Törnvall and Dr Carlos Patillo, had made visits to Crafoord in Stockholm as part of their learning tours in Europe. A large amount of equipment manufactured by the Swedish company ELEMA was transported to Montevideo and Valparaíso. The tour included also Brazil; given that the contact with Janér and Unonius had become well established, the plans took shape in advance. Crafoord's group visited the São Paulo School of Medicine and the thoracic surgeon Euryclides de Jesus Zerbini in São Paulo.[71] Erik Unonius was hoping that Crafoord's visit to São Paulo could propel his efforts of getting a license to practice as a physician in Brazil (he held a license in Scandinavia, but not in Brazil, and previously been a physician in Crafoord's hospital).

A third trip was also prepared by Dr Barcia, and included four countries: Brazil, Uruguay, Argentina and Chile. On this occasion, the group included two engineers from the Swedish engineering company Aktiebolaget Gasaccumulator (AGA), and brought a heart-lung machine (MDHC-5) designed by Per Åstradsson at AGA, which the company had developed in collaboration with Crafoord. In 1965, when the last tour was made, Crafoord was already on his way to retirement; the trip was funded by the Swedish government agency NIB (Nämnden för Internationellt bistånd, a predecessor to the Swedish International Development Cooperation Agency, Sida), and only the province of Mendoza was visited.

While in this paper I primarily focused on Crafoord first trip to South America, all four of them developed as extensions of the aspirations and endeavours of local physicians who had first travelled to learn from him in Sweden. These surgeons succeeded in gaining Crafoord's trust, to the point he agreed to follow them back to South America. The different translations of skill, and the ways Crafoord and his disciples actively engaged in the effort of moving skill reveal the mutual interdependence between audience and surgeon. Thomas Schlich's view of surgery as skill enacted as a performance helps clarify the challenges which had to be overcome. For instance, in Stockholm Crafoord could monitor the access to his operating theatre, but in the tours the gatekeepers were his hosts. This dimension, and shift of control from surgeon (Crafoord) to host (e.g.

Britto), differ in regard to previous discussions about the history of surgery which focus is on opposition of selected vs. public audiences.[72]

The notion of surgery as performance also points to the many different practical aspects necessary to perform at the operating theatre of the Sabbatsberg hospital, as well as to take thoracic surgery on tour. While Crafoord was the undisputable star of the show, several other, supporting actors, technologies, props and assistants had to function harmoniously for skill to be played out. Notwithstanding Crafoord's skills, more people and things had to be transported. Skill was part of the professionals' system, a workforce, together with the equipment and drugs which should be available to orchestrate an operation based on a set of skills similar to those taught in Sabbatsberg. Clarence Crafoord was thus more than just a surgeon who embodied skill: his skills were distributed and collectively actualised by his machines and a larger team of professionals.

While in this paper I analysed a quite short period of time, during which Swedish surgical skill was 'exported' to South America, it remains to be investigated whether these tours did indeed influence audiences and surgical practice in South America. Brazil and Argentina are both currently famous for their thoracic surgery traditions, however, this can no longer be said of Sweden. Yet, in the 1950s and 1960s the situation was different, and surgeons can be regarded as interchangeably collaborating and competing with each other. The tours were, as a fact, an opportunity for intellectual and economic exchange. The medical systems in South America provided an occasion for Swedish surgeons to earn wealth from their skills, and for Swedish technical and pharmaceutical companies to develop new markets. The training seasons at Sabbatsberg and the tours served as display windows. To the local hosts, this exchange could accelerate their careers or improve their medical status, it also attracted the public attention to the new discipline of thoracic surgery and its possibilities.

Interestingly, none of the surgeons who spent long seasons with Crafoord in Sabbatsberg became the stars of thoracic surgery in their respective countries. Alascio did establish a private practice, but got into a conflict with senior physicians, which hampered his success.[73] Unonius never got to develop clinical practice in São Paulo,[74] while on the second tour Crafoord met medical authorities in São Paulo, who promised to grant a license to Unonius, once the Swedish surgeon left the country this promise was all but forgotten. Overall, to what extent Crafoord's tours had any bearing on South American thoracic surgery remains an open question.

The present study highlights the difficulty to move skill, even to a receptive environment. It also shows how skill is part of the socialisation

process, even in organisational and political scale. Crafoord could perform, also in South America, but not without an entire entourage and the specific and expensive tools and technologies to which he was used to at Sabbatsberg. However, neither machines nor Crafoord's performance were enough. Bureaucracy and the political problems which Alascio and Unonius faced reveal the specific context and its importance for skill to survive. Crafoord's success was as much the success of the context represented by Sabbatsberg Hospital, therefore, to make skill move, the entire hospital had to be somehow moved, with all its support systems and underlying financial and political structures, in addition to support within the medical profession and its socialisation.

Once again, Alascio's is a fascinating example. While he seemingly had explicit political support, he had been trained in Córdoba, under Dr Allende, instead of Buenos Aires, where the prominent cardiologist Pedro Cossio (1900–1986) had developed ground-breaking research in heart surgery.[75] This situation involved also differences between academic traditions, Crafoord, like Allende and Alascio, had become thoracic surgeons as a function of the development of surgical treatments for tuberculosis, whereas Cossio, for instance, was first and foremost a cardiologist. This difference might have influenced their exchange.[76] Then, the tension and competition between surgeons might have played a much more important role than the brief potential influence of Crafoord. In this regard, the tours seemingly became opportunities to display academic power as hosts to the renowned surgeon.

The training tours were an ambitious effort to assemble the bits and pieces that Alascio, Barcia, Törnvall and all other Crafoord's disciples needed to become as prominent as their mentor. The tours were not one sided, but rather an exchange between countries struggling in the peripheries of surgical centres, such as France, Britain, Germany and the United States. Analysis of these tours reveal the work needed to make skill travel—or at least, to make techniques developed in Stockholm move to another continent. It also highlights the interdependence of skill with culture and practice. The training tours were an invention in themselves, a catalogue of the requirements needed to teach a subdiscipline within surgery.

Notes

Acknowledgments. The author is indebted to the thoracic surgeons and nurses who described their appreciation of Clarence Crafoord and his work. Christian Olin, Kjell Rådegran, Göran Hambraeus, Maja Ekeström, Lisbeth Rydin, and Margareta Hammarberg helped me understand Crafoord. Stig Ekeström's unpublished manuscript on trips to South America was a source of inspiration. This paper was tremendously improved by the recommendations made by the anonymous reviewers and the support

of the editors, Hjalmar Fors and Silvia Waisse. I am grateful to Prof Dr Jorge Trainini and Dr Pedro Cossio Jr for helping me contextualise thoracic surgery in Argentina in the mid-1950s.

1. On Allende, his disciples and surgical education, see e.g. Adrián Carbonetti, "Gumersindo Sayago y la formación de la tisiología en el interior de la República Argentina" in Adriana Álvarez & Adrián Carbonetti (ed.), *Saberes y prácticas médicas en Argentina: un recorrido por historias de vida* (Mar del Plata, 2008), 175; Domingo S. Babini, "Mis primeros 60 años con el tórax" in *Experiencia Médica* 15:3 (1996), 203–211; José A. Crespo, "Albores de la neurocirugía en Córdoba" in *Experiencia Médica* 22:1 (2004), 29; Egidio S. Mazzei, "Incorporación del académico Profesor Dr. Juan Martín Allende" in *National Academy of Moral and Political Sciences. Annals* 4 (1973–1974), 5–8.

2. Ivanissevich was a physician and Perón supporter, minister of education in 1948–1950 and 1974–1975. His name is mentioned only once in the correspondence between Crafoord and Alascio. While apparently he did not exert substantial impact on Alascio's medical career, this one mention suggests that Alascio had influential political connections which enabled the exchange between Sweden and Argentina described here.

3. Letter from Rafael Alascio Escobar to Clarence Crafoord in Medhist arkiv KI, Clarence Crafoord, E1B (vol. 2).

4. "Pressklipp, Sydamerika 1953–54; 1958; 1965" in Medhist arkiv KI, Clarence Crafoord, Ö1 (vol. 2 & 3).

5. Both Argentina and Brazil were actively making high-level contributions to thoracic and cardiovascular surgery prior to the tours discussed here. For some examples of the advanced degree of development of surgery in South America, see Enrique Beveraggi "Surgery in Argentina" in *Archives of Surgery* 134:4 (1999), 438–444; Horacio Capelli, Christian Kreutzer & Guillermo Kreutzer, "Development of pediatric cardiology in Latin America: accomplishments and remaining challenges" in *World Journal for Pediatric and Congenital Heart Surgery* 2:1 (2011), 104–110; Jorge C. Trainini, *Pedro Cossio: el Premio Nobel que no fue* (Buenos Aires, 2007).

6. James A. Secord, "Knowledge in Transit" in *Isis* 95:4 (2004), 654.

7. The classical, reductionist theory of communication presented by Claude Shannon and Warren Weaver in 1949 introduced a linear mathematical model of information, including transmission, noise and receiver; naturally, the application of Ferdinand de Saussure's semiotics to science would undoubtedly have totally different results. On communication theories, see e.g. John Fiske, *Introduction to communications studies* 2nd ed. (London, 1990). On semiotic studies of science see Bruno Latour, *Science in action: how to follow scientists and engineers through society* (Cambridge, 1987) and John Law, "Actor network theory and material semiotics" in Bryan Turner (ed.), *The new Blackwell companion to social theory* (Hoboken NJ, 2010), 141–158. In part this paper contributes to the discussion regarding circulation of knowledge as studied by e.g. Bruno Latour, *Pandora's hope: essays on the reality of science studies* (Cambridge, 1999), 24; Kapil Raj, *Relocating modern science: circulation and the construction of knowledge in South Asia and Europe, 1650–1900* (Houndmills, Basingstoke, Hampshire, 2007).

8. Secord, "Knowledge in Transit," 670.

9. Bruno Latour, "The power of association" in John Law (ed.), *Power, action and belief: a new sociology of knowledge* (London, 1986), 266.

10. Latour, "Power of association," 267. The interessement model is partly described

in Michel Callon, "Some elements of a sociology of translation: domestication of the scallops and the fishermen in St. Brieuc Bay" in John Law (ed.), *Power, action and belief*, 196–233. Later on it was developed and described in detail in Madeleine Akrich, Michel Callon & Bruno Latour, "The key to success in innovation, Part I & II" in *International Journal of Innovation Management* 6:2 (2002), 187–225.

11. Harry M. Collins, G.H. de Vries & W.E. Bijker, "Ways of going on: an analysis of skill applied to medical practice" in *Science, Technology & Human Value* 22:3 (1997), 267–285.

12. Within this pedagogical literature, this is often defined as communities of practice, see Jean Lave & Etienne Wenger, *Situated learning: legitimate peripheral participation* (Cambridge, 1991).

13. Collins, Vries & Bijker, "Ways of going on," 269. 'Polymorphic actions' are contrasted to 'mimeomorphic actions'; this taxonomy of actions was later described in Harry M. Collins & Martin Kusch, *The shape of actions: what humans and machines can do* (Cambridge, 1998). Within this context, a central aspect of skill (as polymorphic) is that it is taught socially.

14. Collins, Vries & Bijker, "Ways of going on," 271.

15. Michael Polanyi, *The tacit dimension*, (Gloucester, 1983 [1966]); Harry M. Collins, *Tacit and explicit knowledge* (Chicago IL, 2010).

16. Rachel Prentice, "Drilling surgeons: the social lessons of embodied surgical learning" in *Science Technology Human Values* 32:5 (2007), 534.

17. For a summary of different sociological approaches to skill, see Paul Attewell, "What is skill?" in *Work and Occupations* 17:4 (1990), 422–448.

18. Nicholas Whitfield & Thomas Schlich, "Skills through history" in *Medical History* 59:3 (2015), 349.

19. Thomas Schlich, "'The days of brilliancy are past': skill, styles and the changing rules of surgical performance, ca. 1820–1920" in *Medical History* 59:3 (2015), 379.

20. Schlich, "Skill, styles and changing rules," 382–383. On the audience, see also Delia Gavrus, "Skill, judgement and conduct for the first generation of neurosurgeons, 1900–1930" in *Medical History* 59:3 (2015), 261–378.

21. Michael Worboys, "Practice and the science of medicine in the nineteenth century" in *Isis* 102:1 (2011), 112. This definition of performance resembles social practice theory to a large extent, see Elizabeth Shove, Mika Pantzar & Matt Watson, *The dynamics of social practice: everyday life and how it changes* (London, 2012).

22. Roger Bénichoux, *Quand les chirurgiens* étaient *rois: la vie de Clarence Crafoord* (Nancy, 1991); Joar Crafoord & Christian Olin, "Clarence Crafoord—en av seklets stora kirurgiska pionjärer" in *Läkartidningen* 96:21 (1999), 2627; John-Peder E. Kvitting & Christian Olin, "Clarence Crafoord: a giant in cardiothoracic surgery, the first to repair aortic coarctation" in *The Annals of Thoracic Surgery* 87 (2009), 342; Christian Olin & Bengt Åberg "Utvecklingen av thoraxkirurgin i Sverige till en egen specialitet och till internationell ryktbarhet" in Göran Ekelund (ed.), *Svensk kirurgisk Förening 100 år: 1905–2005* (Stockholm, 2005), 157; Kjell Rådegran, "The early history of cardiac surgery in Stockholm" in *Journal of Cardiac Surgery* 18 (2003), 564; Åke Senning, "Experimentell kirurgi under Crafoordepoken" in *Sabbatsbergs sjukhus 111 år* (Stockholm, 1989), 240; Thure Wiklund, "Från blygsam verksamhet till världsberömmelse" in *Sabbatsbergs sjukhus 111 år*, 139.

23. Crafoord's role in social circles was a public entertainment in journals, etc., see e.g. Medhist arkiv KI, Clarence Crafoord, Ö1 (vol. 2); E1A (vol. 1).

24. According to the nomination database (www.nobelprize.org, accessed 18 August 2019); see also Nils Hansson & Thomas Schlich, "Why did Alfred Blalock and Helen Taussig not receive the Nobel Prize?" in *Journal of Cardiac Surgery* 30 (2015), 506–509. The period of the tours coincided with an era of innovation in thoracic surgery; see also Marko Turina, "Fifty years in cardiothoracic surgery through the looking glass and what the future holds" in *The Journal of Thoracic and Cardiovascular Surgery* 136:5 (2008), 1117–1122.

25. Rachel Prentice, *Bodies in formation: an ethnography of anatomy and surgery education* (Durham, 2013).

26. I was initially sceptical of the relevance of the Trendelenburg operation as the source of Crafoord's fame. The re-iterations of this story in biographies (cited in note 22) resembled hagiographic post-productions with early indications of future fame. However, I was persuaded by my student Jens Fransson's MD thesis at Karolinska Institutet, for which he studied Crafoord's work and the creation of a thoracic centre in Stockholm; see Jens Fransson, "Framväxten av Stockholm som internationellt centrum inom thoraxkirurgi," Examensarbete, Läkarprogrammet, Karolinska Institutet (Solna, 2010).

27. This account of the Trendelenburg operation is based on Fransson's work, yet it is also described in Clarence Crafoord, "Hjärt- och kärlkirurgi" in *Läkartidningen* 63:19 (1966), 1836–1846, and in several of the biographical studies described in note 22.

28. According to a conversation with the surgeon Kjell Rådegran, in Fransson "Stockholm ett internationellt," 10.

29. The quote is from E. D. Churchill, "The mechanism of death in massive pulmonary embolism, with comments on the Trendelenburg operation" in *Surgery, Gynecology & Obstetrics* 59 (1934), 513, as cited in John H. Gibbon, "Artificial maintenance of circulation during experimental occlusion of pulmonary artery" in *Archives of Surgery* 34:6 (1937), 1105.

30. Stephen L. Johnson, *The history of cardiac surgery, 1896–1955* (Baltimore MD, 1970), 39–42.

31. Drawing from the styles of skill described by Thomas Schlich, one may argue that the Trendelenburg operation combined Robert Liston's (1794–1847) speed with the step-by-step instructions by Joseph Lister (1827–1912); the procedure thus combined different eras of preferable skills; see Schlich, "Skill, styles and changing rules," 384, 387.

32. *Stockholms Dagblad*, 20 November 1927, 27, tidningsklipp, Medhist arkiv KI, Clarence Crafoord, Ö1 (vol. 2).

33. On his work on the spiropulsator, see Crafoord & Olin, "Clarence Crafoord," 2630; Paul Frenckner: "Bronchial and tracheal catheterization and its clinical applicability" in *Acta oto-laryngologica* 20 (1934), 104–113; Letter from Emil Anderson to Crafoord, 12 May 1939, Medhist arkiv KI, Clarence Crafoord, E1C (vol. 6); F2 (vol. 1).

34. See Erik Jorpes, *Heparin: its chemistry, physiology and application in medicine* (London, 1939); Clarence Crafoord & Erik Jorpes. "Heparin as a prophylactic against thrombosis," *Journal of the American Medical Association* 116:26 (1941), 2831–2835. On Jorpes, see Birger Blombäck & Alfred Copley, "Erik Jorpes (1894–1973): a tribute" in *Thrombosis Research* 7:1 (1975), viii, 1. On the history of heparin, see Lennart Rodén & David Feingold, "A vintage year for Jorpes, Crafoord, and heparin" in *Trends in Biochemical Sciences* 10:10 (1985), 407–409; James A. Marcum, "The origin of the

dispute over the discovery of heparin" in *Journal of the History of Medicine and Allied Sciences* 55:1 (2000), 37–66; James A. Marcum, "The development of heparin in Toronto" in *Journal of the History of Medicine and Allied Sciences* 52:3 (1997), 310–337.

35. See Per Åstradsson, "AGA hjärt-lungmaskin" in *AGAJournal: Organ för Gasaccumulator* 74 (1955), 35–38.

36. On coarctation of the aorta repair, see Clarence Crafoord & Gunnar Nyhlin, "Congenital coarctation of the aorta and its surgical treatment" in *Journal of Thoracic Surgery* 14 (1945), 347–361. On the competition between Crafoord and Robert Gross, see Anthony Dobell, "The ductus and the coarctation" in *Annals for Thoracic Surgery* 57:1 (1994), 246–248.

37. Translated into English by the author, in the original: "Ty det revolutionerande (termen är riktig!) med Clarence Crafoord är att han inte valt att bli kirurg och inte valt att bli vetenskapsman utan valt att vara båda delarna på samma gång, och gjort det av den principiella övertygelsen att detta är det enda rätta om man vill nå hjälpande resultat. Han har alltid byggt sin praktiska kirurgiska verksamhet på föregående årslånga experimentella forskningar," by Malice in *Dagens Nyheter*, 25 May 1949, Medhist arkiv KI, Clarence Crafoord, Ö1 (vol. 5).

38. De medicinska högskolornas organisationskommitté: *Organisatoriska åtgärder till främjande av medicinsk forskning* 2 (Stockholm, 1947).

39. This relatively open approach differs considerably from the neurosurgical selective society described by Gavrus, "Skill, dudgement and conduct."

40. Clarence Crafoord letter to Thyberg, 16 June 1952, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 4).

41. An attitude that differed considerably from that in the pre-war period, see Olof Ljungström, "'När ett helt folk drivits i landsflykt': Gösta Häggqvist och flyktingfrågan vid Karolinska institutet" in Maria Björkman, Patrik Lundell & Sven Widmalm (ed.), *De intellektuellas förräderi: intellektuellt utbyte mellan Sverige och Tredje Riket* (Lund, 2016), 183–202.

42. Clarence Crafoord letter to Thyberg, 16 June 1952, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 4).

43. This vetting system was later put to use when Thyberg asked Jorge de Moraes Grey about a Dr Guertzenstein, whom Grey had not recommended after some initial inquiries; see letter from Thyberg to Crafoord, 4 July 1952, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 5).

44. Letter from Alfredo Givré to Crafoord, 23 February 1949, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 2), original in English.

45. Letter from Crafoord to Alascio, 11 March 1949, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 2), original in English.

46. According to Folke Henschen (1881–1977), professor of pathology at Karolinska Institutet (1920–1946) the Swedish pharmacist Allan Wadström (initially salesman for Astra in Argentina) was highly influential in healthcare issues during the first government of Perón. Henschen claimed that Wadström was director of the national ministry of health in Argentina between 1947–1950 in a newspaper article ("Sveriges medicinska förbindelser med Sydamerika över hundraåriga" in *Svenska Dagbladet*, 5 November 1954, 11) which is not historically correct. On Henschen see Folke Henschen, *Min långa väg till Salamanca: en läkares liv* (Stockholm, 1957); Maria Björkman, "Ras, vetenskap och objektivitet: några lojaliteter hos Folke Henschen" in Björkman, Lundell & Widmalm (ed.), *De intellektuellas förräderi*, 161–182.

47. Letter from Bocalandro to Alascio, 20 September 1949, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 2).

48. Letter from Bocalandro to Alascio, 15 November. 1949, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 2).

49. Erwin Kohn, *Medical mission to Poland and Finland, July 1–August 27, 1948*. Unitarian Service Committee, Inc. in cooperation with World Health Organization (Boston MA, April 1949).

50. Letters from Kohn to Crafoord, 30 August 1949, from Crafoord to Kohn, 13 September 1949; Mannheimer to Kohn, 20 October 1949; Kohn to Crafoord, 21 October 1949; Kohn to Mannheimer, 26 October 1949; and Crafoord to Kohn, 25 November 1949, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 1).

51. Letter from Kohn to Crafoord, Geneva 30 August 1949, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 1). English in original.

52. Edgar Mannheimer (1904–1965) was a physician who specialised in paediatric cardiology in Stockholm and later in Ethiopia, see Bo Lundell, "Barnkardiologi: en svensk angelägenhet" in *Läkartidningen* 102:28–29. (2005), 2056–2059; Gunnar Arhammar, "Edgar Mannheimer: in memoriam" in *Clinical Pediatrics* 4:8 (1965), 433.

53. The secretary was an important addition, as pointed out by Crafoord in his response to Kohn, 25 November 1949, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 1).

54. The correspondence gives the impression that Dr Nicolaeff was a well-known physician, however, I was not able to identify him or to locate biographical information, not even his first name.

55. Letter from Hammarberg to the Crafoord family, 14 March 1950, documented in a travel folder regarding the tours, Medhist arkiv KI, Clarence Crafoord.

56. Tour folder, Medhist arkiv KI, Clarence Crafoord; translated from Swedish to English by the author.

57. C.-G. Crafoord to Clarence Crafoord, 9 July 1950, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 3).

58. Perianes to Crafoord, 25 February 1950, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 3). English in the original, with spelling mistakes.

59. Janér to Crafoord, 15 March 1950, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 3).

60. Tor Janér also tried to encourage Crafoord to perform surgeries in Recife as well.

61. In Crafoord's correspondence, the hospital is referred to as "I.P.S." Inaugurated in 1947, Raymundo de Britto (1909–1988) was the hospital director from April 1947 through February 1951.

62. Unonius to Crafoord, 5 April 1949, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 2). Unonius also published an account of medicine in Brazil: "Medicin i Brasilien" *Nordisk Medicin* 42:31 (1949), 1304–1305.

63. Alascio to Crafoord, 31 May 1950; 14 June 1950; 10 July 1950, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 3).

64. Crafoord to Alascio, 10 July 1950, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 3); original in English.

65. Ibid.

66. Alascio to Crafoord, 16 October, 1950, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 3); original in English. The grammatical errors in the quote highlight the challenges in the exchange between peers who communicate in a third language.

67. Crafoord to Janér, 2 May 1950, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 3).

68. Janér to Crafoord, 11 May 1950, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 3).

69. Janér to Crafoord, 11 May 1950; 4 September 1950; 21 September 1950; Crafoord to Janér, 30 October 1950, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 3).

70. Antonio L. Turnes & Luis Argón, "Dr. Alberto Barcia Capurro (1920–2009)" in *Personalidades Médicas*, Historia de la Medicina en Uruguay (www.smu.org.uy/dpmc/hmed/historia/ accessed 19 August 2019).

71. Letter from Crafoord to Zerbini, 14 February 1954, Medhist arkiv KI, Clarence Crafoord, E1C (vol. 6). On Zerbini, see Ricardo Lima, Fernando A. Lucchese, Domingo M. Braile & Tomas A. Salerno, "A tribute to Euryclides de Jesus Zerbini, MD" in *The Annals of Thoracic Surgery* 72:5 (2001), 1789–1792.

72. See in particular Gavrus, "Skill, judgement and conduct," where she contrasts the work of two surgeons, Harvey Cushing, as advocate of exclusive audiences, and William Sharpe, who used to presented his results in a more spectacular way. This shift in audiences is also exemplified by Schlich, "Skill, styles and changing rules," 398–402. An example of a more spectacular, crowd-pleasing surgeon is that of Eugène-Louis Doyen, described by Michael Sappol, "Anatomy's photography: objectivity, showmanship and the reinvention of the anatomical image 1860–1950" in *Remedia* (2017), available at https://remedianetwork.net/2017/01/23/anatomys-photography-objectivity-showmanship-and-the-reinvention-of-the-anatomical-image-1860-1950.

73. A letter from Alascio to Crafoord from 1951 indicates that the former expected a position as chief surgeon at one of the major hospitals in Buenos Aires, pending a decision by the Eva Perón Foundation. However, I could not locate any information on whether he did or not received it. Alascio to Crafoord, 14 November 1951, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 3).

74. Unonius vividly described his bureaucratic ordeal in a letter to Crafoord from 15 September 1954, Medhist arkiv KI, Clarence Crafoord, E1B (vol. 8).

75. Trainini, *Pedro Cossio*.

76. Crafoord collaborated closely with cardiologists and always had one as member of his entourage.

Abstract

Mobilising skill and making skill mobile: Crafoord's surgical tours in South America, 1950–1965. Daniel Normark, PhD in Science and Technology Studies, Researcher at STS Centre, Department of Economic History, Uppsala University, and Unit for Medical History & Heritage, Karolinska Institutet, Sweden, daniel.normark@ki.se

Between 11 March and 15 April 15 1950, the Swedish thoracic surgeon professor Clarence Crafoord and a team of assistants travelled to Argentina and Brazil to demonstrate surgical procedures. The trip was arranged by the visiting Argentinian surgeon Dr Rafael Alascio, and was financed by the government of Argentina, which in relation to this trip ordered surgical equipment from Sweden. Crafoord was invited to describe and explain how some technologies could be used in surgery, and also to exhibit his renowned skills in the operating theatre to selected audiences. While still in South America, the group decided to visit also Rio de Janeiro, and to conduct surgery and

deliver lectures in Brazil. This was the first of four tours to South America by Crafoord and his team. In this paper I revisit the first trip as an endeavour to mobilise skill and to make skill mobile.

Keywords: Circulation, skill, performance, thoracic surgery, training tour, Clarence Crafoord