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The Cutlery Industry from Production to Industrial Museum: Solingen and Sheffield Compared

by

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INTRODUCTION

The early development of pre-industrial manufacturing in **Solingen** was made possible by the providential amount of rain in this area of Germany, called the *Bergisches Land*, the brooks running down into the valleys from the five Solingen ridges, and the resulting water power of the River Wupper.

The similarity between the trade regions of Solingen and Sheffield has often been commented upon. The area surrounding **Sheffield** was characterised by wooded valleys, scattered water-powered grinders' workshops and small settlements, where people worked in the cutlery trade as well as in agriculture. The success of the Sheffield cutlery trade depended to a high degree on the villagers' dual occupation.

Water power, together with the readily available natural resources of iron ore and coal in southern Yorkshire created favourable conditions for early industrial development. The origins of the Sheffield cutlery trade go back to the sixteenth century.

In 1624, by Act of Parliament, a cutlery manufacturers' guild was formed, the Company of Cutlers of Hallamshire, which proved to be of increasing importance. In its first year of existence alone, 360 cutlers joined.

DIVISION OF LABOUR

As well as the tilt hammer forges, mainly situated in the neighbouring town of Remscheid, where steel was made ready for further processing, grinders were completely dependent on water power. **Solingen** grinders used to work sitting down in front of the grindstone or half sitting and resting against a frame. Their skill and their experience determined the quality of the finished piece.

From the fifteenth century onwards the various production phases were divided up among the workers. Until the middle of the nineteenth century usually four different types of craftsmen were involved in the production of Solingen cutlery.

Before grinding, the individual workpieces had to be prepared at the anvil. Preliminary work in the smaller forges, where forging was done by hand, was supported by a second forger. The forges were scattered throughout small settlements, called *Hofschaften*, which later merged to form the Solingen industrial area. By heating and then quenching the workpieces, the hardener gave the cutlery pieces the required strength and elasticity. In the final step the individual parts—blade and handle or the two halves of a pair of scissors—were assembled and adjusted. This task was normally performed by the finisher, called *Reider* or *Scherennagler* in Solingen.

In the eighteenth century **Sheffield** grew to be the most important centre of cutlery in the world. But, in contrast to the Solingen trade region, the Sheffield cutlers did not start to specialise in particular

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stages of the production process until much later. Forging by hand remained the main technique up until the beginning of the twentieth century.

Grinding techniques in Sheffield differ from those in Solingen. In Sheffield the grinder sits astride a wooden saddle, called *horsing*, bending over the stone. In Solingen the grindstone revolves towards the grinder, while the grindstone in Sheffield rotates up and away from the grinder.

In Solingen as in Sheffield, after forging, grinding and hardening, the different work pieces were assembled. This was highly skilled work, carried out with simple tools and incorporated the production of knife handles and the adjusting of the scissor parts.

INDUSTRIALISATION

A second wave of industrialisation was based on steam power, and its prototypes were the steam-powered grinding shops which sprang up from 1850 onwards along the **Solingen** ridges. These grinding shops, generally situated away from the main town area were, apart from the method of driving power, an exact copy of the larger water-powered workshops. As in the *Kotten*, the driving power was channelled via a transmission system to the individual workplaces rented by the grinders. The technique had not changed, and the grinders continued to be independent craftsmen.

In the area of the town itself a number of cutlery workshops were founded, especially during the phase of high industrialisation after 1871, which was furthered by the construction of a railway line. Many of these workshops developed out of former distribution offices or warehouses.

Some companies, in particular weapons manufacturers such as the company of Weyersberg, Kirschbaum & Co, quickly grew into large companies. The representations on the letterhead may seem a trifle exaggerated, but Solingen had nonetheless grown into a factory town.

Characteristic for Solingen remains the pre-eminent importance of the small craftsmen's workshops. Solingen's by far largest company, Henckels, still has not combined all phases of the work process under its own roof. Even in 1925 Henckels, with its 1000 employees, farmed out work to about 1000 independent craftsmen, most of them grinders and finishers.

In **Sheffield**, the first knife grinding works driven by steam was built as early as 1786. By this time nearly all available water power had been put to use by grinding or forging works, numbering about 200. In 1865, only 80 years later, 132 steam-powered grinding shops existed, compared to only 32 water-powered grinding works. One of the results of this process was that Sheffield's cutlery industry settled right in the centre of the city, vying for the available space.

The early concentration of grinders in steam-powered grinding shops resulted not only in increased production but also in a rapid rise in the mortality rate among grinders. This was repeated in Solingen, half a century later. Complaints about the health risks for grinders were voiced again and again throughout the nineteenth century, without ever producing changes for the better. After 1900 the measures taken in Solingen to reduce the instance of grinders' disease, e.g. the installation of extraction systems, became a model for the Sheffield health authorities, but the breakthrough came only with the introduction of artificial stones in the 1920s.

In 1850 about eleven thousand people were employed in the Sheffield cutlery industry; twenty years later the number had increased to 15,000. The numbers in Solingen barely reached half of that. Most of the larger cutlery firms in Sheffield were founded after 1850, among them the company of Walker & Hall with about 1,000 employees in 1890. But, as in Solingen, the many medium and small businesses remained characteristic for the cutlery industry in Sheffield.

DROP FORGING TECHNOLOGY/FLEXIBLE SPECIALISATION

The drop forging technology, and the system of flexible specialisation associated with it, was of utmost importance for the rapid development of the **Solingen** cutlery industry in the last decades before the First World War.

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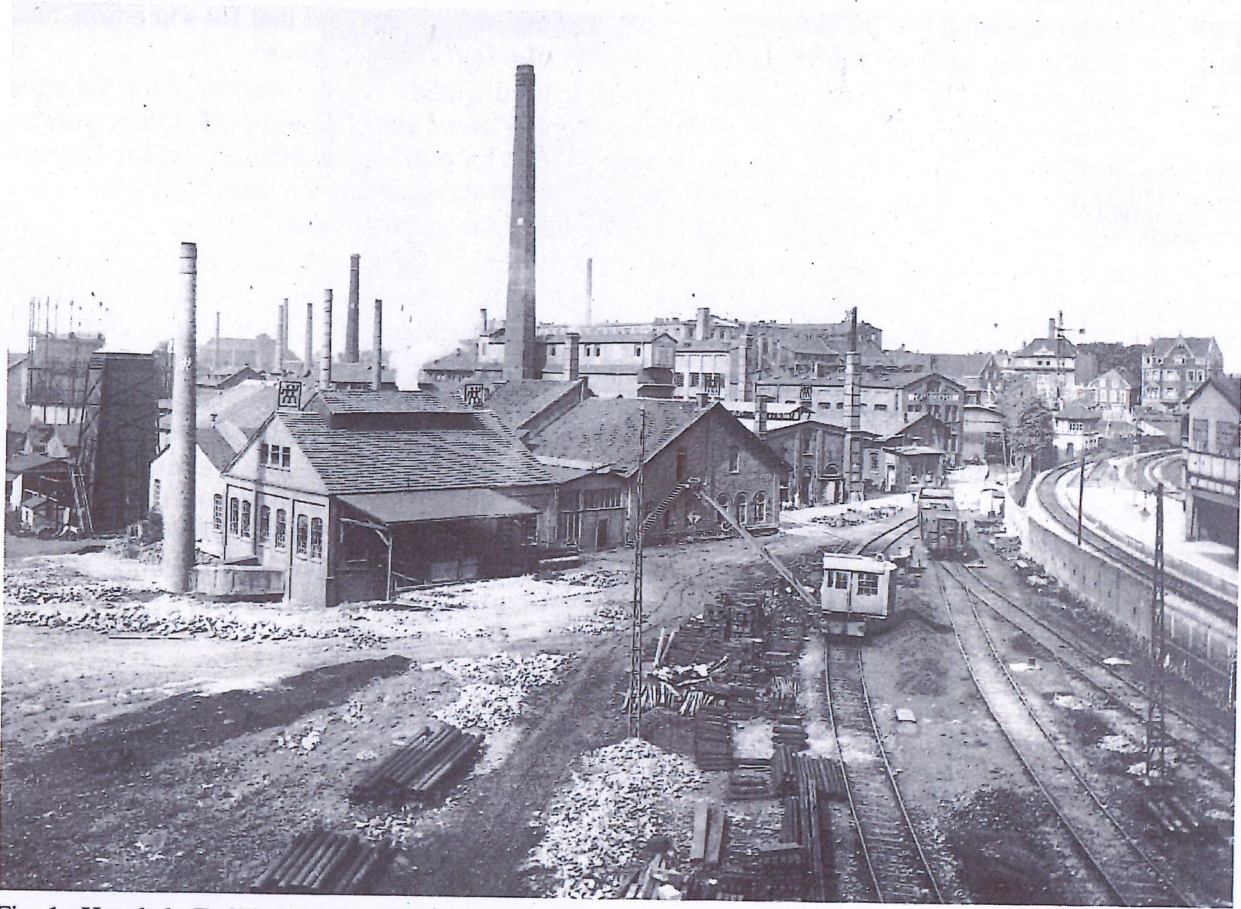


Fig. 1. Henckels-Zwillingwerk, 1925, Solingen. *City Archive, Solingen.*

Drop forges such as the firm of Hendrichs, where the Industrial Museum is now located, provided semi-finished goods produced under mechanised factory conditions. The newly developed drop hammers allowed the industrial mass production of blanks.

The drop forging tools, as shaping tools, allowed the production of uniform work pieces. This proved to be the first step towards a form of manufacturing determined by serial production under division of labour.

Nevertheless, for the next decades the assembly of industrially produced blanks was still carried out by independent craftsmen in the traditional way. The grinders for example were not to be dictated to by the factory bells. They were organised in their craftsmen's unions and were able to demand high wages. They repeatedly and successfully resisted the mechanisation of the grinding process until the middle of the 1920s.

Using the system of flexible specialisation designed by Priore/Sabel, the output of the industrialised sector of the drop forges on the one hand and the independent, specialised craftsmen on the other, could be combined according to demand. Even the smallest factory owner or distributor had access to the services performed in the different sectors, without having to invest heavily in capital resources.

Round about the turn of the century Solingen replaced Sheffield as the most important centre of the cutlery industry in the world. One of the main reasons was that Sheffield did not succeed in modernising the forging techniques at an early enough stage. The **Sheffield** hand forgers were not able to compete with the high productivity attained by the Solingen drop forges. After a visit to Sheffield in

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1908 some representatives of the Solingen freelance cutlers' unions reported that for some time now drop forges were also to be found in Sheffield, but only of a fairly simple nature.

In their report on the state of the cutlery industry in Sheffield, the representatives of the Solingen freelance cutlers' unions further remarked that the local professional associations of the cutlery workers had more or less ceased to exist and that an adequate system for training apprentices and journeymen had not been developed. They were appalled at the dirt in the workshops and the lack of involvement of the workers in the improvement of the technical facilities in the cutlery firms.

Around the turn of the century younger workers were courted by the steel industry, then booming and paying higher wages. The cutlery industry started to lose its influence, even in Sheffield itself. It did not expand beyond its traditional location in the centre of the town and the industrial sites close to it.

While in Solingen the freelance cutlers were the mainstay of the cutlery industry, in Sheffield it was the hundreds of "Little Mesters" who made possible the flexible specialisation demanded by the market. "Little Mesters" were either a kind of master craftsman who employed a small team of semi-skilled workers, or small businessmen, who preferred to farm out work at low wages to freelance cutlers. A recent publication on the history of the city and its industry comes to the following conclusion: 'The structure of the cutlery industry was remarkably complicated; the whole of the centre of Sheffield, with its outworkers, teams, merchants and manufacturers, was likened to one huge factory, drawn together by the complex interdependence of skills and products.'

THE ROLE OF WOMEN

In **Solingen** women were—in contrast to Thiers or Sheffield—the complete exception in the actual production process. Women's direct contribution to the cutlery industry was limited to delivery work—the famous *Lieferfrauen* of Solingen—and work in the cleaning and packing rooms in the factories or distribution stores.

From an early stage girls and young women were employed in fairly high numbers in the cutlery industry of **Sheffield**. Their percentage continued to grow and by the turn of the century had risen to 25%. Nearly half of the women were below twenty, a clear indication that skilled male qualified labour was being replaced by semi-skilled female labour on low wages.

Women did the packing and checking of wares as well as the dirty and unpleasant work of polishing forks, spoons and other cutlery wares, called buffing. The buffer girls became part of local folklore and tradition, like the *Lieferfrauen*, the delivery women of Solingen. They had the reputation of being 'hard and uncompromising women who, when appearing in groups, should best be avoided by men'. Wages paid for this kind of work were among the highest for female labour, but still way below those for grinders.

Until the Second World War most companies insisted on special work clothes and uniforms for the buffers, a red cap and a red overall, complemented by an apron to protect against the dirt and dust. Legs were covered in brown paper which was supposed to soak up the oil-sand mixture created during the polishing process.

WORLD MARKET

The system of flexible specialisation enabled the **Solingen** cutlery industry to make their presence felt even in the smallest niches of the world market. Not only the extraordinary diversity of their products but also the wide range of different qualities, and therefore prices, made it possible to deliver to a variety of different markets. (Most companies specialised in particular markets. Larger companies widened their range by buying in special product ranges from smaller companies.) Major Solingen firms took part in the World Exhibitions in the late 19th and early 20th centuries, with elaborate presentations.

The Henckels-Zwillingwerk has branches in all areas of the world. Most companies employed representatives who established and maintained direct contact with the customers. Like the Solingen

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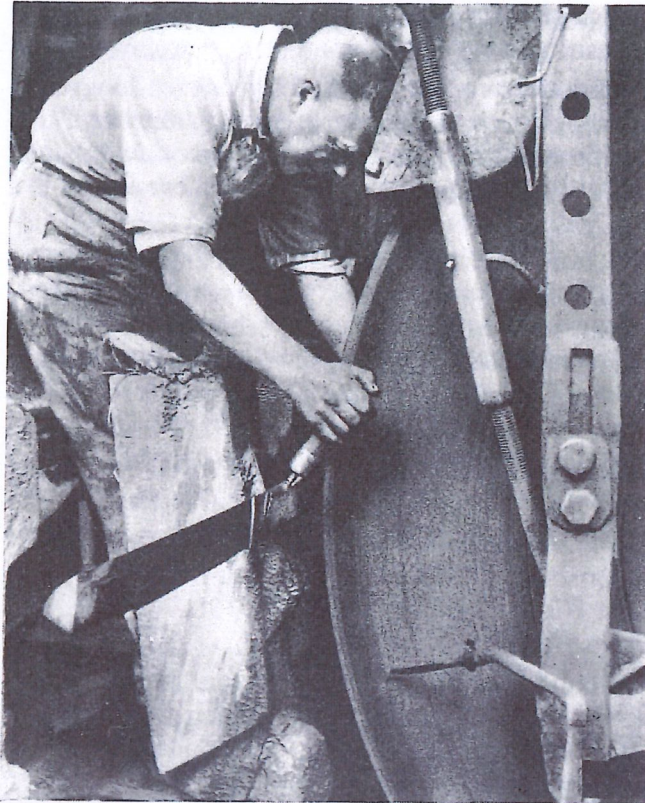


Fig. 2. Grinder, Fa. Herder, 1935, Solingen. *City Archive, Solingen.*

cutlery industry, the Sheffield firms wanted to sell to the world market. Their traditional markets were mainly the USA and the countries of the former British Empire, such as Australia, Canada, India and South Africa. High duties imposed by the USA after 1870 more or less closed this market for the Sheffield firms.

By the beginning of the First World War the share of the **Sheffield** cutlery industry in the global market had fallen to 25%, while the Solingen share had risen to more than 50% in the same period. Neither did this balance of power change in the time between the two World Wars. In the cellars of Sheffield's largest cutlery firm, Joseph Rodgers & Sons thousands of elephants' tusks were stored, waiting to be made into knife handles. As suppliers to the royal family they specialised in quality products, and in some publications the company was praised as a symbol of civilisation.

POST-SECOND WORLD WAR, ESPECIALLY 1960–1980

After the Second World War the local cutlery industry in **Solingen** was characterised by increasingly asynchronous development.

While traditional forms of production were used by conservatively minded generations of entrepreneurs who continued to farm out work to freelance workers and craftsmen, a growing number of businesses took definite steps towards rationalisation.

From the 1920s onwards, grinding machines from the Solingen producer Siepmann were available. But they were mainly used outside Germany rather than in Solingen itself. The number of available freelance workers shrank to a quarter of its former size, because of the Depression years and the Second World War, leading to acute recruitment problems and lack of young blood. Therefore, the 1950s and 1960s saw a period of radical mechanisation, especially in the grinding sector. During the

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following decades other areas of production—from hardening to tool making—underwent a drastic process of modernisation, mainly in the area of computer controlled production.

Many traditional businesses—among them fairly large, longstanding companies, such as Herder—experienced increasing competition from a growing number of international or Far Eastern rivals with efficient production methods. Apart from some spectacular bankruptcies, many companies died a slow death, not least when the question arose of a successor to the owner of an ageing and outmoded company.

What remains—apart from hopelessly antiquated machinery which then finds its way into a museum—is often a factory building of great historical value. Finding a proper role for these sites, which are often situated in the main area of the town, seems to pose a problem in a town that is not characterised by an extensive service sector. Public awareness of the need to conserve industrial buildings, which has only been awakened in the past few years, has often to fight it out with the wrecking ball.

At the other end of the scale are companies such as Henckels-Zwillingwerk or the company of Wüsthof-Dreizackwerk who succeeded in modernising production on their sites in the centre of Solingen, but at the price of a radical restructuring of their historical buildings.

Leading Solingen companies still insist on producing quality; on the other hand it is an open secret that some companies, Henckels in particular, are producing outside Germany. The trade mark 'Solingen' often proves to be somewhat misleading.

Since the 1950s the mixture of industrial and residential areas at close quarters has been viewed with growing concern by the public, and this led to more stringent laws on emissions, especially for the many drop forges. A number of drop forges were therefore relocated to specially created industrial sites outside town. Businesses lacking the means to refurbish their old sites or secure a new location fell by the wayside.

One example is the Hendrichs drop forge, which was chosen as a site of the Industrial Museums of the Rhineland. Cost-effective production had become impossible at this site due to antiquated machinery. In addition, regulations, as stipulated by social insurance groups against occupational accidents and the trade supervisory authority, could no longer be met. In 1986 production ceased. Business was temporarily continued as a drop forge for demonstration purposes and the development of an industrial museum was begun.

During recent years the employees of the new museum experienced at first hand the agony of the traditional industries in Solingen. They saw innumerable smaller specialised businesses being closed down, old factory sites being abandoned, and traditional crafts and craftsmen dying out. It seems that the museum was able to take up its role as guardian of the cultural, technical and economic history of this region literally at the eleventh hour.

The already existing museum facilities in Solingen, the Deutsche Klängenmuseum, that is, the blade museum which concentrates on displaying quality cutlery products, and the Balkhauser Kotten, a reconstructed grinding shop, would not have been able to rise to the enormous tasks involved in the preservation of Solingen's industrial history. It is not by accident that we went to England and especially to Sheffield to gather ideas and find inspiration in 1983.

The Hendrichs drop forge thus can be seen as an important testimony to Solingen's industrial history. Not only is this valuable industrial historic monument a typical example of a production phase of vital importance to Solingen, but the three museums as a whole allow us to demonstrate work techniques as well as socio-economic characteristics of the Solingen industry. Former employees of Hendrichs demonstrate the production of scissor blanks at their old workplaces.

In the coming years the museum plans to extend into the as yet unused parts of the factory building. Our main concern will be to show the different phases in the production of scissors and link them to further information about the industrial development and the history of the working and living

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conditions in the region. The Hendrichs drop forge works should give visitors a good idea of the working conditions in a factory around the turn of the century.

The various existing parts of the factory buildings present a perfect opportunity: The common rooms, the storerooms, the offices, the villa and the machine house, to give a few examples, will form part of the tour and show exhibitions on related topics, e.g. the development of the world market (storeroom) or the cultural history of the bourgeoisie (villa). The steam powered grinding shop extending over three floors, which was rented out to independent grinders up until the First World War and has remained empty since, provides unique opportunities. Here, in the original workshops, the finishing by hand and its mechanisation will be shown. The social history of the separation of individual craftsmanship and factory production will be shown in its characteristic stages via exhibitions. Thus a wide spectrum from the social, economic and technical conditions to the political and cultural activities of the people in the region will be covered.

In the twentieth century the **Sheffield** cutlery industry became increasingly antiquated and unattractive to the young people starting work. In order to counter falling export figures, many Sheffield cutlery firms changed their range to cheap mass produced goods. Until the 1950s the numbers of employees stayed around 10,000.



Fig. 3. Cutlers Hall, Sheffield, about 1900, *Maison de la Coutellerie, Thiers*.

Mechanisation of the workshops and an increased number of semi-skilled female employees—their percentage rose to 50%—were supposed to reduce production costs even further. The government had to establish a so-called Trade Board for the cutlery industry, i.e. a committee with an equal number of employers and employees which was to secure regulated and acceptable working conditions and minimal wages.

After the Second World War the Cutlery Wages Council, the successor to the Trade Board, proposed to close down the small businesses and rented factories in the centre of Sheffield, since they

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would not be able to guarantee adequate working conditions. These recommendations were put into practice mainly in the 50s and 60s. Thus the character of the centre of Sheffield changed dramatically. From then on new department stores, parking lots and office buildings dominated the centre of Sheffield.

In spite of the extensive redevelopment programme introduced by Sheffield City Council, the structure of the small and medium sized businesses in the Sheffield cutlery industry hardly changed at all. Out of 10,000 employees 2000 are employed by about 500 small firms. Only about 10 companies employ more than 200 workers.

The table knife and table ware industry had become the most important sector of the Sheffield cutlery industry. More than two thirds of the goods produced were cutlery ware of basic quality. Even though the mechanisation of the production process had been intensified and the grinding was carried out by machines, the Sheffield cutlery industry was hard hit by cheap imports of table knives and other cutlery from Japan and the Far East. The antiquated Sheffield industry could not, in the long run, keep up with the competition from the Far East.



Fig. 4. Two Table-knife grinders, Sheffield, 1902. *City Library, Sheffield.*

In the 70s and 80s nearly all of the larger Sheffield cutlery firms ceased production. The switch to cheap mass production had proved counterproductive. The Sheffield cutlery industry was fighting for survival. By the beginning of the 80s, out of 600 businesses, only 200 companies with 4000 employees had managed to survive.

Only the range of kitchen and professional knives showed an increase in production in the 80s. Richardson's, owned by an outside company and employing 400 people, has become the largest cutlery

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firm in Sheffield and one of the most important producers of kitchen and professional knives in the world. In the middle of the 80s, the Sheffield equivalent of Henckels-Zwillingwerk in Solingen, produced 700,000 blades with the help of highly automated production processes.

Though repeatedly recommended, the reorientation of the Sheffield cutlery industry towards specialised quality production did not happen on a large scale because of lack government subsidies, overwhelming competition or lack of capital resources. But above all, a skilled workforce no longer existed.

Of the traditional, once so numerous little mesters, who were able to respond flexibly to the demands of the market, only two or three dozen survive, partly due to the stringent redevelopment policies of the city council. But they are too few to provide the stimulus for a re-orientation of the overall production structure.

The wages paid in the Sheffield cutlery industry still belong to the lowest paid in the metal industries of Great Britain. Yet again, women are situated at the bottom of this scale. It is not surprising, therefore, that women, for financial reasons, continue to work in the cutlery industry well beyond their retirement age.

The historic development of the Sheffield cutlery industry from world leader to an 'endangered species' clearly shows that the crisis of the last decades is not the sole cause of the industrial decline. In Sheffield too, the cutlery industry—hardly discernible nowadays in the city panorama—has retreated into the museum. The large area covered by the former scythe forge, Abbeydale Industrial Hamlet, and an old water powered grinder's workshop, Shepherd Wheel, have been opened to the public.

Similar to the Deutsches Klingmuseum in Solingen is the Sheffield City Museum which shows exhibits from the Sheffield cutlery industry. And sharing many similarities with the Industriemuseum Gesenkschmiede Hendrichs is the Kelham Island Industrial Museum, opened at the beginning of the 80s, where the history of the steel, tool and cutlery industry in Sheffield is displayed and where a few cutlery workers demonstrate their old trades in their own workshops.

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DISCUSSION

Mr. Clive Ellam (Executive Secretary) said that he conducted, in the mid-1960s, a works study of an embryo cutlery factory in Ireland, which had been built with grudging assistance from a consultant from the Sheffield cutlery industry, who had been more or less cut off by the Sheffield industry for offering his services outside the town. As part of his work there, he visited Sheffield and it was then clear that the cutlery industry was, as it was then constituted, in near terminal decline. He could vouch for the fact that the 'little mesters' were still very much in being then, but were on their way out very rapidly.

He was introduced into the works of Viners, which were then one of the major tableware manufacturers of Sheffield. They were like Dante's inferno, and the whole thing was antique and, obviously, staggering on from hand to mouth. There was no sign of re-investment. He suspected that, by that time, there was nothing to re-invest. The equipment was ageing the workforce was ageing and all that was said in this paper supported his own observations of almost 30 years ago.

Mr. E. F. Clark (President) said that the pictures of the grinding shops reminded him of the grinding shop that he had seen at North British (Locomotive Company), where there had been a grinding shop, not in a true engineering sense, but as a polishing shop basically for side rods for steam

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locomotives. There, the people sat with big grinding wheels, not driven by a steam engine, but probably by a large, rather antiquated electric motor the other side of the wall, and they were sitting astride the thing.

Mr. Michael Bailey said that there had been no reference in the paper to the introduction of stainless steel. When the Society visited Sheffield, they were told of the reluctance of the cutlery workers to work with this material, and it took quite some time before they eventually took it up. Did the industries of Solingen take it up rather quicker, or was this a material that actually helped to sustain the Sheffield industry rather longer than it might otherwise have done?

Dr. Putsch replied that they had been having some problems with the records of this process. These difficulties could be managed a bit better in future years. On the other hand common sense suggested that the cutlery steel would be better than the common steel.

Mr. Michael Bailey added that the introduction of stainless steel eventually sustained the Sheffield industry for quite some years after that.

Mr. Manfred Krause said that, in the 1920s, he thought that in both cities there were workers who did not want to work with it. It was the same problem and attitude towards introducing stainless steel. So, they found no significant differences between these two in trying to introduce stainless steel.

Mr. E. F. Clark (President) observed that stainless steel was a very much more difficult material to work with, and **Mr. Putsch** said that there were strong prejudices against working with the material in Solingen. **Mr. Clark** added that it was extraordinary that Sheffield did not exploit it, because, after all, that was where they first discovered stainless steel.

Mr. Alan Noble said that the contribution of Sheffield to stainless steel had been enormous, but in the industrial stainless steel as opposed to cutlery. It came in especially after the introduction of 1818 steel. Then, there had been great pressure from the chemical industry to develop 1818, one involving the forging, welding, machining and bending into continuous seamless tubing of larger and larger diameter or large plates for making dished ends. And that sort of fabrication had elements that were allied with 1818 which were very significant; the developments in Sheffield in that way were really staggering.

Mr. E. F. Clark (President) said that the metallurgy of stainless steel led to many different grades, with some cheaper grades which have been more readily used in domestic applications. Stainless steel is now very widely used, presumably because it has come down in price.

Mr. Clive Ellam said that his researches, when he was working for the cutlery factory in Ireland, suggested that one of the reasons why stainless steel may have been resisted, was the more difficult heat treatment properties, or at least it required a different sequence of heat treatment, and if the heat treatment was not properly carried out, it wasn't stainless. There was also a perception, certainly well into the 1960s and 1970s, that stainless steel did not take the edge that carbon steel did, and, therefore, people who felt themselves to be in a quality industry did not want to use stainless steel, because it was regarded as providing a lower quality result.

On different metallurgical types of stainless steel, the cutlery factory in Ireland was actually making its flat ware, that is forks and spoons, to go with knives. It was actually making those from, what should properly be called, rustless iron in some circles, which was a stainless steel which contained no nickel. It was perfectly adequate for the purposes for which it was used, but the downside was that, because it contained no nickel, the scrap had no re-sale value. They actually had to pay people to come and take it away.