A Tribute to the Memory of

Nanna Svartz

1890–1986

Presented at the 2016 Annual Meeting
of the Royal Swedish Academy of Engineering Sciences

by MD, Associate Professor Gunilla Bolinder,
Karolinska Institutet, Stockholm

The Royal Swedish Academy of Engineering Sciences (IVA) is an independent, learned society that promotes the engineering and economic sciences and the development of industry for the benefit of Swedish society. In cooperation with the business and academic communities, the Academy initiates and proposes measures designed to strengthen Sweden's industrial skills base and competitiveness.

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Foreword

Each year the Royal Swedish Academy of Engineering Sciences (IVA) produces a booklet commemorating a person whose scientific, engineering, economic or industrial achievements were of significant benefit to the society of his or her day. The Commemorative Booklet is published in conjunction with the Academy's Annual Meeting.

The 2016 Commemorative Booklet is dedicated to Professor Nanna Svartz, the first women to be given the title of Professor at a Swedish public university, Karolinska Institutet. Nanna Svartz was a skilled researcher who also gained an international reputation and travelled around the world sharing her knowledge with others. The focus of Nanna Svartz's scientific work was rheumatoid arthritis. Among other achievements, she discovered one of the first effective drugs to treat this disease, Salazopyrin® which would become one of the leading medicines to treat rheumatoid arthritis all the way into the 1960s.

We would like to express our sincere gratitude to the author, Gunilla Bolinder, MD, Associate Professor Karolinska Institutet, for all of her work on this year's Commemorative Booklet.

Stockholm, 28 October 2016

Björn O. Nilsson
President of the Academy

Arne Kaijser
Chairman of the Medals Committee

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Introduction

This booklet is a tribute to professor and physician Nanna Svartz who was born in 1890 and died in 1986. She was a pioneer as the first women in Sweden to receive a professorship at a Swedish public university. The appointment as professor of medicine at Karolinska Institutet became a symbolic first and significant step in the ability of women to have an academic career, all the way up to a professorship. Before this there were formal obstacles in the law, as well as the informal "glass ceiling," illustrating how women encountered an invisible and impassable obstacle when attempting to advance in a male-dominated hierarchy. Nanna's title as professor gave her the ability to impact much more than the purely academic aspect of her professional life; she also became a respected and recognised figure and a role model for many other women.

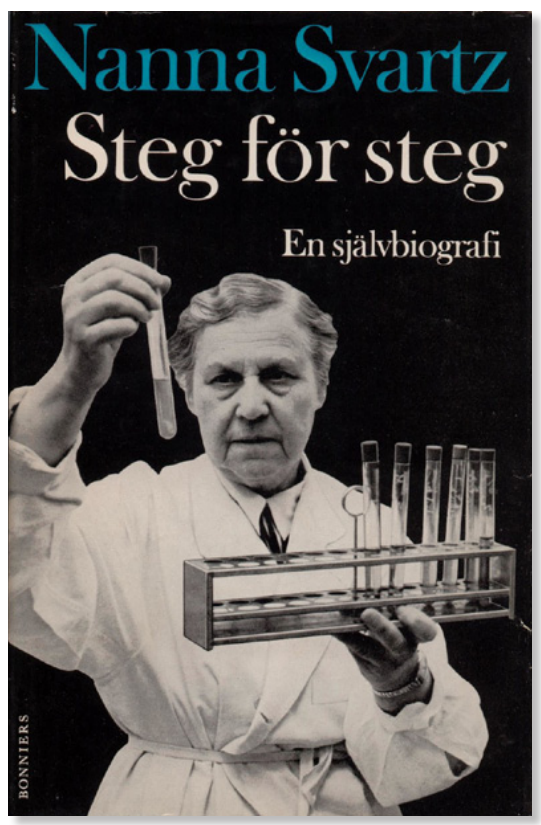
Nanna Svartz was a skilled clinician and a diligent and innovative researcher, and she attached great importance to educating medical students and doctors in training. She had an honourable and bold career as leader; she was an excellent administrator and, thanks to her language skills, had a large international network of researchers. She held countless lectures at conferences around the world in English, German and French.

Nanna Svartz lived and worked during one of the most dynamic periods in the field of medical diagnostics and therapies. The development of antibiotics and vaccinations led to

cures for diseases such as tuberculosis, diphtheria, smallpox and polio. Psychopharmacological drugs were developed and revolutionised psychiatry. Heart surgery, pacemakers, dialysis, transplants, joint implants and other technical innovations extended human life and improved the quality of life for millions of people.

After beginning her scientific work on intestinal bacteria, Nanna went on to devote much of her research to rheumatoid arthritis, its causes and treatment. In cooperation with pharmaceutical company Pharmacia, she invented one of the first effective drugs to treat this disease, Salazopyrin®. It became the company´s best seller all the way into the 1960s.

Nanna Svartz's background, professional life and scientific achievements have been described in a number of publications, including in her own autobiography "Steg för steg" (Step by Step). Successful and exceptional people evoke curiosity about their personal qualities and how their traits affect other people. Success is almost always the result of extremely hard and self-sacrificing work where weakness and complaisance have no place. There is often privation and hardship involved, which is not visible but which gives the person a more human side. So, what was she like, Nanna Svartz, the scientific pioneer?



Nanna Svartz's autobiography 1968

Childhood and growing up

Nanna Svartz was born in Västerås on 25 July 1890. She was the fifth child in the family but was the only one of the children to survive into adulthood. Three brothers died at a young age from tuberculosis or rheumatic fever and one sister died of tuberculosis at just 22 when Nanna was 14. Her parents, Anna, a pastor's daughter née Moxén, and Anselm, a secondary school teacher, were devastated by the fate of their children. The loss of her siblings was never really explained to Nanna; it was hidden in phrases like: "They have travelled far away and are now much better off in heaven." At that time many believed that the grief would be less intense if they refrained from talking about the deceased or even explaining what had happened to a sick sibling. Children were spared from attending funerals and no expla-

Photo: Anselm Svartz
Vasagatan in Västerås

nations were given for what had happened. Nanna felt cheated by her mother who had always maintained that honesty was a virtue. It was difficult for her to understand the situation when no one spoke in plain terms about it. When her sister Lisa, who Nanna mourned the most, also died, Nanna decided "not to throw life away, but to do something of it."

Nanna with her brother Ernst

Her father had a PhD and was a Latin teacher at an all boy's school in Västerås. He was a strict and demanding father and teacher who nonetheless lacked self-confidence. He did not apply for a promotion to senior lecturer because he was afraid of being scrutinised while conducting student examinations. He could be irrationally angry and Nanna realised that there perhaps lay something deeper behind his behaviour and to be careful with her own reactions. Her mother was educated at a school of commerce and was very gifted, but after graduating she went on, like most married women at the time, to take care of the home.

During her youth Nanna was curious, lively, spontaneous and sometimes disobedient. She had many friends, both boys and girls. She once received low marks for her behaviour, which her father considered very disgraceful. She had a mischievous side and was prone to "boyish pranks." Nanna was told by her mother to "refrain from showing affection," urging her to save this for the person she intended to share her life with. She graduated

from a girl's school in 1907 and met up with her old classmates numerous times over the next few decades. She was a gifted and highly motivated student who wanted to continue her education.

At that time more and more people were raising their voices in favour of women's suffrage, and Nanna was keen to listen to women's lib speakers who visited her hometown Västerås. After asking persistently, she was finally given permission by her father to go to an event to listen to Ann-Marie Holmgren, who was married to a professor and a mother of eight children, including two sons who became physicians and professors at Karolinska Institutet. Nanna was very inspired. Her desire to graduate from upper secondary school grew, but was at first met with scepticism from her father, who saw it as a woman's fancy. Nanna did not give up and, as girls were not allowed to graduate in Västerås, her father decided to move the whole family to Stockholm. He resigned from his post one year before he was due to retire out of consideration for his only child. This was a great sacrifice and the family now had to live on a meagre pension.

Nanna studied intensely to be accepted to Åhlinska gymnasiet, a private upper secondary school in Stock-

Nanna as a young medical student

Nanna's upper secondary school graduating class

holm. The school's principal was Lydia Wahlström, the second women to receive a PhD in Sweden and a champion of the women's lib movement. This is where Nanna formed her life motto, "work and keep working, weekdays and Sundays alike," which she kept for the rest of her life. Nanna received her baccalaureate in 1910. Her father was present when she got her diploma and was very proud when she introduced him to her Latin teacher – the same subject that he had taught. He said to her, "Nanna has almost the talents of a man." The response was just an audible clearing of the throat.

Career choices and studies

Educated women did not have many options when it came to choosing a career. Teachers and nurses were essentially the only options, but even those were often reserved for unmarried women. If women got married they were expected to be economically just supported by their husbands and be responsible for the home. Choosing to continue to work, even after getting married, could irritate female colleagues who felt that they were taking jobs away from women who needed them more.

Nanna's father was not happy about her decision to study medicine; he had hoped she would instead study his own subject,

Ny bildtext

Latin. Her decision was influenced by Nils Malmberg, a youth friend from Västerås who she later married. He had already started studying medicine and she would be able to benefit financially from inheriting his textbooks.

Maternity course 1899
(Not Nanna's course, but an interesting photo illustrating the male-dominated medical profession.)

Medical studies begin

The new student had first to complete her humanities studies with chemistry and physics before she could start studying medicine in the spring term of 1911 at Karolinska Institutet. During the early years, Nanna worked hard to pass her exams. Her skills and practical talents were noticed by her teacher, Professor Emil Holmgren. He considered her to be exceptionally well-suited for work with microscopic preparations and offered her a teaching assistant position. But Nanna was not considering a pre-clinical research career, nor were there any academic positions available for a woman.

In Uppsala Nanna took a propaedeutic (introductory) course, which was obligatory before starting the clinical part of her education, and this is where she saw her first patients. She remembered in particular how it was emphasised that "if you are good at asking questions, you will be good at diagnosing" and the importance of thoroughly reviewing a patient's medical history. She always returned to this as an educator, and to the, then as now, particularly important issue of good hand hygiene. "The most difficult thing to teach people is to wash their hands!" After completing her courses she substituted as a teacher's assistant at Serafimer Hospital for SEK 40 a month (equivalent to SEK 800 in 2016), a very low salary. During her clinical service she describes how she learned about various treatments in the way that is still the predominant method, i.e. master to apprentice. She was of-

ten required, without preparation, to perform procedures which she had never learnt to perform in any other way than by observing and practicing directly on patients – sometimes called "see one, do one, teach one." Today, in 2016, this is a method that is used less and less, as today's patients have a much higher level of autonomy and are not willing to be "guinea pigs."

Nanna became certified as a doctor in 1918 and applied for a substitute position to get practical experience and to earn some more money so that she and Nils could get married. Her salary was very low. There was a shortage of most types of food and everyone had to economise. In the summer of 1918 Nanna secured a substitute position as a country doctor in Långshyttan in Dalarna. Being in the country meant a better supply of food in the post-WWI years than in the cities, where sugar, milk, bread and coffee were rationed. Just as she was about to begin her job Nanna started having classic influenza symptoms: high fever, chills and a cough. She realised that is was probably Spanish Flu, which had been rife in Sweden since midsummer. She alleviated her symptoms with strong doses of salicylic acid and worked at full steam despite her illness. Fortunately, her influenza was fairly mild and quickly ran its course. She did, however, use a protective mask for her cough to avoid spreading the flu to those around her.

As an unexperienced country doctor living in a sparsely populated area it was probably hard to get a clear sense of how the influenza epidemic was spreading and how many people were dying, especially the relatively young. More than 35,000 lives were lost to the Spanish Flu in Sweden alone.

Career and research

Nanna Svartz continued to advance in her career as a physician specialising in internal medicine. Her clinical duties were demanding, both at the clinic and in the lab at Serafimer Hospital under professors Hans Christian Jacobaeus and Israel Holmgren. She was highly appreciated by her patients; she inspired confidence and trust, was empathetic and a good listener.

This is the time when she also started her research career under the supervision of Professor Israel Holmgren at Serafimer Hospital. He was a force of nature who demanded obedience, but who communicated the importance of orderliness and gave young doctors important knowledge for life.

New Doctor of Medicine 1927

Patients in the medical clinic at Serafimer Hospital

He suggested to Nanna that she should start a more comprehensive scientific study of the intestinal bacterial flora. Little was known about the causes of gastric ulcers or so-called "fermentation catarrh" at that time. Holmgren himself suffered on several occasions from gastric haemorrhaging and strongly questioned the prevailing treatment method, which involved long-term therapy through diet. More research was needed and Nanna gained

solid laboratory experience while studying the anaerobic (not requiring oxygen) intestinal bacteria flora. Nanna's dissertation was presented in 1927 and included studies of intestinal bacteria, so-called Clostridium, and of the presence of gas gangrene bacteria and their effect on the gut fermentation process. As the dissertation received high marks and as dictated by the rules of the day, she was quickly promoted to docent (senior lecturer). She continued to conduct research for the rest of her life. She had always been very interested in the gut flora (gastrointestinal microbiota), but over time she started focusing her research on the causes of rheumatoid arthritis and the inflammatory processes behind this painful and debilitating chronic disease.

Nanna Svartz in the lab. Photo: Clara Sipprell 1938

Road to professorship

By 1936 Nanna Svartz had published 62 articles, mainly about gastrointestinal and joint diseases. In her continuing studies of the gut flora she found certain similarities between patients with ulcerative colitis and those with rheumatoid arthritis, and her future research would be focused on the aetiology (causation mechanisms) of rheumatism. Her theory was that an infection was the root cause of rheumatoid arthritis. In experiments she managed to produce joint inflammation in animals to support her hypothesis.

Nanna does the rounds

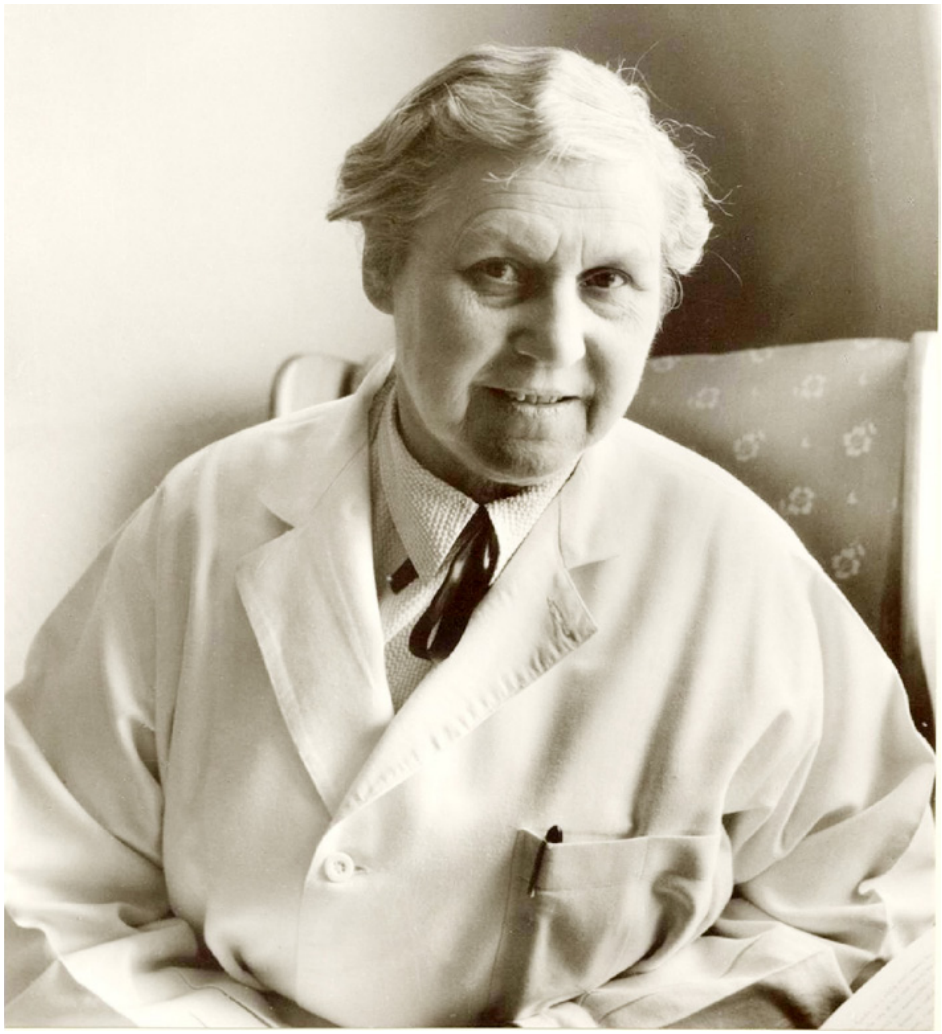


Photo: Gustaf Cronquist

Nanna was now substituting as associate professor (academic rank just below professor) at Serafimer Hospital, and when it was in 1935 when Israel Holmgren's chair became vacant, Nanna Svartz applied for the position as professor and chief physician at Serafimer Hospital.

Her application attracted a lot of attention and many, including some public officials, were of the opinion that it was unthinkable to choose a woman, particularly a menopausal woman!

After a competency assessment by four experts, Nanna Svartz was given the third place by two of the experts, and, placed in shared first place by the fourth and in second place by the fourth person. There were appeals and harsh criticism aimed at Nanna, forcing her to provide so-called "explanations." In a vote by Karolinska Institutet's faculty,

Nanna, to her delight, received 22 votes out of the 26 votes cast. The fact that her predecessor Israel Holmgren and KI's Vice-Chancellor Gunnar Holmgren were the sons of women's lib pioneer Ann Margret Holmgren could have had something to do with the basic attitude of "it can be done."

In connection with this stressful struggle to secure the position as professor, Nanna was called in to Professor Hans Christian Jacobaeus, one of the experts and a strong advocate for Nanna. He told her that he had been experiencing chest pains for a while and was worried that, like his brothers, he would have a heart attack. He was 58 years old, the age at which his brothers had suffered heart attacks.

Jacobaeus took part in the KI faculty vote and he was the one to call Nanna and informed her about the positive outcome. But the very next day he became ill and died suddenly of an acute heart attack. This was an enormous shock for Nanna, who had been greatly inspired by working with this knowledgeable and innovative man. Hans Christian Jacobaeus was, among other things, responsible for inventing thorascopy and laparoscopy. He had realised back in 1910 the diagnostic and therapeutic possibilities of looking inside the body's various cavities.

Nanna Svartz was named as a professor on 17 December 1937 according the rules of the day for a professorship at a public university. She took up the post in 1938. This made her the first female professor at a public university in Sweden. (Mathematics professor Sonja Kowalevsky received a professorship in 1889 at the private institution *Stockholms högskola*).

Women authorised to be public servants

At the time Nanna was named as a professor it had, until very recently, been forbidden under the Swedish constitution for a women to hold a public service position. The law at the time characterised an applicant for a such position as being a "Swedish man." An increase in the need for personnel within government authorities, such as the post office, telegraph office, the railways or as teachers, led to a "qualification inquiry" to remove this obstacle by changing the constitution to allow women to hold public service positions. After the inquiry, a bill was proposed and approved in the Riksdag (parliament), and the law went into effect in 1925 allowing women to become public servants. Many obstacles had been overcome during the period up to the passing of this bill. Medicinalstyrelsen (now Socialstyrelsen, Sweden's National Board of Health and Welfare), for example, expressed an opinion on the bill stating that "it would cause medical, hygienic and social risks, as well as administrative inconvenience" if married women were to hold public service positions. A woman was not regarded as having the same personal qualifications as a man and in areas that did not "suit her nature," she was considered inferior.

To illustrate the spirit of that time – the 1930s – when society was slowly opening up previously closed doors in women's education, here is a quote from a speech given by the Minister of Ecclesiastical Affairs Arthur Engberg in May 1938 at the opening of Sveap-

Nanna Svartz, Ebbe Nyman, Karl Schlossman, Börje Olhagen, Sture Helander at K.S.

lans gymnasium (upper secondary school) for girls. He expressed his "wonder" over the "peculiar talents" of girls, which he did not really consider suited for upper secondary education:

"Perhaps the education of female youth would benefit from being specially adapted for the distinctive nature of young women./.../ Perhaps my understanding of this is related to my own personal doubts about whether this type of education, which is aimed at gaining a baccalaurate diploma, is the best thing for our girls/ .../A specific female talent is difficult to define. I would just, most humbly, suggest that ingenious, childlike and feminine are three terms to express the instinctive, intuitive and immediate where, avoiding all rules of logic, a conclusion is reached before the premises are in place. Perhaps this is exactly what is most perplexing about this special talent/ .../That is why I am a sceptic in the face of every attempt to set the same educational goals for our girls as for our boys."

This speech was given in front of members of the royal family, the incoming female secondary school pupils and their teachers shortly after Minister Engberg had witnessed that Nanna Svartz was appointed as a professor of medicine. Nanna was otherwise actually very fond of the amiable Engberg, who perhaps viewed her as an exception in terms of educability.

Nanna's predecessor, Professor Israel Holmgren, was asked by the journal Hertha (published by the feminist Fredrika Bremer Society) to write something about Nanna Svartz when she became a professor. He started with proudly announcing that Nanna

now held one of the four most prestigious chairs in medicine in the country. He did not hide the fact that he had been tough on his students and that Nanna had gone through the rigorous ordeal necessary to successfully perform her duties at Serafimer Hospital.

Holmgren's view of what it takes to be a professor involved above all being independent; having the ability to use one's judgement and not be influenced by what others believe and think. This requires the courage not to fold in situations when one is personally and publicly attacked, which often happens when people aspire to positions at the top. He writes as follows: *"I wonder if women in general find it harder than men to accept being a target and I wonder if this is not actually a more significant reason, rather than a lack of qualifications, as to why they are still so poorly represented in leading positions. If women have not worked out what it takes to become a professor, it is not my fault."*

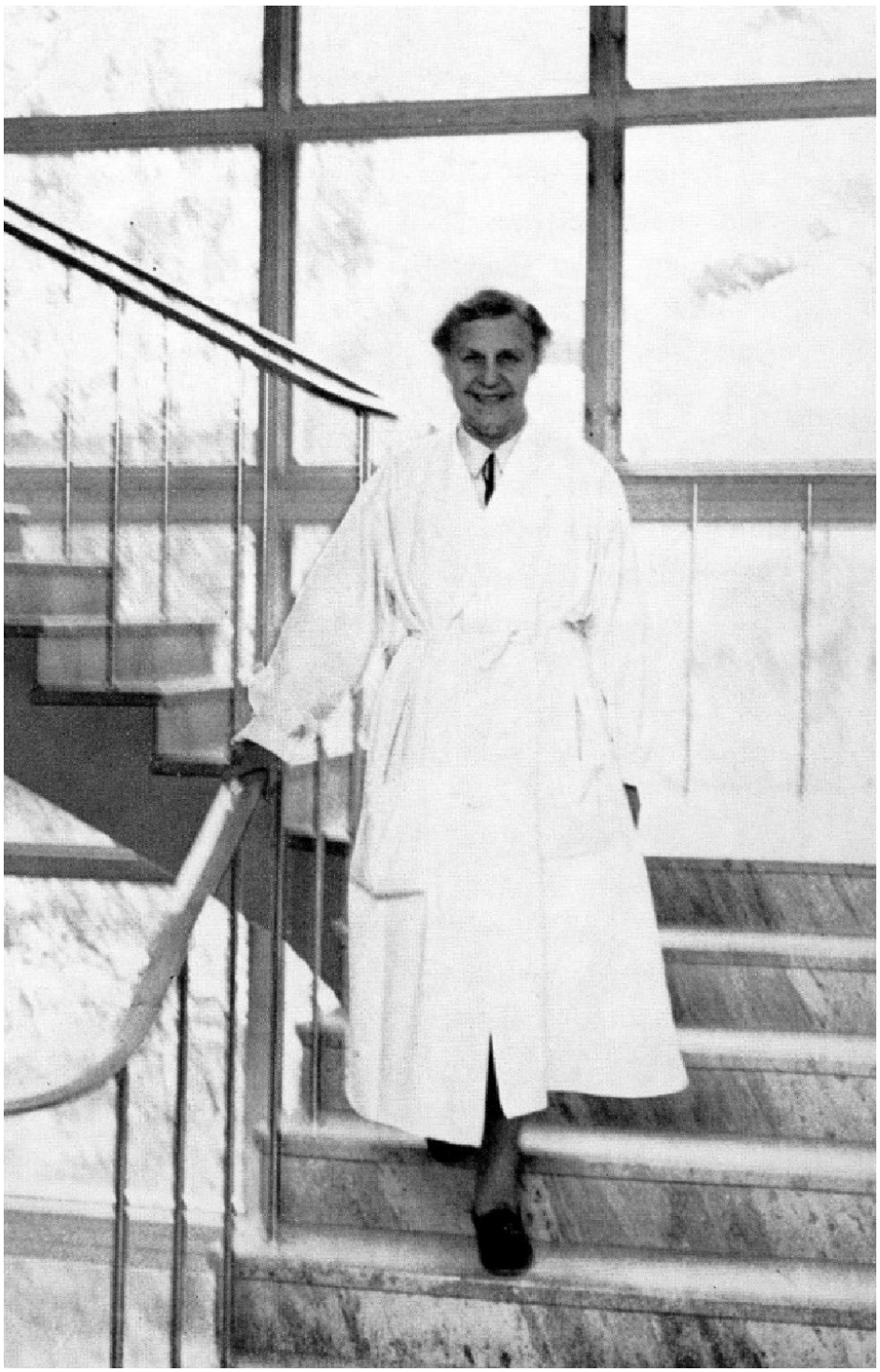
Changing opinions and ending prejudice is a process that is not easy and takes time. Despite Nanna's distinguished appointment, it still took until 1963, i.e. 25 years later, before the next women received a professorship on a Swedish medical faculty (child psychiatrist Anna Elisabeth Annell, Uppsala). One interesting detail is that the 1809 constitution remained in effect all the way up to 1945. Section 28 stated that those eligible for service by royal appointment (high-level public officials under the orders of his Majesty the King, such as professors) were to be "Swedish-born men." *Behörighetslagen*, the law that authorised women the same right as men to serve in public service positions, went into force in 1925, but a women holding a royal appointment position was actually against the constitution when Nanna became a professor.

In comments in the Swedish medical journal *Läkartidningen* in 2003, Nanna's daughter Gunvor describes what she had learnt in the years living with her mother were the qualifications necessary to become a female professor:

- Being extraordinarily gifted and suitable for the assignment.

- Having faced severe challenges during childhood as to be well-prepared for the storms that would rage at the heights of the profession.

- Having the ability to win your superior's approval for your capabilities and making that person willing to stick with you part of the way.



Nanna on the stairs in building GV

Salazopyrin® – a successful invention

Gerhard Domagk, a German researcher who proved the antibacterial effects of Prontosil, a sulfonamide, received the Nobel Prize in 1939 for his discovery. He was, however, forbidden by Hitler from accepting his award as the Nobel Committee had previously awarded the Peace Prize to a person who had criticised Hitler. Nanna Svartz had met Domagk back in 1936 and had discussed the effects of Prontosil at that time. It was primarily a sulfonamide component with a bacteria dissolving effect in granulation tissue. Nanna wondered if it would be beneficial to combine sulfa and salicylate, which had also proved effective in rheumatoid arthritis. She started clinical trials using a variation of sulfonamide to treat patients with rheumatoid arthritis or ulcerative colitis, the latter being a disease that presented similar granulation tissue as rheumatism. She had the idea, but not the tools to develop a drug, so she turned to pharmaceutical company AB Pharmacia for help. This collaboration resulted in the development of a new medicine belonging to the sulfonamide group of drugs, salicylazosulfapyridine which was given the trade name Salazopyrin®.

The drug proved to be the most effective in ulcerative colitis and was used worldwide. Even 40 years later, Salazopyrin® was still the recommended treatment for the intestinal disorder. It was registered as a drug back in 1941 and was Pharmacia's first proprietary drug, and for many years the company's absolute best seller.

Nanna Svartz reconnected with Nobel Prize winner Domagk after the war. He came to Stockholm and received his Nobel Prize, but no prize money, according to the rules. It emerged that he had been arrested and subjected to ill-treatment after he was named a Nobel Prize recipient but had refused to sign a letter to the Nobel Foundation.

Portrait of Nanna Svartz, Department of Medicine, Karolinska Hospital

Karolinska Hospital established

A source of great support for Nanna came from professors Gösta Forssell and Einar Key who were on the construction committee for the new Karolinska Hospital being built in Solna. When it was decided that the medical clinic at Serafimer Hospital, of which Nanna was in charge, would move to Karolinska Hospital, she was immediately asked to join the construction committee. The committee in cooperation with hospital management, of which she was also a member, were responsible for ensuring that the hospital was appropriately designed and equipped. Nanna made an extraordinary contribution, showing her tireless capacity for work, her excellent memory for details and a personal interest in construction and interior design. Two years later in February 1940 she was able to see the first patients in the new, modern hospital. A few days before this an open house was held to show off the large hospital complex. There was great public interest and 3,650 people queued to inspect the new facility. Nanna Svartz had had a lot of time-consuming work to do, but she was also very excited. She writes: "Perhaps I deserve the epithet 'workaholic.' I'm aware that I'm one of those people who love to be active all of the time."

She was head of the medical clinic at Karolinska Hospital 1940–1957 and during that time managed to get an extension built for a rheumatology ward with 70 beds. She also served as head of that unit and it provided her with great opportunities for both teaching

and research involving patients. This was also a contributing factor in the opening of King Gustaf V Research Institute in 1948.

Karolinska Hospital

Roof terrace at the rheumatology clinic

Gustaf V Research Institute

King Gustaf V would turn 80 in 1938 and in preparation for this occasion a nationwide fundraiser was organised. SEK 5 million was raised for the King's fund (the equivalent in 2016 would be about SEK 147 million). After consultations to determine the greatest research needs, the King decided that the funds would go to support research on widespread and debilitating diseases, primarily polio and rheumatic diseases. Nanna Svartz was on the board of the foundation and was tasked with producing a plan for how the funds would be used.

She realised that one important prerequisite for running research projects on rheumatic diseases effectively was access to a well-equipped research institute and a hospital ward directly adjacent to it. The board of the foundation approved this plan, but it evoked strong protests from the faculty of Karolinska Institutet who were concerned that there was no qualified person to run such an institute. The proposal for an institute on the hospital's grounds probably caused some concern that there would be a competition for KI's preclinical researchers and research funding. Nanna maintained her position on the benefit of the hospital's researching doctors having only a short distance to walk between their clinical work and the lab.

The building, which is now called "GV" (G five), would be located next to the hospi-

tal's main building and the architect was Sven Ahlbom. It took some time for construction to get started due to a shortage of materials during the war, but the institute would be officially opened in 1948 by the then 90 year-old King Gustaf V in one of his final official engagements.

The issue of who would be in charge continued to concern the KI faculty. Karolinska Institutet was categorically against having a clinician as head of the institute, while Nanna and other clinicians saw great drawbacks in having a theorist and pure laboratory researcher in charge. When no decision on the matter was forthcoming, Nanna offered to serve as acting head of the institute and the offer was accepted. She would head the institute until her retirement 1958, but continued her own research until she was over 90.

King Gustaf V Research Institute

Funds for equipment and operation of the institute came, among other sources, from the Wallenberg Foundation and the Wessén sisters, a family that contributed a considerable amount of money to medical research. At the institute, areas were prepared for chemical, bacteriological, serological and environmental research. The institute would become an institution for research teams from most of the hospital's clinics. Scientific research began immediately in the fields of internal medicine, rheumatology, cardiology, gastroenterology, orthopaedics, ophthalmology and otology. The scientific production was reflected in a number of doctor's dissertations, readerships and professorships. The institute had its own board and was not incorporated into Karolinska Institutet until 1976.

Nanna could now continue her own research into the so-called rheumatoid factor (RF), the serum protein present in rheumatoid arthritis, the function of which she was trying to discover. Studies were conducted with all available techniques, such as ultracentrifuge, electrophoresis, immunoelectrophoresis and chromatography. In experiments Nanna was able to induce joint inflammation in animals after injecting them with bacteria from patients with rheumatism. She could eventually count 22 years of RF research in an article in 1972, where she presented her hypothesis on an infection of β streptococcus, which through consumption of milk set off the serious joint inflammation process. It is still not clear what the real cause of rheumatoid arthritis is, but today there is significantly more known about molecular biology relating to the group of autoimmune diseases of which rheumatoid arthritis is one. Many new and more effective medicines and therapies have been developed that can slow the destructive effects of the disease.

Nanna Svartz with the staff and researchers from building GV

ISIM – International Society for Internal Medicine

Portrait of Nanna Svartz, Swedish Society of Medicine,. Painted by William Fleetwood

Nanna Svartz was an enthusiastic catalyst for the creation of the International Society of Internal Medicine (ISIM) in 1949, with its head office in Basel. She realised that conferences were the best opportunity to meet colleagues and to learn about the latest news in her field. She participated for many years in all of the conferences of internal medicine and rheumatology, and also in some of gastroenterology. She got to know many world authorities at these conferences and was subsequently also able to visit them and their institutions on the field trips she took to several parts of the world in the 1950s and 60s. Despite an already substantial workload, she served as President of ISIM from 1952 to 1956.

Donations from the Wessén sisters

Nanna took care of the Wessén family's health for many years. One brother had severe rheumatoid arthritis and all four siblings were in poor health. They had a large trust which their father had set up from his fortune from trading in colonial products in Norrland in the north of Sweden. The family was very cultured and collected art and furniture. None of the siblings had any children.

Just before Christmas 1949 the two Wessén sisters, Helga (married name Johansson) and Hilda (married name Österman) visited Nanna and gave her a leather-bound book. They had formed and registered a foundation *"Stiftelsen Professor Nanna Swartz' fond"* with statutes in place and donated capital of SEK 500,000 (SEK 14 million in today's money). This was an incredibly valuable means of support for the institute's research. One thing that could perhaps be called into question with today's code of ethics was the expensive personal gifts in the form of art, furniture and jewellery that Nanna received from the Wessén sisters. They represented a great deal of value and were all personal gifts.

Nanna Svartz at the microscope

The private patients

For a person who often worked 16 hours a day, there could not have been much time left over for a private life. Also, Nanna spent many of the hours outside of her hospital duties at the private practice which she and her husband Nils maintained next to their apartment on Brahegatan. Many patients had a life-long relationship with Nanna. At her practice she was able to follow the progress of her patients for many years and they had great confidence in her. Many of the visitors to her private practice were celebrities, several of whom had been patients in her private ward at Karolinska Hospital. A few of them, described in her memoires, are of interest to present here.

Gustaf V

As a professor of medicine she had the status as personal physician to the King and was called on a number of occasions to provide medical advice to Gustaf V. Over time the King got to know her well, in connection with his 80th birthday fund and construction of the research institute. Nanna describes how for her first visit, she obtained a new stethoscope to listen to the King's heart and lungs. She placed the stethoscope against his back. As it was made of metal, it was quite cold and made the King jump. When Nanna left the room His Majesty asked: "Who was that girl with the cold ears?"

Marshal Mannerheim

Another famous patient was Marshal of Finland Gustaf Mannerheim who visited Nanna in 1946. He was 80 at the time and a man with, to say the least, a varied and colourful background. He was born in 1867 as a member of the Finnish aristocracy, made a career in the military in the service of Russia during WWI and was called home to Finland after the October Revolution to establish the Finnish defence forces following the country's declaration of independence. He was greeted with scepticism as Regent of Finland, but was praised after his service as Commander-in-Chief during the Winter War of 1939 holding the rank of Field Marshal – the only one in Finland up to that time. Mannerheim had recurring problems from a bleeding gastric ulcer and had great confidence in Nanna Svartz and her surgeon colleague John Hellström, who would operate on his ulcer. He subsequently, despite residing in Switzerland, stayed in touch with Nanna who was called to his sick bed in 1951 when he was severely ill and suffering from ileus. She flew immediately to Lausanne to see him, but was only able to conclude that he was dying. He remained a very stoic and venerable person to the end.

Madame Kollontaj

A third example of a person who placed their trust in Nanna as a physician was Minister and later Ambassador Alexandra Kollontaj from the Soviet Union. She also had an unu-

sual and interesting background. She was the daughter of a general in the Tsar's army, but became politically active and a dedicated socialist. She was a feminist and advocated for the real power of the worker, women's liberation and the abolition of conventional marriage. She studied economics, left her first husband and son, and eventually had a diplomatic career despite being treated with suspicion by the Communist Party. Eventually she was appointed as the Soviet's Union's emissary in Sweden from 1930 to 1945. She was extremely highly regarded by her colleagues and by most people she came into contact with.

In 1942 during a conference in Falkenberg Nanna received a call from Minister Kollontaj's secretary to say that she (Madame Kollontaj) had become acutely ill and had lost consciousness. They wanted to send a plane to bring the professor to Stockholm, which she rejected as she felt there were highly competent individuals in the capital city who could handle the situation. Kollontaj's people did not listen; a plan arrived anyway and Nanna climbed on board the small three-seater. She diagnosed Madame Kollontaj as having had a probable apoplectic fit (the word "stroke"

Madame Kollontaj in a portrait by Albert Engström 1923

was not used at that time). She was paralysed on one side of her body and was unconscious. After acute treatment with a vasodilating drug she regained consciousness, but faced a very long period of rehabilitation. She subsequently returned to her work as Minister. She had retained her intellect and ability to speak, and the after-effects of the "fit" consisted of impaired mobility on the left side of her body.

Three years later Madame Kollontaj came down with a severe case of pneumonia, but Nanna was fortunately able to treat her with the new drug penicillin. After several weeks Madame Kollontaj recovered, although she was far from healthy. When she was suddenly called back to Moscow she refused to inform the political leadership of her weak condition. She persuaded Nanna to go with her to Moscow as her chief physician. This would be an adventure for Nanna, who was forced to quickly arrange for time away from work – which was almost impossible – and was rushed away with Madam Kollontaj to board a Soviet military plane. She arrived in Moscow where it was 30 degrees below zero and where, after the war, almost nothing worked. Arranging adequate room and board required some ingenuity. While in Moscow she was able to take part in various interesting meetings with diplomats. She also experienced an audience with Soviet Foreign Minister Molotov at which she was to report on Madame Kollontaj's condition. Nanna was asked to stay on longer to take care of her, but she needed to return home to her doctoral candidates and her patients. The adventure ended with a trip by train and boat via Leningrad and Helsinki. Nanna continued to correspond with Madam Kollontaj, but they would never meet in person again.

Private life

At the age of 39 and after 11 years of marriage, Nanna and Nils had a daughter, Gunvor. Nanna wanted to keep her pregnancy private and hid the news from her superiors by working on her research in the lab and with an extended study trip to Germany. The child was born at home on Kommendörsgatan and father Nils held the little new-born up to the window so her maternal grandmother who lived across the street could see her.

As parents to an obviously much longed-for child and bearing in mind Nanna's own childhood memories of the death of her siblings at an early age, both Nanna and Nils were constantly anxious that something would happen to her. Gunvor talked about this in an interview with Dagens Nyheter a few years after her parents' death. Nanna's father was extremely strict and forced Nanna, who had been a lively and slightly wild child, to control her emotions and keep them to herself. Nanna's husband, Professor Nils Malmberg, had similar characteristics to Nanna's father; he had poor self-esteem, was highly talented but was introverted, obstinate and reserved.

Due to Nanna's great integrity she almost never talked about her family, her parents-in-law or about her opinion of her colleagues or friends. It is reasonable to assume that the delayed grief over the loss of her siblings had taken away some of her joie de vivre.

Nanna described her social anxiety as always feeling frightened but acting as if she was not. She would always prefer to have a manuscript when speaking in public and would

avoid speaking directly from the heart. She raised the volume of her voice and focused on the task at hand to give the appearance of confidence.

In an interview in the Dagens Nyheter newspaper from 1990, Gunvor describes how she interpreted her parents' behaviour at the table when guests were invited to dinner in their home as very strict and expressing the authority that was supposed to show that they knew how to carry themselves, that they had style and that the professional positions they held were important. The young trainee doctors at the clinic were all invited at least once with their spouses for dinner at Nanna's home. Everything was very elegant, but the atmosphere was stiff, serious and lacked spontaneity. The guests were just as afraid of saying or doing something wrong as Gunvor herself was.

Gunvor said that "the world was never the same" after her mother became a professor. She was only eight at the time and while growing up found it hard to find her identity as the only child of successful parents – the "pioneer woman's child," as she called herself. She was very close to her maternal grandmother who often took care of her when she was small. Gunvor could talk to her about everything. She could not ask her mother about any of "the important issues" such as life and death. Nanny and governess Ingegerd Hermansson, a crofter's daughter, also had a big influence on Gunvor. She knew about everything, worked all the time and eventually took on a role that was more like the family's secretary. When she was with Ingegerd, Gunvor read all of the working class literature and learned not to behave in a superior manner. She was often slightly afraid of her father because his humour was difficult to interpret and he periodically had fits of rage. She says in the inter-

Nanna with her family on Torö island

view that she has never really known where she belongs.

In this context it is interesting to note that Guvnor also became a physician. She was never really drawn to the profession but feels that she did it to please her parents. Perhaps she had more of a talent for languages inherited from her maternal grandfather, Anselm, the Latin teacher? Eventually she would work on bibliography assignments at Karolinska Institutet. She was also involved in the launch of the databases, Medlars and Medline, the basis for the modern literature search system PubMed.

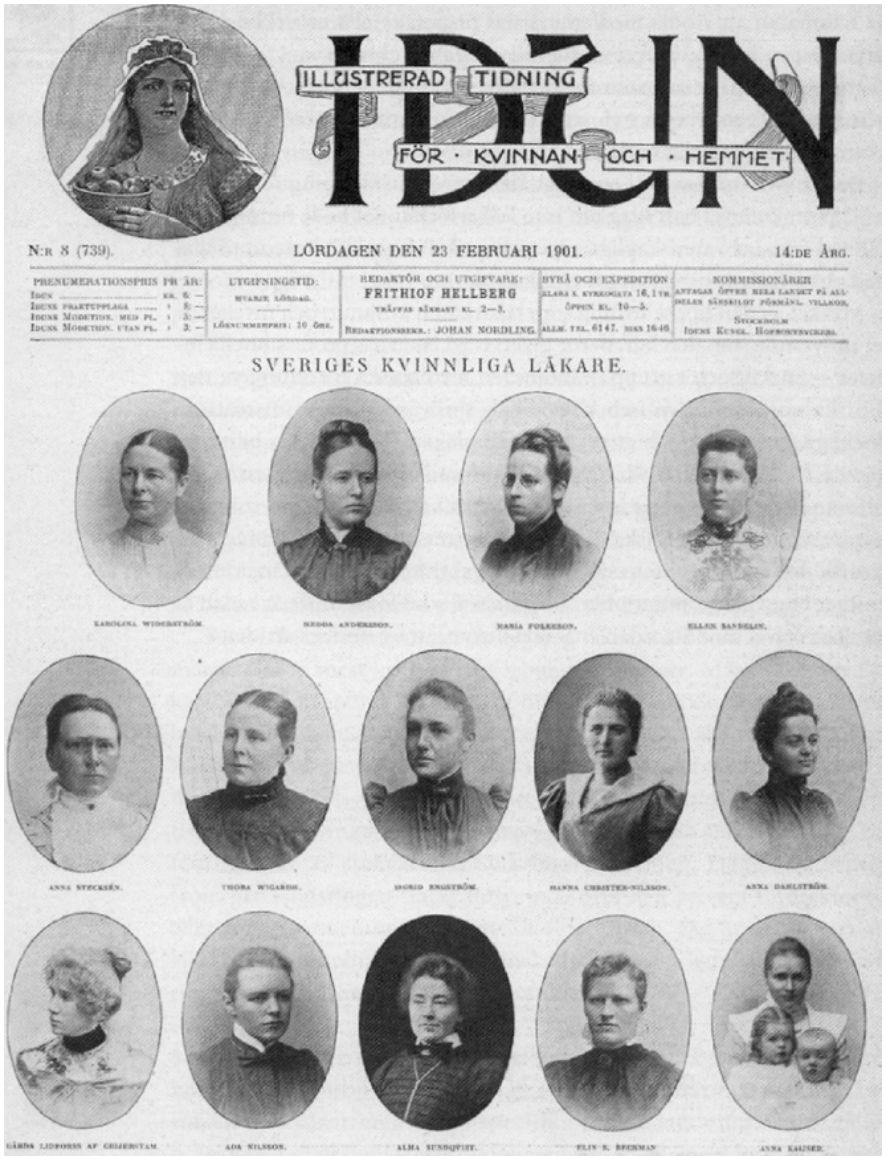
Nanna was always keen to ensure that her career would not prevent her from having a perfectly well-kept home. She appreciated how easy it was to get servants at that time. For relaxation she designed patterns and did embroidery, a hobby for which she had a great talent – as was already evident during her school days. She also created a kind of academic formal attire, a "hybrid white tie" suit consisting of a long skirt and a modified tailcoat, which she used in all important academic contexts when the men were in white tie.

The family's summer house, Örentorp on the island of Torö, was a favourite place where the family spent time together and also hosted friends and foreign guests.

Women's lib, politics and suffrage

From her autobiography it is clear that Nanna as a young girl was both innovative and creative. She was deeply committed to women's rights issues and had several far-sighted suggestions on how to implement improvements to women's lives and status. But she did not feel that she was well-suited to stand at the barricades. Sweden's first female physician, Karolina Widerström, 34 years older than Nanna who became certified physician in 1888, supported her in this and said: "Nanna, you should take care of your position and do scientific work." Nanna was grateful to be able to avoid being a prominent figure in the women's lib movement, but attended activist meetings, both as a member of the female physician's permanent committee (KLPK) and subsequently as a member of an association of female academics. Women were fighting for equal pay for equal work, for suffrage and for the same retirement age as men. These networks of women were important for the success of the movement as there were many setbacks and many people questioning it.

Nanna never liked to actively participate in pure political discussions. This had probably more to do with the fear she had throughout her life of making mistakes or blunders in spontaneous discussions, despite the fact she had a strong interest in women's lib issues. She was brought up in a religious and conservative home, but her attitudes expressed in her speeches and writings give the impression of a fairly liberal set of values. The persecu-



Female physicians in Sweden in 1900

tion that Jewish doctors were subjected to – both in Sweden and elsewhere in Europe – during the interwar period, upset her greatly. In discussions about whether she would be granted the professorship she had applied for, some physician colleagues stated in a newspaper article that Nanna Schwarz (with that spelling) was Jewish and that the Government must consider whether it wanted to have a "Swede or a Jew" as a professor. This misconception about the Svartz family and the spelling would later be corrected, but this type of attitude was not unfamiliar to many in the medical profession. After the war Nanna would meet up again with many of her former internationally renowned Jewish research colleagues who had fled to the USA. She felt great sadness about the depressed and melancholy state of mind they now possessed.

How Nanna's colleagues treated her

Nanna was often subjected to what today we call bullying. In her memoires she has very few negative comments about the attacks her colleagues would subject her to. But others have described how her male colleagues could sit in the lecture hall and sneer when doctors she was supervising defended their doctoral thesis.

She refers to one incident as being extremely humiliating. At a Nordic rheumatology meeting in Oslo, she assumed that she, as a professor at Karolinska Institutet, would hold the speech of thanks for the Nordic hosts. But one of her colleagues, who had competed with her for the professorial chair, ignored this. He took the floor himself and formally thanked the hosts without informing or asking Nanna. This was a public insult which she took very hard.

One anecdote refers to when Nanna at an X-ray demonstration, asked the radiology professor Lindgren if he really was *confident* that his diagnosis was correct. His response was "The only thing to be *confident* about is sanitary napkins."

Envious colleagues spread rumours that she would not have the stamina to do her work, that she was incompetent and that it would be the ruin of Swedish internal medicine with her at the helm. On other occasions she was treated with a little more respect; for example, from Professor Erik Ask Upmark in Uppsala with whom few found favour and

who actually disliked female physician candidates. He rarely minced his words, but on one occasion he maintained emphatically that Nanna Svartz "was the only real man among the other old hags" – if that can be interpreted as a recognition.

Nanna Svartz and Nobel prize winner Dorothy Crowford and Minister Karin Kock

Retirement and International Network

Nanna Svartz retired from her chair in 1957 at the age of 67. Before retiring she was very concerned about losing control, particularly of her clinic. She admitted that the thought was simply "dreadful." She met opposition regarding the appointment of her successor.

Nanna is thanked for her service upon her retirement in December 1957

She had preferred for it to be one of her adepts. Instead the position went to Henrik Lagerlöf who had been the adept of her rival, Hilding Berglund at Sankt Erik's Hospital, the clinic which among doctors was called "the gangster clinic" because of Berglund's many years of experience in the USA.

Nanna Svartz with her medals

In the end Nanna seemed to have a fairly good working relationship with him after all.

Nanna would in no way be idle in retirement. She stayed on as head of Gustaf V Research Laboratory for another three years and continued to conduct her own research at the institute until the age of 93.

Through her strong language skills she also had (for that time) an enormous network of colleagues in many countries, which she maintained after her retirement. Her memoire gives the impression that she felt both inspired and more relaxed when she met with colleagues from other countries. The more hierarchical and fairly austere attitude she had in her homeland seemed to melt away when she travelled to all four corners of the world to hold speeches at conferences.

One important event happened in 1961 at a rheumatology conference in Moscow. At a visit to a research institute lasting for several hours, Nanna ventured to pose a question to the head of the institute about whether he knew what had happened to Raoul Wallenberg. She knew the family and was familiar with their desperate attempts to learn about his fate. She described what had happened in 1945 when he was "taken into custody" by the Russians and that no one knew anything about his fate after that. In her conversation with the research institute director it was implied that Wallenberg was alive and living in a mental hospital. When she visited Moscow again two months later, her informant was called before an angry Khrushchev and ordered to only talk to Professor Svartz about scientific matters. There is still no answer to the mystery of what happened to Raoul Wallenberg.

Nanna Svartz's publications

Nanna produced more than 400 pieces of writing, which are catalogued in the bibliography "Index Operum a Nanna Svartz scriptorum."

The journal Nordisk Medicin was an important forum for medical information during the war when the Nordic countries were largely cut off from the international literature. A quarter of all of Nanna's works were published there. Eventually increasing internationalisation meant that scientific studies were published in English-language journals and Nordisk Medicin was closed down in 1998.

Nanna Svartz's publications are found in between 30 and 40 different journals in Swedish, English, French, Germany, Italian, Spanish and Romanian, which is a testament to her strong network of research colleagues all around the world. Her dissertation from 1927 was written in French: "Etude sur les bactéries intestinales iodophiles et spécialment sur les chlostridies iodophiles."

It should be noted that only in exceptional cases are there more than one or two authors for these articles, compared with in the medical research today, where there are often large groups of authors.

Nanna Svartz was a pioneer in her field. There are now more women than men studying medicine in Sweden and increasingly they are reaching heights beyond the "glass

ceiling.” A quote from another prominent woman might be appropriate here:

“Whether women are better than men I cannot say, but I can say they are certainly no worse.” (Golda Meir)

She invented Pharmacia’s first real medicine (Ny Teknik)

New Karolinska Hospital 2015, with building GV in the foreground

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