## 'PUTTING THINGS IN PERSPECTIVE'

The 18th century marked the beginning of a mighty surge of human activity which has continued right up to the present day.

The Agrarian Revolution, with the seed drill, the improved plough, and the rotation of crops, enabled the land to yield much greater harvests, and this in turn led to a considerably enlarged population.

Britain had been a maritime nation for hundreds of years, because of its island isolation from Europe, and now that better ships could sail around the World in reasonable comfort, we now started to take our products in growing quantities to our colonies in America, Africa, and beyond, and to scour the World for new sources of raw material with which to feed this growth of industrial production. Perhaps because of our difficult relationships with our European neighbours, there had been a greater determination to widen our trading arrangements. Undoubtedly, the threat posed to us by the French Revolution, and the growth of military power in France, would add fillip to these events.

Civilisation, and the development of ideas, depended to a great extent upon communication, and it was the speed within this field of activity that triggered the mighty industrial and scientific revolution that was to follow. Water transport, used much by the Romans, who had linked the Trent and Witham Rivers with the Foss Dyke, was growing with a network of new canals, to provide wide distribution of commodities, and the stage coach, developed when it became possible to produce metal axles, were much more comfortable than horseback. Thus, a network of rough roads grew, together with the coaching inns, so necessary to service them.

Sheffield had by the mid 18th century become a centre of industry of considerable proportion. Mention had been made by that famous poet of the 15th century, Geoffrey Chaucer, of a Sheffield Thwittle or knife, and it was Sheffield's natural advantages that gave it its early start. It is built around a number of hills on the eastern edge of the Pennine Range. Still heavily wooded in parts today, it formed, in earlier times, the north western end of Sherwood Forest, that stretched way to the South and East beyond Nottingham, and was reputed to have given protection to Robin Hood and his Merry Men, when they

were pursued by the officers of the Crown, in the shape of the Sheriff of Nottingham, and his cohorts.

The woodland was important to iron making, for it provided charcoal for fuel, and the hills together with a rather high rainfall, provided the water power. Streams became rivers, and rivers were dammed at around 200? separate places to provide water power for rolling, forging and grinding. The third ingredient, iron ore, was never plentiful, though in sufficient quantities to meet earlier needs, and the adjacent Derbyshire hills provided sandstone for grinding in abundance.

Thus it was that iron and steel making became Sheffield's primary occupation, together with cutlery and tools, and its fame spread far and wide across the World, as the 19th century developed. The skills learned with water power gave Sheffield a lead that it retained when steam, gas and electrical power removed the dependence upon it and made production possible virtually anywhere.

It should be remembered that earning a living in these industries was hard, and dangerous. Steel was melted at around 1500°c and crucible pots could break, scattering molten metal over the floor. The charges were removed by hand with long tongs, a most heavy task amid searing heat and little wonder large quantities of ale were consumed, to replace energy drained from the system. Rolling of ingots into bar was the next essential, and Shaws still have some of their steel rolled at a mill beside the river that formerly provided its power. It will be seen from the illustration of Sheffield around 1750, that the demand for Sheffield's traditional products of steel, tools and cutlery, had brought growth of population, and as the agrarian revolution gave way to the industrial and scientific one, the pace was to quicken.

We have dealt in another chapter, with events of a scientific nature, but it was clear that by the turn of the 19th century, shipping was growing, around the World, and particularly across the Atlantic, where our American colonies were beginning to exploit the rich resources available to them, and to expand westwards as fast as the trading posts could be established and the land cultivated.

The earliest days at Shaws are unknown to us, and a study of the City Archives shows Shaws occupying No.68 Burgess Street no earlier than 1819, when they were making inkstands and magnets, though another source shows Joshua Shaw living in Burgess Street as early as 1774. There is a folklore handed down to us from earlier generations of Shaws that a visitor from Birmingham found himself in the 'Black Swan' where he became engaged in conversation with Jack Shaw, and claimed to know the secrets of magnet manufacture. Jack, no doubt looking for new products to manufacture, pricked up his ears and plied his new friend with ale. The more he drank, the more he talked and the story has it that this was the basis upon which Shaws commenced making magnets. The story is made more feasible when we discover that a pub called the 'Black Swan', though long disappeared, did exist adjacent to his home. Secondly, we find that a magnet manufacturer, long established in Birmingham sold its magnet interests to Shaws in 1912.

The area in which Shaws became established, was built around the Church of St. Pauls. This church, left top in our picture of Sheffield, had been built as a chapel of ease, some 300-400 yards from the old parish church, and around it had sprung a mass of small dwelling houses intermingled with workshops, all belching forth so much smoke that the very air was grimy, and the sun itself took on a yellow tint. The picture of Sheffield in 1859, with its numerous factory chimneys tells its own story.

Whilst the rolling and grinding of steel had to be done on sites adjacent to water power, the hand forging, the fashioning, the hilting of knives and warehousing could be done anywhere, and here with a typical centre. The Blacksmiths Hearth, heavily built of brick, would be the centre of operations, and adjacent would be the bellows, barrel shaped with leather sides and a large handle to be pushed back and forth to generate the high temperatures needed to manipulate the steel bars. The anvil would be nearby, with the hand hammers and a variety of shaped jigs to assist in achieving the required shape. Against the wall would be a tank of water several feet square, probably made of wood, and lined with lead, with an open top, and used for quenching the red hot magnets to harden them, and enable them to accept and retain magnetism.

Apart from forging, special shapes would be achieved by filing, and the whole effect would largely resemble a blacksmiths shop. The magnets would then require grinding and glazing, but this would be done by others elsewhere. A hand cart would transport them to some 'grinding wheel' where sandstones up to 20" diameter, and propelled by water power, would brighten the surfaces and square the pole ends of the magnets. The operator would sit astride a 'horse', a shaped box adjacent to the wheel, that enabled him to work over the wheel, and exert his strength to achieve the necessary pressure. Glazing, done similarly, but with fine emery glued to the periphery of round cotton 'Dollys' would give that bright polish to the steel that closed the grain, and rendered rusting unlikely in most conditions, and back they would come to the firm.for finishing and magnetising.

Sheffield at this time, and for many years afterwards, was a mass of small workshops, with 'Little Mesters', self employed men with specialist skills, all contributing their part to the product. Even years later, when steam and gas engines provided more reliable sources of power, and enabled manufacturers to be concentrated within factories, the 'Little Mester' system often survived and individual workshops, with line shafting and belting transmitting power through the floors, would subcontract their work to the factory owner, who would eventually market the product.

To return to magnet making, we would now require a coat of colouring, and this was achieved with coloured wax, similar to sealing wax, heated in a large copper saucepan, and applied with a pallet knife or rolled between two plates in the case of round bar magnets.

Magnetising was carried out by stroking the magnets against a large compound magnet. This whole operation was shrouded in secrecy, and the magnetising room was at the top of the building, where strangers were expressly forbidden to go. Even the workforce were excluded, and when the business was sold to the Horton family in 1954, one employee, Ernest Windley, told us that he was third generation at Shaws, and none of his family had ever entered the room.

Our earliest order books go back to the 1860's, but it is clear that we had progressed over the years from making compass needles, and compass adjusting magnets, to complex horseshoe and 'U' shaped magnets, often several

screwed together to form compound magnets, used for early generators and for separating metal particles from grain etc., in food manufacture. Illustrations of these are to be seen on page **12.**

They were called upon to produce all sorts of odd shapes as a host of 19th century inventors found new uses for magnetism, and the new found electricity, and went on to make telephone magnets, incorporated into those long handled ear pieces, and later still, we were to produce magneto magnets for motor cars.

However, the mass market of electricity, telephones and motor cars, was to bring fresh minds to the subject of magnets, as with so many other products, and designers working on these problems were calling for shapes unattainable by forging.