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Preface

The third chronicle issued by the Finnish Academies of Technology, FACTE, honours the life's work of the scientist Victor Hartwall as an industrial entrepreneur and a remarkably influential person in the society.

On the second of February 1836, the Senate granted a "Charter for the production of mineral waters given to the Commissioner of Mines, Hartwall". That is how the Hartwall company was born; the first in Finland in its line of business.

One of Victor Hartwall's most important achievements was the Kaivohuone spa, built in connection with the new Kaivopuisto park. He supervised both the work and the production at the establishment. The success of Kaivohuone brought about a tremendous interest and a stream of tourists never experienced in Helsinki before.

We thank the writer Sten Enbom for his valuable work by which the industrial and social importance of Victor Hartwall's life-work will be presented to the general public.

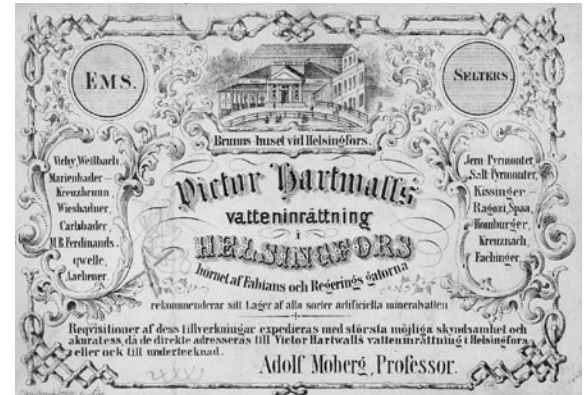
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VICTOR HARTWALL Sr. (1800–1857) The scientist who started up an industry



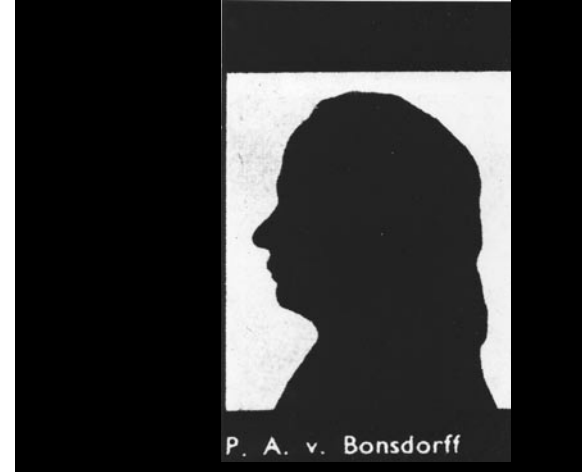
The early days of artificial mineral waters in Helsinki

In summer 1836, the citizens of Helsinki (Helsingfors) were able to experience a new and interesting phenomenon along the Public Promenade in the still somewhat moderate Botanical Garden: so-called artificial mineral waters were being served close by the pavilion that had been erected just a few years earlier. On the 17th of May preceding the event, an announcement appeared in Helsingfors Tidningar in which the gentlemen P.A. von Bonsdorff and Victor Hartwall informed the public of this opportunity to enjoy a choice of health-bringing waters "direct from large reservoirs" while strolling in the park. The gentlemen's announcement listed a number of waters bearing the familiar names of big spas on the Continent, such as Carlsbader, Marienbader-Kreuzbrunn, Jern-Pyrmonter, or Selters. It also offered a weekly subscription to such waters at a price ranging from 6 to 10 roubles, and an opportunity to obtain "other sorts of mineral waters out of fresh bottles"; further still, it was complemented by an even longer list of "the waters now being produced at the establishment" with bitter and soda waters being mentioned at the end.

This constituted the modest beginnings of today's leading manufacturer of waters, soft drinks, and beer in Finland. In this booklet, it will be explained in more detail how it came about that the two scientists, Professor Pehr Adolf von

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Bonsdorff (1791–1839) and Ph.D. Victor Hartwall (1800–1857), became engaged in water production and were able to take advantage of their expert knowledge in doing so. Since the principal character of this story and his serious scientific work provided the impetus for a successful family business, there is every reason to describe the events that influenced his actions and led up to the subsequent activities. As will be seen later, it was a question of serious and earnest research work, primarily seeking after medical solutions to make it easier for people to overcome diseases and to regain their health as far as possible. Many well-known and acknowledged scientists devoted their time and interest to finding solutions, and we shall find out that our principal character too was an active participant in this development work.

Victor Hartwall's background and studies

Victor Hartwall was the son of a ship-owner and landowner, Erik Johan Hartwall, and his wife, Anna Charlotta, born Bergqvist. The first member of the Hartwall family known with certainty was Johan Mattsson, a tenant farmer on the Pöksy farm of the Ojoinen (Ojois) estate in the 1680s and parish supervisor in the parish of Hämeenlinna (Tavastehus), where he was buried on the 12th of May, 1701, at the age of 66. The son of Johan Mattsson, Anders Johansson, and his grandson, Johan Andersson, were also tenant farmers and parish supervisors. For reasons unknown, Johan Andersson's son Erik Hartwall, born in Hämeenlinna in the year 1723, adopted this family name, together with his three brothers and his uncle. In those days it was common among the burghers of Hämeenlinna to start using proper family names. Erik Hartwall went to school at Hämeenlinna Junior Secondary (the so-called trivial school), passed his matriculation exam in Turku (Åbo), was inscribed in the association of students from Häme (Tavastland), and was admitted to the Academy gratis in 1746. He worked as a tutor, book-keeper, and, in the years 1763 – 1772, enrolment clerk at the Uusimaa and Häme (Nylands och Tavastlands) Dragoon Regiment. He owned Petas, in the village of Tolkin kylä (Tolkby), in the parish of Helsinge. He died when he was a regimental commissary and enrolment clerk in Turku in the year 1800. The eldest son, Erik Johan Hartwall, already mentioned in the introduction, was

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born on the 6th of April, 1758, probably in Helsinge. At the beginning he was a shop assistant in Turku. In 1782 he was accepted as book-keeper at the Gamla skeppsvarvet shipyard in Turku. He took the burgher's oath in 1793 and after that he purchased the shipyard. He was a partner in, and owner of, several ships. The shipyard was taken over by other owners in 1800, while Hartwall continued as sole owner of the newly-built frigate *Freden* during the years 1802–1823. In 1802 he also bought the Metsämäki farm in Maaria (S:t Marie) and lived there as a landowner for the rest of his life. He died on the 10th of April, 1826. In September 1793 Erik Hartwall entered into marriage with Anna Charlotta Bergqvist from Stockholm, who died in Maaria on the 11th of August, 1822.

Their son, Victor Hartwall, matriculated from his senior secondary school in 1817, and then studied mineralogy at the Academy in Turku with Professor Bonsdorff. He presented his dissertation for a Ph. D. degree in 1823 and became a docent in chemistry the following year and an adjunct (assistant professor in today's terminology) in 1825. Hartwall's dissertation dealt with the analyses of chalcopyrite from the Orijärvi mine, as well as of wernerite, a new deposit from Parainen (Pargas), which he continued analysing in more detail, presenting a new dissertation on the topic in 1824.

From natural to artificial mineral waters

Since time immemorial people have been aware of the beneficial effects of certain natural springs, and they have used the water both for external and internal use. At the beginning of modern times, medicine started developing into a critical science. First and foremost, this involved taking a new view of old traditional medicines and striving to bring about means that could help a sick organism to eliminate the cause of the disease. Traditionally used at the spas in Central Europe in particular, health-bringing waters were now also being recognised among new medicines and means of medication. Certain discoveries confirmed that, in many cases, these waters had beneficial effects. This resulted in an active search for such springs, even in Sweden-Finland, and towards the end of the 18th century there were over 300 springs in the country. Along with increasing welfare, many springs were developed into establishments with parks, buildings, and gardens in order to add to the common well-being, especially in Sweden.

Since the 16th and 17th centuries, there had been botanical gardens of some sort at the European universities. The knowledge of flora was then mostly used for medical needs. In the Swedish kingdom, some botanical gardens were built in the 18th century because of the interest shown in botany thanks to Linné, Carl von Linné (1707–1778).

Medevi, in North-Eastern Östergötland, near Lake Vät-

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tern, developed into the first real spa in Sweden. Urban Hjärne (1641–1724), a physician and chemist as well as the Assessor at the Board of Mines, led the active search for healthy springs and was able to establish the iron content of the Medevi water; in 1678 Medevi was opened, with Hjärne as the spa physician, and hereby Sweden gained her first dignified spa.

The next interesting name in this connection is Torbern Bergman (1735 - 1784), a physicist and professor of chemistry at Uppsala University. As one of the foremost teachers, he attracted disciples from many countries, while his articles and dissertations “were studied with enthusiasm and interest by European scholars”. Apart from a large number of dissertations and studies in the world of physics and of chemistry in particular, his invention of “reproducing mineral waters” by means of chemistry stands out, and therefore he is regarded as the first to succeed in the attempt to produce mineral waters artificially. One of his disciples, Johan Gottlieb Gahn, first experimented with production in Sweden, in Falun, as early as 1776. In the 1790s, there were a dozen small production plants in Stockholm. What methods Bergman first utilised are not really known for certain. The Swedish natural mineral waters were normally poor in salts. Naturally, the waters in springs and spas had different compounds and different amounts of common salt, possibly bromine and iodised salts, while the iron water usually contained iron sulphate. It is not known whether, at that time, information on salt content was made available or not at different famous natural springs in

Europe, such as Karlsbad, Kissingen, Marienbad, Selters, and so forth. The amount of dissolved salts was probably considerably higher there than in Sweden.

Since natural mineral waters had long been in increasing use for medical purposes, some attempts to bring about non-natural copies had been made as early as in the 16th century. Nevertheless, Bergman was the first and close to being the creator of the method; production on a large scale did not exist before the end of the 18th century. Mineral water plants were erected in Geneva in 1780 and in Paris in 1798. The chemist and apothecary Friedrich Adolph Struwe established a mineral water plant in his hometown of Dresden in 1820. As he apparently mastered the technique and fabrication methods, the world has since honoured him by regarding him as the founder of the first rationally-functioning factory. It was probably for this reason that in 1821 Struwe obtained the sole right to produce artificial mineral waters in the Kingdom of Saxony over a period of forty years. During the subsequent years he founded factories in Leipzig and Berlin, as well as in England. Struwe is also mentioned as the first to have managed to sweeten and aromatise soft drinks.

One of the small factories that were to be found in Stockholm towards the end of the 18th century was established by L.G. Werner in the year 1799. Interestingly, he combined the production with spa drinking. A young Bachelor of Medicine, Jöns Jacob Berzelius (1779–1848), who in due course would be regarded as one of the most famous researchers in Sweden, next to Linné, worked as spa doctor at Werner's

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establishment in 1803. In 1799, while still a student, Berzelius had been appointed as assistant to the superintendent of the Medevi spa and thus took advantage of the opportunity to research the water in various health springs. These studies were to result in his first dissertation in the year 1800: *Nova Analysis agarum Medeviensium*.

Hereafter Berzelius' career proceeded rapidly; doctor of medicine in 1804, professor of medicine and pharmacy in 1807, and, in 1808, at the young age of 29, he was invited to become a member of the Royal Swedish Academy of Sciences; in 1818 he became its secretary and finally, in 1837, a member of the Swedish Academy. Berzelius was one of the founders of the Swedish Association of Medicine and a colleague at the Medical College, which soon after became the Karolinska Institute. He made many groundbreaking discoveries in chemistry, as well as determining the precise atomic weights of nearly all the chemical elements then known. He also laid the foundations of today's chemical formulary and discovered a number of chemical elements. He was ennobled in 1818 and became a baron in 1835.

Berzelius set up a laboratory of his own at Riddarholmen in Stockholm, where most of his discoveries were made. There he was surrounded by a large number of adoring, curious disciples from all parts of Europe. Later on, during their own careers, many of these students were to attain fame in different fields of scientific research.

The oldest known spring in Finland is that of Kupittaa (Kuppis) or Saint Henrik's spring, which is the spring where,

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JÓNS JACOB BERZELIUS (MV).



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according to the legend, Bishop Henrik baptised the first Finns. The energetic professor of medicine at the Academy in Turku, Elias Til-Landz, originally Tillander (1640–1693), showed interest in the spring, took water samples, and found out that the water was beneficial to health. He also took the initiative in establishing a hospital for leprosy in the vicinity of the spring. Til-Landz, a clergyman's son from Småland, obtained his Doctorate in Medicine from Leiden, where medical research, biology, and botany were on a high level, and also became famous as the publisher of the first flora in the country.

Since the long-lasting period of wars had ended simultaneously with the fall of the Great Power of Sweden and the Peace of Uusikaupunki (Nystad) in 1721, the Akademy in Turku was able to return to its home town after the obligatory years of flight in Stockholm. It was now possible to resume activities and establish professorships. Doctor of Medicine Petter Elfving (1677–1726) had already been appointed as professor of medical studies in Stockholm in 1720. After his studies in Uppsala and Utrecht Elfving worked as a provincial medical doctor, and from 1705 to 1709 he was in charge of the spa in Sätra, near Västerås. Urban Hjärne, the renowned physician from Medevi Spa, who had been able to draw attention to health spas, was Elfving's father-in-law. Elfving published an article on the treatments he had given. He also described the good results that had served many people "in their frailty, diseases and difficult attacks".

Back in Turku, Elfving showed interest in the Naantali

(Nådendal) spa, making it into a much-visited health spa for a long period of time. Even here Petter Elfving wanted to prove the water's health benefits in writing. In his small brochure he praises "the delightful and desired effects that the healthy water of Naantali" had caused, and he mentions scurvy, stiff knees, and excessive appetite that had been cured by the water from the spring. The brochure, written in 1724, is the first of its kind for a health spa and establishment in Finland.

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The next in the list of prominent scientists interested in health spas was Johan Haartman (1725–1787), frequently described as "the Father of Finnish Medicine". After Haartman's election as professor of medicine at the Academy in 1765, medical studies underwent a big boom. Among others, Haartman was to preside over fifteen dissertations in medicine, which then led to the first Ceremonial Conferment of Doctoral Degrees in Turku in the year 1781.

Haartman also had the time to show an interest in health spas in the country. He carried out chemical analyses of the healthy water in Kupittaa, Naantali, and the Runni (Gregorii) spa in Iisalmi (Idensalmi) and submitted reports thereon to the Collegium medicum, the Board of Health of the time. He produced mineral waters for people who did not have the opportunity to visit the spas. On various occasions, he also described the use of spas and the effect of waters.

Haartman's important support and financial donations resulted in an increasing interest in the science of medicine and hence nursing. A number of mineral springs and other springs were commissioned in different parts of the country.

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However, the information about their activities is insufficient, and it seems that in most cases the quality, salts, and minerals of the water there had not been analysed thoroughly. Traditionally, many springs had been considered reliable, with good results being reported chiefly locally. During the long construction period at Viapori (Sveaborg), ailing and overworked soldiers were sent to a spring in Espoo (Esbo) for "complete recovery of health".

Even though the growing number of health spas was becoming common knowledge, the fact is that towards the end of the 18th century people in Finland actually lived in rather a close society, where the little information that there was reached only a few. Health spas were often situated close to regions like Rauma (Raumo), Kristiinankaupunki (Kristinestad), Vaasa (Vasa), Uusikaarelpöy (Nykarleby), Pietarsaari (Jakobstad), and Oulu (Uleåborg) on the west coast, or Pohja (Pojo), Espoo (Esbo), and Loviisa (Lovisa) in the south. In the interior of the country there was Iisalmi, as mentioned earlier, as well as Mikkeli (St Michel), Kangasala, and Orivesi. More often than not, the spas served the property-owning population from nearby towns or parish villages, while the country people, for the most part, were waiting their turn. As soon as some sort of services were provided for drinking mineral waters, the charges for visits rose, and yet most spas were offering only primitive facilities for a long time. Consequently, the guests from far away had to manage as best they could in the neighbourhood. The figures available to date indicate that at the turn of the century some 40 to 50 people

visited Iisalmi and Rauma each season. As for Iisalmi, it also appears that in the year 1793 thirteen guests fell into the “poor” category. It was the social spirit of the time to help the disadvantaged and the poor by granting lower charges or charge-free services.

Nevertheless, in both halves of the country activities at the springs had reached such a level that it was considered advisable to draw up a set of rules and regulations governing activities at the health spas. It is not known exactly how long the oldest rules have been in existence, but a fairly early set from the health spa of Oulu, in the Finnish half, dates back to 1789. The drinking of mineral waters was considered a serious matter blessed by the higher powers, and the guests could not feel indifferent about it. At every spa, drinking started early in the morning with a prayer or a divine service, and attendance was obligatory. In other respects, one was supposed to behave in a gentlemanlike fashion, neither arms nor spurs were allowed indoors, and not even smoking was tolerated. Apart from the charges levied for the cure, fines were collected in a money-box and mostly used for medication for the poor. Social life was less serious during the cure; people made excursions and took promenades, played games, and enjoyed entertainment of a most varied sort.

The few intensive weeks of summer were not necessarily convenient for everyone to enjoy drinking at the spas. For agriculture, for example, it was the busiest time of the year, and for the weakest and sickest a fatiguing trip to a distant but reputable spa was too much. Though foreign healthy

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waters had long been imported, only well-off townspeople could afford to drink them. Therefore, the idea of producing waters domestically was considered urgent; for most of the year navigation was curtailed and imported healthy waters could not be stored for a longer time.

The idea of producing artificial mineral waters locally was by no means new; Torbern Bergman had been the first to think of it, and in 1765 Johan Haartman published his observations under the title of *Om Artificielt Mineral-Vattens bruk och verkan* (On the use and effect of artificial mineral waters) in the writings of the Royal Academy of Sciences. It was of special interest that Haartman also gave his recipe to his readers. At the Turku hospital the patients who had no opportunity to go to the health spas were cured with good spring water to which he had added 4 lods (1 lod = 13 g) of iron filings and 6 to 8 lods of pulverised sulphur wrapped in thin linen and placed hanging in a flask of two pottles (1 pottle = 2.6 l), which was then closed and left overnight in a cold cellar. Together with a varying amount of English salt, the patient drank considerable amounts of Haartman's “artificial mineral water” every morning for several weeks. The flask was refilled immediately after each drinking. Haartman also described concretely how a patient had almost fully recovered after difficult pains and spasms. Further still, he mentioned that he used to check the chemical consistency of the water every morning, adding that it had reacted to the tests in the same way as natural spring water did. Besides, Haartman stated that the artificial mineral water used “corresponds to

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the goodness and strength of the water from Turku Health Spa” (Kupittaa) which he had found both stronger and better than all the waters he had had the opportunity of trying both in the home country and in Sweden. Certainly, Haartman’s last reflections are not without interest when he states in a spirit of great confidence that artificial water can be of service to people far away from natural springs and, consequently, a great help.

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Haartman’s interest in artificial waters portends active involvement in many fields. The importation of expensive foreign waters had considerably increased, keeping pace with increasing welfare; for instance, in the year 1772 nearly 30,000 barrels were declared to the customs, which meant a significant outflow of currency from the country. The authorities endeavoured to reduce this by further favouring domestic production. Added to this, the science of medicine had adopted the opinion that mineral water played a certain role in curing chronic diseases in particular. Finally, it was certainly more convenient to deal with artificial waters that could relieve the patient of expensive cures at health spas.

It is still quite appropriate to revert to the energetic professor Torbern Bergman and his continued work. As a concept, carbonic acid (H_2CO_3) was not totally unfamiliar to the researchers of previous generations, but when both the correct chemical and physical nature of carbonic acid (a chemical compound formed when carbon dioxide is dissolved in water) had been defined, scientists took a great step forward with the work of imitating natural medical waters on a large scale.

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This immediately gave Bergman the reason to publish a dissertation, *Om luftsyra* (On air acid), in 1773. So, Bergman was the one who discovered the method of carbonating water chemically. Two years later, his next dissertation was published, i.e. *Afhandling om Bitter- Selzer Spa- och Pyrmonter-Vatten samt deras tillredande genom konst* (Thesis on Bitter, Selzer Spa and Pyrmonter waters and their fabrication by artifice). This clarification is interesting, because Bergman also openly describes the method of fabrication, mentioning all the added elements. He strongly emphasises the importance of introducing enough carbonic acid into the water. Without doing so, the gypsum, calcium, and magnesium, which had been pulverised and added to the water in given amounts, would only be decomposed with difficulty. Even iron filings were included in Bergman’s recipe. The flasks were to be quickly corked up and placed upside down in a cold cellar. According to Bergman, an experienced person could prepare 40 to 50 flasks a day. This article, published by the Academy of Sciences aroused a lot of attention and an offprint had to be made. Bergman’s text was clear and logical and the method was scientifically proven. In other words, it was time to go ahead. There is much evidence of the method having been put into use swiftly and widely.

In Finland it was probably a provincial doctor in Turku, Johan Gabriel Bergman, who first prepared water in 1775 according to the recipe of his namesake Torbern Bergman. He even urged many people to prepare or make their waters themselves – with good results. Additionally, Professor Johan

Haartman had continued using prepared mineral waters for treating his patients. Furthermore, it appeared in some other contexts that - apart from carbonic acid - the salts needed for preparing flasks of 1 stop (1.3 l) of Spa, Pyrmonter, Bitter, and Selter waters were now available for sale at the few existing pharmacies that there were.

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As early as 1782, artificial mineral water was on sale in Turku, duly announced in *Tidningar af et Sällskap i Åbo*. This announcement should be considered the first ever in Finland about the new water. The manufacturer was Adjunct Michael Holmberg, and he would soon be followed by several more or less recognised makers, with the result that the manufacture and sales of mineral waters were forbidden before samples had been approved of by the Collegium Medicum. However, the time was not ripe for selling in large quantities; buyers-patients were not yet aware of the improvements that had taken place and they rather placed their trust in imported or domestic spring waters, and, perhaps above all, avoided the trouble of producing the water themselves. Purely medically speaking, healthy waters had, nevertheless, established a reputation among both physicians and the authorities as a cure for many diseases.

In the list of eminent professors of chemistry at the Academy in Turku, von Bonsdorff stands out as one of much interest in this connection. Born in Turku, an undergraduate in 1810 and awarded a PhD in 1815, a docent in chemistry in 1816, an adjunct (assistant professor) in 1818, and, in 1823, appointed to a professorship in chemistry after his famous

predecessor, the chemist and mineralogist Johan Gadolin (1760–1852), a student of both Pehr Adrian Gadd (1727–1797) and Torbern Bergman. Bonsdorff's main interest was also actually directed towards mineral analysis.

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Now introduced into and admired by the scientific world, Berzelius surrounded himself with many colleagues, admirers, disciples, and assistants in his laboratory in Stockholm. In the year 1820 Bonsdorff had the opportunity of working with Berzelius as his student and research colleague for some time. Nils Gustaf Nordenskiöld (1792–1866), who was appointed as superintendent to the Finnish Board of Mines in 1823, was also able to participate in research work there for a while. For the time being, the main interest lay in mineral analysis, and during the following years Bonsdorff was to publish a study on Finland's mineralogy in a series of articles. He also stayed in London and Paris for a few months before assuming a professorship in chemistry in Turku in 1823.

It was only natural that Bonsdorff, as professor of chemistry, would also be interested in mineral water. In winter 1818–1819 he had examined the water in Naantali, which much later led to a dissertation entitled *Bidrag till närmare kännedom om Finlands mineralkällor* (A contribution to a better knowledge of mineral springs in Finland). In 1821, together with his student Victor Hartwall, Bonsdorff performed certain experiments to produce artificial mineral water. Even the old spring in Rauma was of interest, in the first place because in 1824, when his father, the professor of medicine, archiatre Gabriel von Bonsdorff (1762–1831, ennobled in 1819), still

full of vigour and spirit, had started to fit out a spring and bath establishment there. Among others, they also acquired Carlsbader water apparatus set up at two different degrees of heat. By that means they could offer artificial mineral water as an alternative and possibly as a necessary complement to the natural spring water of the spa. At the same time a similar establishment was set up by the city medical officer and hospital doctor Carl Daniel von Haartman, (1792–1877), later professor and director-general of The Board of Health. According to Haartman, the Carlsbader apparatus had been “fabricated in Stockholm by craftsmen experienced in such work, so that it would not be short of anything as regards its highly necessary precision...” The quotation indicates that there was a certain demand for such apparatus.

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The year 1827 brought about the great catastrophe of the Turku fire, which destroyed a good deal of the town, even destroying or damaging much that was valuable in the buildings, collections, archives, and gardens of the Academy. The collection of minerals was demolished and Bonsdorff lost his large personal collection of minerals, his preparations, and laboratory notes. Nevertheless, a great deal was later dug out of the ashes and reused. The fire hastened the move of the Academy, which in fact had been decided on earlier, and the loss was difficult to bear in Turku. It goes without saying that when the Academy, by the name of “The Imperial Alexander University of Finland” moved to Helsinki as early as the following year, professors, other teachers and students followed. Bonsdorff continued his interrupted work in Hel-

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sinki in two shallow and dark rooms on the bottom floor of the Commandant's house at 6 Eteläesplanadi (Södra Esplanaden) (today the Government Banquet Hall). The front room was used for rough work, while the back room was for conducting analyses. In the absence of ventilation, the often malodorous “gases” spread from the laboratory into the upper floors of the distinguished house. Crowding was also a difficult problem, and therefore Bonsdorff was forced to retire to a laboratory adjacent to his private quarters. In autumn 1832 it was eventually possible to move into the new university building, where three rooms had been reserved for the chemistry laboratory on the ground floor in the south-eastern corner, facing Aleksanterinkatu (Alexandersgatan). A lecture hall was organised on the floor above, but still part of the rooms had to be used for analytic experiments. Added to this, the number of 24 working places was inadequate, with constant crowding as a result. Bonsdorff repeatedly appealed for more space for increasing education, but without result. It was not until the times of his successor, Adolf Edvard Arppe (1818–1894), that some larger spaces were occupied, and eventually, when Arppe was Chancellor, the “Arppeanum”, a stately building for the chemistry laboratory, was inaugurated in the vicinity of Senate Square in 1869. The mineral collection that Bonsdorff had started bringing together after the university's mineral collections had been damaged by the fire in Turku also found a home in this building.

The Europe-orientated Bonsdorff paid frequent visits to Central Europe and participated actively in many conferences,

which also made him a well-known and respected scientist.

On one of his many visits to Berzelius in Stockholm Bonsdorff had taken up Victor Hartwall's wish to complete his studies with Berzelius. In a letter dated the 1st of November, 1826, Bonsdorff expresses his gratitude:

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"for the goodness and benevolence the Professor was willing to show me during my recent stay in Stockholm... Adjunct Hartwall... has finally been able to arrange a trip abroad, and it is him who now delivers these lines to the Professor" ... "If only the Professor could be so kind as to let him work with some mineral substances composed of less common metals, because some practice in analysing organic substances would be of much use to him. Since Hartwall is inclined to much accuracy, I feel assured that he will not be without skill for such work."

Victor Hartwall, who was 28 years of age, was well received and he was given new research tasks in the field of mineralogy. In his capacity as secretary of the Academy of Sciences, Berzelius edited a series of annual reports on the most significant results within international research. On several occasions Hartwall was mentioned in these reports, receiving much praise. Additionally, some investigations were included in the documents of the Academy for the year 1828.

Victor Hartwall's journey to Odessa

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As mentioned earlier, artificial mineral waters had now arrived even in Finland, much influenced by Sweden, where the tradition had been developing on a much larger scale than in the neighbouring sister country, which was harassed by war and crisis. But Sweden had also had to look for examples in Continental Europe and in other parts of the old world with even older traditions of drinking healthy waters. The development had traditionally been especially strong in the German-speaking regions. Promenades and time spent together in city parks and at spas were all a natural part of middle-class social life in the small German kingdoms and duchies. Added to this, since mineral water springs operated as sanatoria bringing health, there was a large number of people moving about in their parks. Hence, supplementing the natural springs with facilities for the manufacture of various artificial waters proved justified. The above-mentioned builder of mineral water plants, the apothecary Struwe from Dresden, continued to prosper. He was offered or given the opportunity to found mineral water establishments in Warsaw, Moscow, Saint Petersburg, and Kiev.

In 1828, General Peter van Suchtelen – the Russian minister in Stockholm and known as a skilful negotiator at the capitulation of Viapori (Sveaborg) during "the Finnish war" of 1808–1809, among others – received a letter from Odessa, by the Black Sea, dated the 5th of June. The letter had been sent

by Count Mihail Semenovich Vorontsov (1782–1856), Governor of the Russian districts of Novorossiisk and Bessarabia since 1823. Vorontsov's father had acted as Russian minister in London and thus the son had spent his childhood and youth in England. After finishing his studies at Cambridge, the son had returned to Russia to do his military service. His military career was spectacular, and in 1832 his military rank was the fourth highest in the country. The family owned large areas of land around Odessa, which had also affected Nicholas I's decision to appoint Vorontsov as governor.

Odessa was still a port of little importance, and yet it was the centre of vast areas along the coastline of the Black Sea. The town housed both the office and the governor's residence. Vorontsov had many plans for developing the town. When the alternative artificial waters reached the Russian cities, it became clear that a sanatorium had a high priority in the development plans for the town:

"The proximity of the unhealthy regions... which gives rise to liver diseases curable by means of fresh or artificial water from Karlsbad rather than by any other remedy... all this indicates that the inhabitants in these regions desire to have the possibility of finding this beneficial remedy in this central location...".

It is known that Vorontsov was well informed of both natural and artificial waters, as well as of the famous names of Berzelius and Struwe. Struwe's establishment in Brighton, England, which opened in 1825, was also familiar to him. Dur-

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ing the Imperial couple's visit to Odessa in May 1828, which was first and foremost related to the on-going Russo-Turkish war, Vorontsov obtained the final acceptance of the project in question.

Prior to the Emperor's final confirmation, however, the project had been planned for some time. Vorontsov had been in contact with Struwe, as well as with the manager at the mineral water establishment that was being built in Moscow. He wished to have a similar establishment in Odessa. Nevertheless, Struwe had been forced to give a promise "not to give his own resources and help to any establishment of the kind in Russia without the consent of the establishment in Moscow". These contacts had led nowhere; "the directors are so hard to agree with..." All this explains the letter written to Suchtelen:

"At present Sweden has the foremost chemist in Europe. Mr Berzelius has... devoted himself to the production of German mineral waters, in accordance with similar or corresponding methods to those of Mr Struwe. Could we not hope that he would help us... On similar occasions, Mr Struwe normally participates in speculation with some free shares, which he accepts as a fee for giving the information on the method, and so he nominates an experienced chemist... to install and maintain the machinery for the production of mineral water."

Vorontsov concludes the letter by looking forward to Suchtelen's help and thanking him in advance. It is now Suchtelen's duty to contact Berzelius and prepare him for be-

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ing engaged in the project. In his letter to Berzelius dated the 8th of July Suchtelen refers to a recent interesting meeting between the gentlemen two days earlier and, being perfectly convinced of Berzelius' wish to support the enterprise, encloses Vorontsov's letter, taking the liberty of inviting the Professor "and the person you have chosen to have dinner with me on the first date convenient to you".

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On the 21st of July, Berzelius replies that he is only too pleased to contribute to accomplishing a useful enterprise.

"To that end I have directed my eyes on Mr Hartwall, a young Finnish chemist, assistant to the professor of chemistry at Helsinki University. He has worked in my laboratory for a year now, and, as far as I know, he will not have anything against leaving for Odessa, in order to commission a factory for the production of artificial mineral water there."

According to the letter, Victor Hartwall offers to spend the following spa season in Odessa, hoping to have enough time to train a student who can continue the activity. Further still, Hartwall would be content with the agreed remuneration for his trip to Odessa, the stay there, and the return trip home.

"as for the reward that could accrue to him as a compensation for starting up the enterprise, he refers to the commonly-known righteousness so characteristic of Mr Vorontsov, whom he wishes to follow in all respects."

Berzelius continues by describing what is needed:

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"for the production of such mineral waters as in Karlsbad, Marienbad, and other such places,

1) a beautiful shady yard, where people drinking water can promenade with delight. This yard shall lead to a spacious lounge where one can promenade in all weathers. The apparatus for making mineral water shall be located in the same space or in an adjacent building. As for the apparatus, considering the lengthy transportation, I have advised Mr Hartwall that he should have made a very small model of tinsplate so that the craftsmen of Odessa can build the apparatus without problems. Cranes and pumps that call for precision work and do not take much space can be manufactured here and brought there with Mr Hartwall.

2) a certain amount of different salts and acids. As I do not know whether they can all be obtained in Odessa, I suggest that a business firm be assigned in Warsaw to which these substances could be sent from Berlin, and from there they could be forwarded to Odessa, at least as long as one cannot pass through the Bosphorus.

3) a cellar in which to hold and store the amount of ice required for the production of cold mineral water ."

Finally, it is mentioned that Hartwall works every day in the artificial mineral water plant owned by Berzelius' student Mosander, and he also points out that Count Vorontsov "shall be content with Mr Hartwall, with his work as well as with his calm and modest behaviour".

The letter is signed by Jac. Berzelius. Suchtelen hastens to convey Berzelius's answer to Vorontsov, including the choice of Hartwall:

"...Mr Hartwall, whom I know personally and whom Mr Berzelius regards highly. I must add that Mr Hartwall can only speak Swedish and German, that he does not speak a lot, and that he has a most modest appearance; it is to be hoped that his abilities will meet the recommendation, and that his manner of acting as a leader corresponds to his behaviour... besides, Hartwall is ready not to make any secret of the experimenting with ingredients and the boiling of water; hence, the management shall introduce a skilled person at his disposal who is tied to the management in such a way that he shall neither reveal the secret that will be entrusted to him nor leave the establishment. Mr Hartwall would like to know whether he can find skilled workers in Odessa for manufacturing pumps and cranes. A prompt reply to this will be of use to him when making preparations for the complete apparatus, which, according to his calculations, would cost between five to six thousand roubles..."

Finally, there are Vorontsov's exuberant compliments in his letter from Odessa dated the 3rd of August, 1828, where, among other matters, he presumes that:

"we are not going to need a steam engine, nor any of the other complicated machines which I have seen at Doctor Struwe's establishment in England and which would make things very difficult for us as far as the expenses and the problems

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of the construction and repair of such machines are concerned."

In the autumn Victor Hartwall returned to Helsinki in order to resume his job at the university, expecting the final notification from Odessa. At the same time, he was also waiting for his baggage from Stockholm, which he speaks about in his letter to Berzelius dated the 24th of October.

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"Ever since the beginning of the month I have been postponing my letter to the Professor to convey my gratitude for the friendship and kindness that the Professor had so generously lavished on me during my stay in Stockholm; I have put it off, hoping that thereby I might also send details of the analyses that I had the good fortune of conducting in the Professor's laboratory under the Professor's guidance. Because of a most unpleasant event, I cannot do it now; for the past two weeks I have in vain been waiting for a ship, which, besides the belongings of many others, also has mine on board, among them almost all my books; the compiled analyses were therein; I am fortunate to have the numerical results with notes taken during the process of analysing in my possession and I therefore hope to be able to send the results by the middle of the next month at the latest. It is taken for granted that the above-mentioned ship has been wrecked in heavy seas during the previous week. This loss, perhaps even more so the two years of pleasantly sojourning in Sweden, in sharp contrast to my present existence, makes living extremely tedious and troublesome. The journey to Odessa, which I considered absolutely positive following a letter from Count Vorontsov,

with the result that I placed an order for the apparatus with Collin in the middle of September, appears to be foundering. This is what I presume, since Vorontsov commands at Varna for the time being.

Nordenskiöld begs me to send his regards. I was unfortunate enough to forget the minerals the Professor had promised to him before the Professor's departure. While asking you to give my regards to Pasch, Mosander and Rudberg, I remain, yours faithfully

The Professor's humble servant,
Victor Hartwall

Even though Vorontsov had gone out to war in anticipation of victory for the Christians, a message about the journey was eventually received, since it is noted in Helsingfors Tidningar at the end of the February of the following year, 1829, that:

"The adjunct in chemistry at the local university, Mr Hartwall, who has undertaken to reproduce artificial mineral water in Odessa and for such a purpose establish a so-called Carlsbader institution, received not a long time ago from the local Governor, General Count Woronzov, a most obliging letter, with an invitation to leave for there as soon as possible; as a result thereof Mr Adjunct has recently departed for Saint Petersburg in order to continue his journey from there to the above-mentioned town."

It took a good month for Victor Hartwall to arrive in

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Odessa. All the stretches of the journey were undertaken by horse and sledge or horse and carriage in the worst weather, according to Hartwall himself. He arrived in Odessa on the 21st of March. In a letter to Berzelius he expresses his disappointment at the landscape and Odessa:

"terribly monotonous steppes, no mountains, no trees, elevations in the landscape of 15 to 20 feet . . . a motley crew of Russians, Italians and Greeks, a fairly small number of literateurs."

Among his disappointments and difficulties he mentions, first of all, that hardly any of the preparatory work that had been agreed on had been done. Besides, it was not possible to find copper plate or copper workers in Odessa, and therefore the apparatus were fabricated in Nikolajev, a town 130 km from Odessa, where the bulk of the Russian Black Sea fleet was constructed. Therefore the copper plates were provided from the local stores of the Crown. In his next letter to Berzelius, in August, Hartwall is really tired of all the adversity and discomfort. The apparatus, apart from the ones he had brought with him from Sweden, had been delivered to him in June and they were:

"indeed of such dirtily poor manufacture, and since repairs had sometimes been impaired, since one is also subject to criticism from people who understand nothing of the matter, I have grown tired here, and so forth."

SENATE SQUARE AND SOUTH PORT SEEN FROM THE
TOWER OF ST NICHOLAS' CHURCH.

In 1834 the production of water started in the Sederholm house, on the left, on the corner of the market square. As late as in 1876 the production returned to the square, in the building on the right corner of Aleksanterinkatu and Sofiankatu (Sofiegatan) (HKM).



Despite all this, the production of both cold and warm mineral waters started at the institution in the middle of July, with the local aristocracy as the first guests. Thanks to Vorontsov, the company that had been established for the purpose had a centrally-located and beautiful house at its disposal, which was owned by the town and built in 1795. The park nearby was owned by the town, but according to the agreement the patients could promenade there. The company had to pay for the interior decoration of the building, the construction of the laboratory, and the rooms for the production of water, as well as the accommodation of the chemist, all situated in the building. The water needed for production was available from a nearby spring in the same street. Victor Hartwall built and furnished the laboratory in two months and was also the first to occupy the chemist's accommodation. The building is still there; however, since the mineral water institution was closed in 1914, it has served other purposes.

After the specimens of mineral water had been handed in as required by the authorities, the Board of Health of the Russian Ministry of Interior Affairs passed an opinion, reading, *inter alia*, as follows:

"The artificial mineral waters, such as "selterskaja", "pirmontskaja", "egerskaja", "emskaja", "sudskaja" and "marienbadskaja" . . . were well made, and they contained the same compounds as there are in natural water... Waters were consumed both cold and warm, and they were sold not

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BUILDING AT THE CORNER OF DERIBASOVSKAJA ULITSA – ULITSA SOVJETSKOI ARMII WHERE VICTOR HARTWALL OPENED THE FIRST MINERAL WATER ESTABLISHMENT IN ODESSA, 1829. (PHOTO: BORIS ORLO 1988).



only in Odessa but they were also distributed to the towns of Kerts, Jalta, Herson, Kishinev and Evpatoria.”

Thereby the artificial mineral water factory gave fresh impetus to the rapid development of life in Odessa. The institution became a spa of good reputation, and in due course the town also had sea bathing facilities, the free port grew in importance, and cultural life flourished.

The annual report of the water company for the year 1830 concludes by stating that the equipment needed for the operation of the plant and the chemical ingredients had been purchased by the then chemist, Mr Hartwall, for a price of 15,000 roubles. Over 20,000 roubles were used for his fee and the salary of his assistant, as well as other expenses, while a loan of 7000 roubles by His Highness Count Vorontsov was unpaid.

Because of the plague epidemic prevailing at the time in Odessa, which, to a certain extent, also interfered in the activities of the water institution, Victor Hartwall's journey home was delayed so that it was not until January 1830 that he started off on the journey, and he arrived home in Helsinki at the end of February.

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Hartwall and Bonsdorff start to produce mineral water

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After coming home Victor Hartwall faced many questions regarding his immediate future. The two years in Stockholm with Berzelius had greatly widened his views, especially in scientific terms, while the year in Odessa had definitely guided him into a more technical and practical field of activity. He formally resumed his post as adjunct at the university, for certain, but at the time the conditions were not of the best, as the university building was still being constructed; the inauguration took place in spring 1832. What certainly interested him most for the time being was associated with a young lady, Carolina Fredrika af Stenhof (1802–1875), and this led to a marriage the very same year. With Bonsdorff, now more as a colleague, Victor Hartwall went back in thought to the times in Turku during which the famous teacher and the young student had made artificial mineral water together. By the time, the field had progressed by leaps and bounds, and Hartwall's experiences from Odessa had also proven that there was growing interest in those waters which were well suited for alleviating pains and curing certain diseases. In 1831 the decision was made to try out serious production in secrecy and exploiting the latest know-how. Since Hartwall was also still working at the university, they decided to organise the production anonymously. To begin with, the production took place in Bonsdorff's private laboratory. The merchant C.J.

Sallmén, a well-known shopkeeper with a shop by the new esplanade of the town, was assigned to market the waters. Sallmén's first announcement was published in Helsingfors Tidningar on the 4th of June, and read as follows:

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"Artificial mineral waters of a special kind, for whose sophisticated production the manufacturer assumes full responsibility, are for sale with the undersigned. Prices for Spaa and Järn-Pyrmonter are 40 shillings (of a Swedish riksdaler), for cold Carlsbader, Eger, Marienbader-Kreuz-brunn and Ferdinands-Quelle 36 shillings, for Selters 24 shillings per bottle of 1/3 of a pottle. Other well-known mineral waters are available, provided that orders, for not less than 25 bottles, are placed by the middle of this month. C.J. Sallmén."

The most important piece of information in this announcement was the fact that domestically produced artificial mineral waters were now available in Helsinki, and, moreover, that they were provided with the producer's guarantee of quality. Success was guaranteed, and as early as the following spring the partners were able, still by means of an anonymous announcement, to make it known that waters would also be sold in other localities and that the prices of some would be lowered. The new localities where the waters would be available were Turku, Loviisa, and Heinola, and in addition to these a few more points of sale appeared in Helsinki in quick succession. The first few years were successful, even though there was no lack of competition. Many

merchants continued to either import waters from abroad or order them from domestic springs with "reliable healthy waters".

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Even though neither Bonsdorff nor Hartwall wished to introduce themselves, it was common knowledge that they were the producers. Knowing also their scientific background and know-how, this was considered a guarantee of the quality of the waters, while taste and effect also had an influence on the consumers' judgement. In spite of its medical aspects, artificial water continued to be a seasonal product mostly used during the short summer months. This was one of the reasons why they both kept their academic posts, an especially important reason for Victor Hartwall, who was now expecting an addition to the family; his eldest son, Carl Victor, was born in 1832.

However, the demand for different waters was growing all the time, and there was no longer sufficient space in Bonsdorff's place. It was necessary to start looking for more space, and in 1834 a place was hired from the merchant Sundberg in the Sederholm house by Senate Square, the oldest building in town, at the corner of Aleksanterinkatu and Kattariinankatu (Katrinegatan). Now larger deliveries became feasible. It was possible to order lots of not less than 100 bottles of mineral waters direct from the producers; a discount of 8 per cent was given for cash. Empty bottles were taken back and refunds at a fixed price level paid for them.

Since Helsinki had been elevated to the Capital of the Grand Duchy of Finland in 1812, the Senate and the rest of

the central administration had moved to the capital in 1819, and finally, in 1828, also the Academy in Turku, in its new guise as the Imperial Alexander University of Finland, so that the town now had a totally new status. The extensive reorganisation and reconstruction after the difficult fire of 1808, which had destroyed one third of the buildings in town, was still half finished. Senate Square, with its monumental buildings by Carl Ludvig Engel (1778–1840), was being created, whilst the future St Nicholas' Church and the university building were still under construction. By the market place the stately building of Seurahuone (Societetshuset) had recently been finished, but altogether there were just a few larger stone buildings in the town until the almost thirty public buildings that had all been designed by Engel were erected. For a good many years, this extravagant setting round Senate Square resembled a stage set amidst an otherwise rather plain environment. Modest wooden houses with household buildings in the back yard were a common sight even in the city centre.

For a long time past, there had been a popular park or public promenade, later Kaisaniemi (Kajsaniemi), on the outskirts of the town east of Kluuvi (Gloviken), where the burghers of the town had strolled and met. In 1831 the university acquired parts of a private garden east of the park for their use. In the past, the Academy in Turku had had a botanical garden, hortus academicus, which had gradually developed about the middle of the 18th century, with the necessary conservatory for hibernating more delicate plants. The last scien-

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tist to continue with gardening in Turku was Carl Reinhold Sahlberg (1779–1860), professor of natural history and economics. After the garden had been destroyed by the Turku fire in 1827, Sahlberg, in 1831, was to be the founder of the new botanical garden that was needed in Helsinki. In the beginning, a modest greenhouse was built of wood, which by no means met Sahlberg's expectations.

Hartwall and Bonsdorff had continued to produce artificial mineral waters successfully, and they started to think of a new enlargement of their operations, for instance, by making the water more visible and bringing it closer to the user. Indeed, both gentlemen had experience of serious spa activities, Bonsdorff from Rauma and Hartwall from Odessa. Now that the new botanical garden had been opened to the public, they decided to experiment with serving waters from "big reservoirs" and from "fresh bottles" outdoors. "The advertisement" on the 17th of May, just before the opening of the 1836 season, was special in that both gentlemen were signatories of the announcement for the first time. The whereabouts of such a service during the five to six summer weeks were given a less exact address, and yet it was one that the likely visitors were certainly familiar with. The wording was "These waters will be served... in a beautifully-situated location, appropriate for the occasion in all respects, with an opportunity to stroll". Obviously, they did not want a direct reference to the botanical garden that was owned by the university where both entrepreneurs held posts. The indication "...with an opportunity to stroll" made it clear to everybody

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that it was actually the park by the public promenade. There was no other alternative.

The idea was successful, and the location by the greenhouse in the park became popular with all those who felt the need for a cure. This provided a reason to improve the services the following year and to create a milieu more like a spa. "In his capacity as a physician, adjunct in medicine, Doctor Lars Henric Törnroth, MD has been kind enough to be present during the spa season to help those who wish to consult him for medical advice." In the philanthropic and social spirit that traditionally characterised the health spas, "persons of the class without means" were offered the opportunity to consume waters at half the fixed price. The gentlemen had already been given a certain impulse to act in this manner during their various visits to Berzelius' in Stockholm, where people had initiated a campaign against drinking and the tremendously large and harmful consumption of spirits. Eventually, people had universally begun to realise the social perils of drinking spirits, and hence in 1837 the Swedish Temperance Movement was founded, with Berzelius himself as chairman and Crown Prince Oscar as its first member. Even if the consumption in Finland was among the lowest in Europe, the symptoms started to become evident; this motivated the foundation of sobriety associations even in Finland. Nevertheless, hardly anyone from "the so-called class without means" in need of such care at a low price ventured into the botanical garden where ladies and gentlemen were enjoying their cure.

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Victor Hartwall becomes High Commissioner

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As far as Victor Hartwall was concerned, he had repeatedly had to decide about his future. The activities had certainly increased, and yet they were mostly seasonal, with their heyday coinciding with the five to six summer weeks. He was no longer so interested in his work at the university as he had been before, while Bonsdorff was whole-heartedly committed to his professorship. Even though they were both involved in discussions about the grand yet uncertain spa project, in November 1833, Hartwall accepted the office of "the Director of Control at the Board of Control for Gold, Silver, and Pewter Work", which was subordinated to the Board of Mines, where a friend of Hartwall's, Nils Nordenskiöld, acted as Superintendent and highest in authority. Since minerals had originally been Hartwall's main interest, he was nominated as High Commissioner at the Board of Mines as early as in September the following year. As a result of this, he now handed in his notice to leave his assistant professorship at the university.

Soon after the separation from Sweden in 1809, the necessary importation of Swedish iron ore and cast iron for use in domestic works became a significant nuisance for the new holders of power. While imports were reduced in trade agreements, the interest was directed towards ore prospecting. The Board of Mines was now being organised into an office that

was assigned to influence, supervise, and later even to participate in this work. In search of a competent superintendent, contact was made with Count Suchtelen in Stockholm, who, in turn, was commissioned to turn to Berzelius in order to find a perfect candidate through him. Berzelius responded by stating that his former student, Nils Nordenskiöld, would be the only right person for the task. The Emperor appointed Nordenskiöld in December 1823. Together with Bonsdorff, an earlier fellow-student at Berzelius', he began to look for candidates for the other posts. This took time; there were but few candidates, and both the decision-makers and the owners of the ironworks had their own points of view. Victor Hartwall was chosen as the last candidate, and he was then nominated as the Commissioner of the Board of Mines in October 1834, first and foremost to act as the secretary of the office. In fact, Hartwall was to carry out his part-time tasks at the Board of Mines till his death in 1857.

In a sense, Nordenskiöld's wish to develop all the industry in the country became a reality along with the Imperial Decree of May 1835, on the so-called Directorate of Manufacturing (Manufactur-Direction) to be in charge of advancing and controlling the development of industry, manufacturing, and handicrafts. The chairman should be the head of the financial office in the Imperial Senate; the directorate should have two more members, one of them being the superintendent of the Board of Mines. For a good many years and in many ways, the directorate was run by "His Dreadfulness", Senator Lars Gabriel von Haartman (1789–1859), head of the finan-

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cial office, and above all, as of 1841 the deputy chairman of the economic department in the Imperial Senate and hence the most powerful man in the country. One of the members was, of course, Nordenskiöld, Haartman's brother-in-law, and Bonsdorff, a member from the very beginning, presided till his premature death in 1839. Hartwall was elected as a member in 1844, a post he held till his death in 1857.

As early as in the 1820s, the promotion of ore prospecting became active, and fairly good results were gained in the 1840s and '50s, when the state supported the industry by reopening several smaller mines, thanks to Haartman's energetic contribution, and by acquiring Leineperi (Fredriksfors) near Pori (Björneborg), where a blast-furnace was built. Malmberg, in Kisko, near the copper mine of Orijärvi owned by Fiskars, and Jussaari (Jussarö), in the archipelago of Tammissaari (Ekenäs), were promising new finds that were now being processed again. At the end of the day, however, one by one, many of these smallish mines had to be closed down; either the ore had become exhausted or it was not very suitable for processing. For a period of time, the situation was alleviated by the use of lake iron ore that was found in the interior of the country. Also, there was an intense desire to improve on the possibilities of manufacturing in the mechanical workshops.

In Nicholas I's Finland, technicians were not yet being trained. Latin and Greek were taught at gymnasia to prepare students primarily for education as lawyers or clergymen. The ruling class was perfectly ignorant of the need for technol-

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ogy, which remained very much on the margin. Nor was the number of people employed by industry at the time more than some 3500, most of them being women in cotton and textile factories. On the other hand, there were as many as nearly 20,000 craftsmen.

The Imperial Decree of the year 1835 provided that a technological institute be founded in Helsinki with two different fields of study, mechanical, with workshops, and chemical, with laboratories. The Directorate of Manufacturing was assigned to come up with a detailed proposal, to be submitted the following year. However, their proposal was considered far too comprehensive, and a new, more modest scheme was presented in 1837; a response was not received before 1842, to the effect that the matter should be suspended "till a change in industrial conditions in the future would make such an educational institution necessary". As a substitute, so-called Sunday schools were set up to provide elementary teaching for the apprentices and journeymen of the craftsmen. Added to this, some scholarship travel grants were seen as offering prospects. Accordingly, the development of technical education in the country retained an air of expectancy.

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Helsinki becomes a spa resort

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In older times it was not common to swim in the open sea, and besides, swimming skills were remarkably poor at this time, and so a bathing house would provide facilities for a highly private plunge. The absence of a bathing house had long been talked about in Helsinki, without, however, any concrete results. There was a private one, the so-called "Old Bathing House", but it was only used by the small group of personages who had taken part in financing the place. An event which proved to have a decisive effect on the course of action, however, was the visit of the Emperor to Helsinki in summer 1833. Nicholas I had chosen to come on his pleasure yacht *Izora*, which was the first steamboat ever seen in the port of Helsinki. After much wonder and the first expressions of disbelief about the future of steamships, people soon perceived that in the near future these could fetch visitors from far away to the rather isolated town of Helsinki, if there was a health spa similar to those in Tallinn and in other Baltic towns.

Henrik Borgström (1799–1883), the energetic Commercial Counsellor who had realised a number of valuable projects in the town, had visited England in his youth and admired the parks there; he had decided to enhance the beauty of his home town with parks as beautiful as those. He had also looked after his health by having spa and spring cures both in

Loviisa and in Sweden, and he saw that the plans could now be fully realised after long-drawn-out discussions. Added to this, since for political reasons the Emperor had decided to forbid Russian citizens to travel, for example, to the European spa resorts, this further improved the prospects of proceeding with the project. A well-attended meeting convened on the 1st of September, 1834 by Borgström, quickly elected the board and fixed the price of the shares. Shortly after that, as many as 277 shares were bought; it is worth mentioning that Nicholas I had 30 shares subscribed for himself. What definitely affected the Emperor's subscription for shares was his visit to Odessa in 1829 and the involvement in the spa institution there, as well as the expectations that the plans should be carried out in Helsinki.

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The next thing was to lease the hilly and marshy terrain of Ullanlinna (Ulrikasborg), located in the south-eastern corner of the headland of Helsinki, from the town for another 50 years. As soon as it was known that a certain circle of people in Turku were engaged in a steamship project, Borgström hastened to proceed with the plan in Helsinki. An apothecary, Konrad Appelpgren, came to his rescue in the huge task of planning and organising the park. It was a project of vast proportions, such as never before seen in Helsinki; promenades and avenues were created, marshlands were converted to two small lakes, and many different kinds of trees and bushes were planted. Down by the waterside the spa house designed by Engel was built rapidly and it was finished by the end of 1835.

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It was also necessary to have rules and regulations for the running of the spa activities, and the director of the Board of Health, Haartman, and Victor Hartwall were assigned the task of drafting them; Hartwall, with his experience from Odessa, certainly had a lot to contribute to this. No later than this, there were already realistic plans to extend the bathing house to also include a spring house with artificial mineral waters. In spite of the monetary problems – the park in particular had used up a large amount of the share capital – a decision was taken as early as in March the year after to build a spring house of stone. Well-disposed and known citizens stepped forward with loans. The realisation of the project was assigned to Bonsdorff, Hartwall, and Magister F. Tengström. The spring house was also designed by Engel, and it was finished in spring 1838. Bonsdorff's and Hartwall's assistance in the planning clearly indicated that their mineral water production would be included in the new spa environment. The botanical garden and public promenade were now faced with a fearless rival in the new park that, with its entire establishment, was called Kaivopuisto (Brunnsparken).

As the activities would now increase and the names of the partners had become common knowledge, and as Bonsdorff was a member of the Civil Service Department at the Board of Health, the decision was made to submit a statutory application for a permit to carry on the activities. Even though Bonsdorff still wished to participate in the activities, his position was some impediment to official appearances, which resulted in the application being made in the name

of Victor Hartwall exclusively. A "Charter for the production of mineral waters given to the Commissioner of Mines, Hartwall" was granted on the 2nd of February, 1836, which is still considered the birthday of the present company today, even if activities had been going on for a period of five years at the time. There was obviously nothing to hinder Bonsdorff from being seen more informally in the announcement issued later in May of the same year.

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The spa house was calculated to accommodate about 600 people. Besides the spaces available for catering, conversation, a ladies' society room, billiard room, etc., the spring hall occupied most of the building. Standing in line by one of the walls, the reservoirs with warm and cold artificial waters were attended to by ladies. As for the drinks with classic names from European springs, as frequently mentioned earlier in this article, seven were served as warm water and about the same number as cold. Apart from this there was a large assortment of bottles to choose from. Waters were practically paid for in advance and weekly; people were expected to be on a cure as patients, each with a doctor's description of the type and quantity of water he had to consume daily. Spring drinking could start as early as at six o'clock in the morning, to go on till ten o'clock. The "General rules for the use of mineral water" gave many good pieces of advice on motion, moderateness in eating and drinking, diet, sufficient sleep and healthy living as a whole:

"The strict observance of a most regular way of living is, during every spa cure, of paramount importance. Therefore a diet for the soul is of equal importance as one for the body..."

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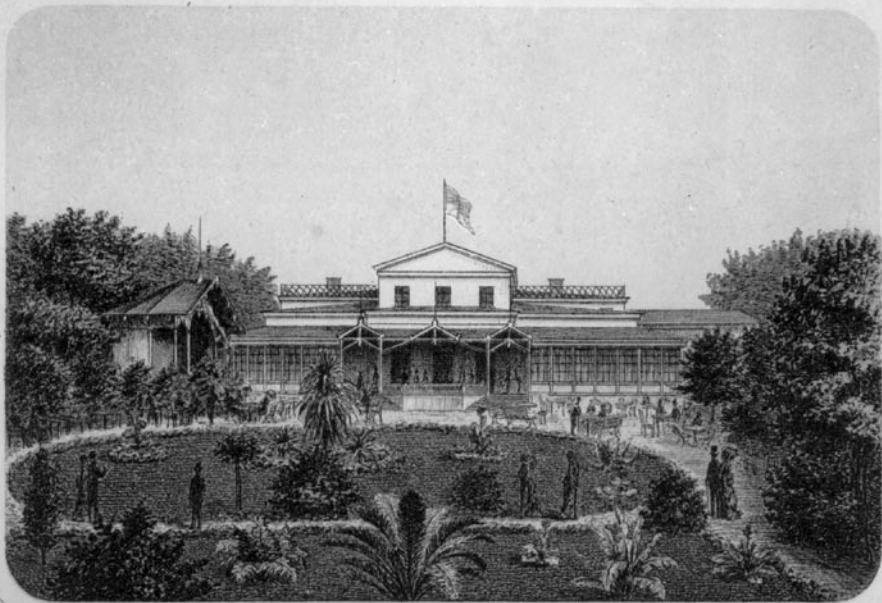
In April 1838, the management was in a position to inform the public of the opening of the bath establishment on the 5th of June, and of the availability of "artificially prepared waters" to the guests. It was also pointed out in the announcement that:

"The preparation and service of water takes place under the supervision of the Professor of Chemistry and Knight von Bonsdorff and Commissioner of Mines, Doctor Hartwall, joint owners of the establishment for artificial mineral waters, founded as early as in 1831, and thereafter favoured with the annually growing confidence of our physicians and of the public. Drinking at this institution will commence on the 15th (27th) of June, to continue till the latter half of the month of August ."

Even in the first summer, the newly opened steam passenger service between Tallinn and Helsinki brought a curious new audience to Helsinki and Kaivopuisto. When the summer service on the steamships "Storfursten" and "Furst Menschikoff" also started operation from Saint Petersburg, the spa life provided such pomp and circumstance in the life of Helsinki as had never been experienced before. Distressed about the travel ban, the Russian nobility chose Helsinki as

SPRING HOUSE IN ITS HEYDAY, YEARS
BEFORE THE CRIMEAN WAR. (MV)

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BRUNNSHUSET.

their spa resort to begin with; they found charm in the still modest and somewhat rustic life of the town, appreciated the spa life there, and came back in subsequent years. Spring cures were then interspersed with entertainment, concerts, balls, and excursions.

“A lot has already been written about the establishment for artificial waters and the bathing house in Helsinki; they truly deserve all the fame that has been acknowledged by everyone unanimously. Waters are prepared with unusual care, in accordance with the famous Berzelius method, besides which the healthful climate by the seaside and the pleasant way of life, accessible to foreigners through both the kindness of the inhabitants in Helsinki and cheap commodities, guarantee much better progress in the recovery of health”.

wrote Jakob Grot, later on a renowned professor of the Russian language at the university. Fame grew and came from elsewhere, too, and the water producers had every reason to be more than content after the first successful season. However, what worried them most was the poor health of Bonsdorff, who had been ailing for quite some time already. In spite of that, during the last few years of his life the European-minded and celebrated professor still made several trips abroad, until he passed away at the age of only 49 years, on the 11th of January, 1839. Prior to this, Hartwall had bought Bonsdorff's half of the joint enterprise, and paid 7000 roubles “for the apparatus related to preparation”.

In 1846, the Senate reverted to the question of technical education, requesting the Directorate of Manufacturing to make a proposal for the organisation of education. In 1827, the Swedish technological institute had opened its doors in Stockholm, and its model was copied in most details in the proposal of 1836. Also, contact was made with Denmark's "Polytaekniske Læroanstalt", which had started functioning in 1829, and which already corresponded closely to the model of a polytechnic institute. The Swedish institute had higher requirements for educational standards, both for students and teachers, than those laid down by the Directorate of Manufacturing in its own simplified proposal. Now, ten years later, with Nordenskiöld and Hartwall still as members, the directorate proposed the formation not only of Sunday schools but the so-called real schools, and "in due consideration of the state's resources", with as practical and popular a programme and as low admission requirements as possible. Hartwall had contacts with Chalmerska Slöjde Skolan in Gothenburg, founded in 1829, where the general level of education was lower than in Copenhagen and Stockholm, a fact that definitely suited the Finnish plans better. In June 1847, a Decree was issued on the establishment of technical real schools in Helsinki, Turku, and Vaasa (Vasa). The low requirements of a minimum age of 12 years, reading and writing skills, and a curriculum that offered far too many "useless" and only a few technical topics gave a scattered image of the work that began in January 1849. Only one person was appointed as teacher and principal of a school, the Master

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of Philosophy Anders Olivier Saelan (1818–1874) in Helsinki, while most of the other teachers, who were badly paid and worked part-time, did not stay long. The quality of students varied with the passing years, and in 1859, after ten years of tuition, a mere 29, i.e. 15 per cent out of the 192 young – far too young – students, had finished their studies. In their memoirs, both Minister Ernst Qvist, principal 1880-1903, and Baron K.E. Palmén, vice-principal 1890–1896, stated that the school could not yet at this stage really be considered a technical school. The development, however, took the right direction along with growing experience and better possibilities.

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Continuation of the activity

Hartwall continued the activity on his own for some time, both at the Spring House and at the water establishment. At a time when the 10-year contract with the Spring House company was about to be renewed, Hartwall took on Professor Adolf Moberg (1813–1895) as a partner. In the absence of competent candidates after Bonsdorff's demise, Moberg had been acting professor of chemistry as a docent and adjunct till 1847, when the chair was given to Edvard Arppe, though Moberg had been placed first on the list of nominees. At the beginning Moberg was not very much involved in the activity, but this would change later on.

The summer season in Kaivopuisto was a short yet essential part of the whole activity, and it affected the sales of bottled water. In Helsinki one distributor was added and another replaced, while in the countryside, which had grown greatly in importance, a new representative was appointed for Hämeenlinna and its surroundings. Therefore, the Sederholm yard started to become crowded, and in 1841 Hartwall bought Yard No. 5 by Fabianinkatu (Fabiansgatan) at the corner of Hallituskatu (Regeringsgatan), a conveniently located and imposing two-storey building of stone. The basement, with its windows facing the street, provided good facilities for enlarging the activities. The Bergskollegium (Board of Mines) had a dozen rooms at its disposal on the first floor, and the Hartwall family, now totalling six persons, occupied

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YARD AT 5 FABIANINKATU (NOW 20) ACQUIRED BY VICTOR HARTWALL IN 1841 FOR THE WATER PLANT, TO SERVE AS ACCOMMODATION FOR HIS FAMILY WITH THE BOARD OF MINES AS TENANT. (PHOTO HOFFERS 1866, HKM)



the upper floor. Thus, Victor Hartwall had his home, his office as Commissioner of Mines, and his water factory under the same roof.

The continued success of the activities also caused some feelings of envy around. A critical comment on the use of carbonic acid gave rise to a furious flood of words by Victor Hartwall to a friend of his:

“Carbonic acid has been incorporated in ferruginous waters, not by compression, but exclusively by means of refrigeration, as recommended by Berzelius in writing . . . Without being inspired by blind belief in authority, people initiated in this matter know that the quantities of carbonic acid prevalent in natural water can gradually instil waters by the method as mentioned earlier, whereby the atmospheric air is eliminated.”

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Hartwall had also emphasised that the waters prepared by him contained at least as much carbonic acid as the natural waters in springs. He further added that he had a compression apparatus at his disposal, but that he seldom used it and never for anything but the preparation of selters and soda water.

The spa seasons continued to be lively and successful; summer after summer the Russian and Baltic nobility came back to Kaivopuisto. During the summer Helsingfors Tidningar continued with the habit of giving the names of the arriving visitors in each issue, and dukes, generals and admirals with their wives and daughters enhanced the splendour, and not only at the soirées and balls. But no happiness lasts forever. At one blow everything changed. Hand in hand the events followed one another, the Crimean war, with the English and French fleets along the Finnish coastline in 1854, the sudden demise of Nicholas I the year after, the bombardment of Viapori in August of the same year, and, in the end, the Peace

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of Paris in March 1856. With the peace and the new Emperor, Alexander II, life changed, and a period of both political and economic liberation emerged. This was not exactly a stroke of good luck for Helsinki and even less so for the future of the spa company. The atmosphere in Europe and in Russia had changed, new contacts were being developed, and mobility was increasing. Moreover, the restrictions on travel abroad were abolished in Russia, and there were no longer any obstacles in the way of those interested in spa resorts and they could now leave for the traditional fashionable spa resorts in Europe. As a result Helsinki lost its appeal, and before long this was witnessed by the number of visitors during the short summer seasons. Naturally, all that was possible was done to retain at least the domestic clientele as guests at the bathing and spring houses. Despite every effort, a downturn had started and there was nothing that could be done to stop it. In 1883 the City of Helsinki took over Kaivopuisto and so, after nearly 50 years of activity, the spa company ceased operating.

During his first visit to the Grand Duchy in 1856, the Emperor had already expressed his wish to develop industry and technical education in the country. Rapidly convened by the Governor-General, Count Feodor Berg, a group of “enlightened owners of ironworks and other manufacturers” now proposed, for instance, the establishment of a technological institute and the reorganisation of the existing real schools. In 1856 and 1859, Saelan made several trips to Germany and Switzerland, visiting well-known institutes, gathering impres-

sions, and recruiting teachers. As early as in 1850, Victor Hartwall had paid a visit to Sweden and Denmark, partly with the same mission. In 1858–1859, the reorganisation of the real schools started, teaching staffs were improved, certain less important subjects were thrown out, and more important ones were added to the curriculum.

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With Senator and Adjoint Financial Head Axel Ludvig Born as chairman as of 1853, the Directorate of Manufacturing advanced further and proposed the establishment of a polytechnic institute for higher technical education. People expressed certain doubts about its realistic possibilities, which is quite understandable. The level of industrial activity was still insignificant, the concept of “technology” as a whole unknown, and hence the need for such an establishment was doubtful, to say the least. The few technicians in the country were often Swedish or German immigrants or natives with a foreign education, working in various fields as installers of new technology or operators; there was no skilled labour with a profile of its own for the time being. The strongest criticism of the school project was levelled by no lesser a personality than Johan Vilhelm Snellman (1806–1881), a philosopher, professor, leading opinion-shaper and eager supporter of the Finnish nationalist movement. Engaged in the topic, Snellman posed the question of what these newly-trained technicians would be used for and how they would earn their living. He agitated, to the contrary, for travel grants to foreign universities when required, and he also claimed that education was especially needed for the development

of agriculture in the country. Furthermore, he paid attention to the absence of the Finnish language in every curriculum proposed; the technical institutes and real schools would exclusively serve the purposes of the west-orientated and Swedish-dominated industry that was dawning in the country, whereas the necessary investment in agricultural schools would benefit the country in a much better way.

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Nevertheless, the proposal by the directorate was noteworthy in that it constituted the first scheme for the organisation of technical education in practical trades on a higher level. After continued development, the technical real school was granted the status of a polytechnic institute in the year 1879, and in 1908 it was eventually renamed as the Teknillinen korkeakoulu, Tekniska högskolan. When the proposal was presented on the 28th of January, 1857, Victor Hartwall was no longer present. On New Year’s Day he had suffered a stroke from which he would never recover; he died on the 8th of August of the same year.

It goes without saying that Hartwall’s departure at the age of 57 was noticed; he had been a distinguished citizen of Helsinki with a concrete impact on the development of the city. Helsingfors Tidningar wrote that “he can be considered the founder of our spring house”, since the establishment had exclusively been related to the artificial mineral waters from the Hartwall institution.

It is of interest to have a look at the inventory of the estate that was drawn up. Besides the valuable yard by Fabianinkatu, the inventory included a horse and carriage, both

for summer and winter rides, and, finally, the articles in the water factory:

“two Danish water apparatus of copper, a limewater apparatus, a gas-generating apparatus of lead with accompanying gasometer and other accessories, a gas-generating flask of copper, a compression machine, a pressure pump of brass, a water cart with barrel, a sieving apparatus with accessories, saucepans, tubs, bunks, scoops, funnels, pans, scale pans, a box containing 25 seal stamps, a cork press, two bales of cork, bottles, glasses, flasks, tankards, retorts, crockery, demijohns, bottle stools, and so forth.

In the spring house there were 19 water reservoirs of copper with 5 bigger and 4 smaller vessels coated with tin-lined copper plate, nameplates, drip cocks with silver pipes, faucets and so forth, a pressure pump of brass with two accessory vessels of copper, pipes and hooks, and so forth, a steam boiler of copper and two water reservoirs and so forth, two gas generation flasks of lead with accessory gas-holders of copper, pipes, faucets, and so forth, two Danish water apparatus with accessories, a filtering apparatus with accessories as well as a number of other inventories, such as 44 porcelain mugs, and finally, 25 dozen spring glasses, 3000 water bottles of 1/3 pottle and 4500 bottles of 1/6 pottle.”

The property had been estimated at 12,000 silver roubles and “the fittings of the water factory” at more than 600 roubles, and the unsold water at 200 roubles, in addition

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to secured claims with a value of not less than 7700 silver roubles. Debtors mainly consisted of pharmacists, physicians, shopkeepers, and restaurant-keepers who had been Hartwall's customers; they even included the Clinical Institute and General Hospital. All added up, the sum invested essentially in the activities amounted to over 20,000 silver roubles in the conservative estimates of the inventory of the estate, which was definitely a considerable amount in the entrepreneurial sector of the time in Helsinki.

However, the question of continued activities remained unsolved. The few employees, with G.R. Hellsten as supervisor, were able to see to the routines without an interruption but among them there was no single person with the formal competence and sufficient sense of responsibility to run the company; the sons of the family were still at school and student age, while Adolf Moberg, since 1849 professor of physics, was already tied to the water plant by a contract with the spring house company. When the year 1857 drew to its end and after the inventory of the estate had been finalised it was time to take a final decision about the future. Moberg had applied for a due charter (Privilegium) in his own name, and he had been granted one on the 1st of December to produce and market artificial mineral waters. The deeply religious Moberg had hardly ever considered taking over the activities; it was rather a question of empowering him to finalise a contract in case the contract now being constituted with the Hartwall family would be accomplished.

In the end, a contract was signed on the 30th of December

to the effect that the mineral water establishment should be run jointly under the same name it had become known by, "Victor Hartwall's mineral water establishment" now becoming the name of the company. Moberg undertook both the management of and the responsibility for the company and its production lines in their entirety. The estate of the undivided inheritance made all the apparatus, instruments and vessels available to the joint institution. Furthermore, the estate contracted to place the three rooms on the ground floor, two water cellars, an ice cellar, a storehouse, and a woodshed, together with the supervisor's accommodation, at their disposal for a term of ten years. The value of glassware, porcelain, raw material and finished products was carried over to a mutual account, from which account the costs of repair, new inventories, property rent and rides then accruing to the institution were to be paid for. Moberg collected the income and paid for the expenses, and every quarter of a year the profits were equally distributed between the shareholders "after reserving the working capital in the form of cash for the next quarter as required".

In Moberg's days the production continued in as versatile a manner as before. However, the downturn in the spring business called for new initiatives so as to adapt the activities to the prevailing conditions and, better still, to develop them further. Moberg was very preoccupied with other activities, and his modest character was not exactly suited to business. So, on the 31st of December, 1864, Moberg sold his half of the jointly-run operations to the Hartwall family for the modest

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sum of 4000 marks (the Finnish mark had been introduced in 1860).

It was August Ludvig Hartwall (1837–1906) – the elder brother, Carl Victor, had died in 1860 – who took over Moberg's share, and the remaining three parties to the estate did not oppose this arrangement. Four years later, in 1868, Aug. Ludv. Hartwall acquired the other half of the estate from his mother. Since the year 1856 he had been practising in the water plant, so he had already gained the knowledge he needed to react to new challenges and to lead the company further to new triumphs along the long road toward the future large-scale enterprise.

In parallel with creating new, improved conditions for the ironworks and nascent manufacturing industry as a member of the Board of Mines, Victor Hartwall was long an active member of the Directorate of Manufacturing, which also laid the foundations for higher technical education in the country. As a knowledgeable chemist and geologist, guided in his younger years by both Berzelius and Bonsdorff with good personal results, he succeeded in combining his knowledge with the artificial production of health-bringing mineral waters, a new activity later unfolding into a commercial enterprise. By that he also created a solid start for the largest enterprise within the beverage industry in the country today.

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