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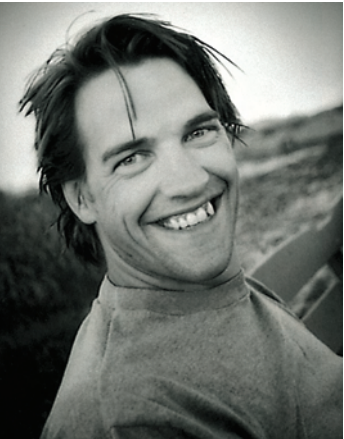
by Steven T. Murray

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Foreword



This is the history of one of Norway's oldest manufacturing companies. The origin of Jøtul goes all the way back to Kværner Works [Kværner Brug], which was founded on the outskirts of Christiania in 1853 by the businessman Oluf Onsum. For a long time Kværner Works was primarily an iron foundry with trade cast-iron goods as a pillar of its production. One of the company's early specialities was cast-iron stoves. This sector production eventually became so extensive that it was established as a separate division and continued as such until 1916. The division was then sold, and it emerged as an independent company for the first time under the name Kværner Stove Foundry [Kværner Ovnstøperi]. This company name was retained until 1935, when it was changed to Jøtul and Kværner Stove Foundry [Jøtul og Kværner Ovnstøperi]. In 1953 the last remaining ties to its origin were completely severed when the Kværner name was removed, and the company assumed the name that is now so well-known both here in Norway and in many other countries.

Today Jøtul is the only company remaining in a once significant branch of Norwegian industry. The Norwegian stove industry developed during the latter half of the 19th century, and in the early decades of the 20th century it consisted of about 20 manufacturers, both large and small, dispersed throughout the country. The industry reached the high point of its production in the first decade after the Second World War. After that it began a sharp and rapid decline, primarily as a result of competition from other energy sources such as oil and electricity. In a few years most of the stove foundries either ceased operation or switched to making other products. By the mid-1960s the industry was virtually non-existent.

One of the few stove foundries that managed to survive was Jøtul. Indeed, for Jøtul the 1950s marked the first phase of a vigorous and sustained period of growth which – with a few noticeable interruptions – has continued to the present day. Jøtul is also the only Norwegian stove foundry that has developed and continues to maintain an extensive export market. Today the company is one of the most internationally oriented stove foundries in the world, with exports making up all of 70 per cent of its turnover.

As the author of this work, one of my most important objectives has been to explain Jøtul's extraordinary development. How did this company manage to survive at a time when most other manufacturers were falling by the wayside, and also have the wherewithal to expand rapidly – not only within Norway, but on the world market as well?

By necessity this perspective has guided my attention towards the upper-level employees in the company. This is not to say that all strategies were conceived and developed at this level. But it was here that ideas and visions were discussed and examined, and finally either realised or discarded. The power to determine the direction of the company has always resided with the management level. In this sense, the book was written from a "management point of view". Some readers might think that priority was given to this viewpoint at the expense of other important aspects in the varied history of the company. And to some extent this may be true. It has indeed not been possible to provide much detail regarding other important aspects, such as working conditions, company culture and the like. As desirable as this would be, the time allotted for the project did not permit a broader presentation. Given the 12-month time frame, it was necessary to limit the focus and restrict my use of the available material.

The project was financed by Jøtul. In addition, numerous employees of the company have contributed by offering their support and assistance. "No one named, no one forgotten" is in many instances a good rule, but in this case, it would not be fair. Throughout the entire process, Human Resources Manager Ole Jan Johansen has provided enormous encouragement and assistance. With almost 40 years in the company he was able to offer valuable insights into so many areas. He was also responsible for assembling the excellent illustrations for the book.

When I began my research, I found a quite hopeless situation when it came to source material. With the exception of the last couple of decades, almost none of the company's archives have been preserved. For the Kværner Works period – that is, the first 63 years – there is no source material whatsoever. For the subsequent period there were minutes of board meetings, but nothing more. Only in the past twenty years have any systematic archival efforts been made. For this reason it was necessary to base portions of the book on secondary sources. The archive of the National Association of Stove Foundries [Ovnstøperienes Landsforening], which is housed at the National Association of Technology Companies [Teknologibedriftenes Landsforening], was an important source. Industry journals, newspapers and other literature on company history were also extensively used. Finally, I was able to conduct interviews with former and current board members and employees. I would like to take this opportunity to thank all of them for their contributions. In addition, a more detailed list of sources is included in the back of the book.

I am particularly grateful to Erik Moe, Benedikte Solberg and Ole Jan Johansen at Jøtul, who have read and commented on the entire manuscript. My colleague Harald Espeli at Handelshøyskolen BI read Chapters 4 through 7 and provided helpful comments. Otto B. Halvorsen read Chapters 5 and 6 and also offered valuable input. I have received much advice and many suggestions along the way. But of course I take full responsibility for any errors or unclear passages that may remain in the text.

Tønsberg, juni 2003

Dag Ove Skjold



Chapter 1

An Industry in the Crucible (ca. 1850–1900)



Open-hearth cottages could be found in mountain pastures until the 1900s.

The old and new meet. The old-fashioned fireplace lived side by side with the modern cast-iron stove in many homes for a good many years.



In the 1850s and 1860s, theologist and social researcher Eiler Sundt undertook a number of journeys criss-crossing Norway. Sundt wanted to study the living conditions of ordinary Norwegians, and he did so by visiting people all over the country, talking with them, and observing how they lived and worked on a daily basis.

Of particular interest to Sundt in his investigations was the way people heated their homes. In a country like Norway with its long, hard winters, the interrelationship of living conditions, health and home heating was quite obvious. But Sundt was the first to systematically chart Norwegian fireplace traditions. His notes provide us with unique insight into how people in traditional Norwegian society solved the life-and-death question of heating their homes.¹

So what experiences did Sundt have on his travels? He found that the open-hearth cottage – the primitive mediaeval building in which the hearth was placed in the centre of the room, and the smoke escaped freely through a hole in the roof – had almost completely disappeared. Only amongst scattered inhabitants of the northernmost parts of the country could open-hearth cottages still be found. Another type of flueless fireplace, the “smoke oven”, was still common in a number of coastal areas in western Norway. Unlike the open hearth, the smoke oven was an enclosed fireplace that was walled up with stones in a corner of the room. The great advantage of the smoke oven was that it stored up the heat and thus made good use of the firewood. For this reason it was still rather widespread on the west coast, where there was often a shortage of wood.

In the rest of the country, the open hearth and smoke oven had long been replaced by fireplaces with chimneys, both small and large open fireplaces. Sundt believed that the small fireplace was first employed in eastern Norway, apparently sometime in the 16th century, and that it gradually became the predominant heat source on most Norwegian farms. The fireplace, both small and large, was indeed much less fuel-efficient than the smoke oven. On the other hand, it had the

great advantage of not releasing smoke directly into the room, but out through a chimney. This meant a great deal for both health and comfort, because people avoided the acrid and heavy smoke hovering just below the ceiling in the open-hearth and smoke-oven cottage.

It was during Sundt's time, however, that the Norwegian people were experiencing an important new advance in home heating. In the decades after 1840, enclosed stoves and cooking stoves made of cast iron began to be used throughout Norway. They had great advantages compared with other hearths. First, they were much more efficient at providing heat. This was significant in a time when increasing urbanisation was forcing more people to buy firewood. Second, the cast-iron stoves could be stoked with new types of fuel such as coal and coke. This was not possible in a fireplace. Third, they made housekeeping easier in many ways. It was no longer necessary to stand close to the fire when preparing food and be bothered by heat and smoke, and cooking became cleaner and more convenient.

Today it is difficult to comprehend the impact of the introduction of cast-iron stoves in the daily lives of most people. But for people in the 19th century, the stoves were a minor social revolution.

Smoke-oven room portrayed by Adolf Tiedemann in a painting from 1867. The smoke oven was an efficient heating source for its time, but it did not produce light and was poorly suited to cooking.



They meant a great deal for the working conditions of women. In those days housework, heating, and cooking took up most hours of the day, but the new cast-iron stoves made many aspects of this work easier. The American historian Ruth Cowan claims that the transition from fireplaces to cast-iron stoves represented the most significant advance in American homes in the 19th century.² Others have indicated that the transition from fireplace to cast-iron stoves can be viewed as a greater advance than the transition from cast-iron stoves to electric furnaces which began more than half a century later.³

In the decades after 1850, cast-iron stoves took on ever greater importance for home heating in Norway. In the villages, of course, both large and small fireplaces continued to be used for a long time, but their practical importance was steadily diminishing. And by the turn of the 20th century, cast-iron stoves had taken over as the primary heating source for most purposes.

The breakthrough for cast-iron stoves was closely related to the growth of the Norwegian iron and metal industry. The first iron foundries and mechanical workshops in Norway were established in the 1840s, and a number of new businesses of this type emerged over the next two decades. They produced the stoves, cooking stoves, galleys, and other types of cast-iron goods, for which the market was steadily growing. In this chapter we shall therefore take a closer look at some general features of this new industry, but with a special focus on the factors affecting iron casting as a field of manufacturing.

The Norwegian iron-casting industry is founded

Iron casting was in actuality an ancient art. In China it is thought that objects were produced in cast iron long before the Christian era. In Europe iron casting arrived much later. The first known foundries were the German cannon foundries that were probably established sometime in the early 1400s.⁴

In Norway iron casting began at the same time that the first iron works were established in the beginning of the 17th century. Here, too, it was war materiel, mainly cannons and bullets, that were the most important products at first. But Norwegian iron works shifted over to civilian production very early, and the most important product was the stove. Almost all the production was devoted to large, resplendent luxury items that were reserved for only the wealthiest customers. A large part of the production was exported, mostly to Denmark, but also to other countries on the Continent. And it never amounted to actual large-scale production. For example, the biggest iron works in the country, Fritzøe Works in Larvik, cast about 500 stoves annually in the early 1700s. And of these, the majority was exported.⁵

Iron stoves thus had little overall significance in Norway before 1850. "For the entire 17th century they were found in practice only in towns, in the residences of government officials and on large estates, and even there it seems that their dispersal occurred late", says a standard work on Norwegian iron stoves.⁶ Throughout the 1700s they became somewhat more widespread in the cities, but up until the early 1800s it was the fireplace that predominated. In the villages, cast-iron stoves were still of little importance.⁷

Iron stove from Næs Iron Works, 1806. Stoves from the old iron works were usually large and richly ornamented, which meant they were found only in wealthier homes. Much of the stove production from the iron works was exported, primarily to Denmark, but also to a number of other European countries.



Illustration of the upper section of a blast furnace at an older iron works. Here charcoal and iron ore were charged in layers during the smelting process. In the lower part of the furnace, the finished pig iron was tapped off and conducted along the floor in flumes to the casting moulds.



The new iron and metal companies were based on completely different operating practices than the old iron works. The iron works used iron that they produced themselves, and cast directly from their own blast furnaces. The new iron foundries, on the other hand, were based on remelting scrap iron or pig iron in cupola furnaces.⁸ And while the iron works used charcoal as an energy source and water for their operating power, the new iron foundries used coal as their energy source and steam as their operating power. In this sense, the iron foundries had much more freedom as to where they could be located. While the old iron works were bound to the forest and waterfalls, the new iron foundries could be situated near the markets, which meant primarily the towns along the coast.

The new iron and metal companies varied sharply with respect to scope and type of production. Some were purely mechanical workshops without an iron foundry. Others were purely iron foundries without a mechanical workshop. But most were a combination of foundry and workshop. The focus of these companies varied widely. Some concentrated primarily on workshop production, and then the foundry would generally act as a subcontractor to this activity. Among these were operations such as Aker Mechanical Workshop (Christiania [Oslo], established 1841), Trondheim's Mechanical Workshop (Trondheim, established 1843), Myren's Mechanical Workshop (Christiania, established 1848), Nyland's Workshop (Christiania, established 1854), and Bergen Mechanical Workshop (Bergen, established 1855).

Others concentrated on the production of cast-iron trade goods, that is, goods produced in a specific quantity for an unknown market. Among such operations were Drammen's Iron Foundry and Mechanical Workshop (Drammen, established 1846), Wingaard's Iron Foundry (Bergen, established 1850), Trolla Works (Trondheim, established 1854), Havstad Iron Foundry (Arendal, established 1854), and Laxewaag Works (Bergen, established 1855).

In the early phase, however, there was not a great deal of specialisation. Most iron and metal firms produced a broad spectrum of products, from simpler machines, agricultural implements and the like, to construction and shipbuilding goods in every conceivable variation. And even in the most specialised mechanical workshops, considerable quantities of trade goods were often cast, either on a regular basis or from time to time. This production was both part of a conscious market strategy and was undertaken in order to keep employment in the foundry as high as possible. Production of trade goods could provide a badly needed source of income during periods when there was a shortage of other commissions. A typical example of this situation was one of Norway's first mechanical workshops, Aker's Mechanical Workshop, which during the recession in the latter part of the 1860s compensated for the decline in shipbuilding orders by producing stoves.⁹

Technological requirements

Why were the first mechanical workshops and iron foundries established precisely in the years around 1850? Part of the explanation must be sought in the conditions related to production. In the 1830s and 1840s, new technology was developed which contributed to the production of cast-iron goods that were both cheaper and better. The major advances were in metallurgy and



Cupola furnace at Fritzøe Works in Larvik, erected around 1850. The picture was taken almost 100 years later, but still gives a good impression of how an early Norwegian iron foundry looked. The foundry was used almost exclusively for the company's own purposes, and was thus not greatly modernised during its lifetime.



Kværner Works manufactured a wide variety of machinery in addition to its cast-iron goods. The illustration shows an advertisement for farm machinery from the early 1880s.

foundry technology. Here we shall take a closer look at the most important new advances in these fields.

The high price of iron had long restricted its commercial utilisation as an industrial raw material. Of course, technical progress in the second half of the 18th century helped reduce production costs. The development of methods for iron smelting using coke was especially important in the 1770s. It thus became feasible to produce cheaper pig iron, which was the type that was used for foundry objects. Yet it was not until the development of the hot-blast method in the late 1820s that the production of iron truly became more economical. The hot-blast method resulted in a decrease in production costs by two thirds in English and Scottish iron works during the 1830s.¹⁰ In that same period, iron exports from Great Britain began to climb sharply. By the end of the 1850s, eleven times more iron was exported from the British Isles annually than in the early 1830s. This growth has been closely linked to the introduction of the hot-blast method and the drop in iron prices.¹¹

Cheaper iron was not in itself sufficient to create the basis for a whole new industry, of course. On the other hand, we must assume that the falling price was significant for the new iron and metal works here in Norway. Most of the new businesses were based almost exclusively on imported pig iron from Great Britain. It is also interesting to note that during the 1840s, Norwegian iron works began using English pig iron, instead of iron they produced themselves, for casting purposes. For example, it was said of the cast-goods production of Bærum Works in the early 1850s that a considerable portion was “extracted by cupola furnace by remelting pig iron, particularly English”.¹²

Decisive progress was also made in the moulding and casting technology itself. The most important new advance in this connection was the two-part sand mould system, which was invented in the 1820s. The usual moulding method through the end of the 18th century was to cast the goods in open sand moulds directly on the floor. English ironworkers, however, had long been experimenting with moulding and casting in two-part flasks. Flask casting had a number of advantages over open casting. First, it was possible to cast much more complicated items, which was particularly important in view of industrialisation and the need for more complex machine parts. Second, production became more economical. Moulding sand was an expensive contributing factor, but through flask moulding the sand consumption could be reduced drastically.¹³

Wooden moulds, as used in casting at most iron works in the first half of the 19th century.





For a long time the ship-building industry was one of the most important markets for many foundries. The illustration shows a galley (cooking and roasting stove for shipboard use) that was cast at Kværner Works.

Moulding in flasks became more and more common toward the end of the 18th century, but the real breakthrough in moulding technology appeared only with the introduction of the two-part sand mould system in the 1820s. Using this method it became possible to reduce the dimensions of the items and thus save greatly on materials. At the same time it was possible to manufacture smoother and much more attractive objects than before.¹⁴

During the 1830s the two-part sand mould system became the common method used by foundries in most European countries. It was also the method of choice in Norwegian foundries. The significance of the two-part sand mould system was described as follows in 1858 in an article in the Polytechnic Journal: "Along with the moulding art, which has made great strides particularly in recent years, the iron foundry has also made progress... Producing such smooth surfaces and such sharp corners as the market now requires would have been regarded as an impossibility twenty years ago."¹⁵ At the same time this technology made it possible to produce objects much more inexpensively than in the past.

Pressure from the markets

Undoubtedly the technological advances were of great significance for the iron and metal industry. However, market conditions also played an important role. It has been said of the earliest iron and metal works that they filled a "vacuum" in the market. There was a demand – a market – and the new factories responded to that need.¹⁶ One important driving force was the simultaneous growth of other branches of industry. In the capital, the first textile factories were established in the 1840s, and they had need for workshops that could produce and repair machines and other equipment. In addition, steam power gradually began taking over ocean transport, and the ships also required workshops for repairs. The need for a domestic mechanical workshop industry which could service other new fields of industry was thus one of the important driving forces behind the establishment of many of the mechanical workshops.¹⁷