Chapter Fifty-Five

COUNTRY INTO TOWN: THE INDUSTRIAL REVOLUTION

1 MAY 1851 was a day of sunshine and showers. By 11 o'clock over half a million people had gathered in London's Hyde Park around the vast structure made of iron and glass known to posterity as the Crystal Palace. Along the route past the teeming crowds a thousand coaches swept, bearing some thirty thousand guests to the opening of 'The Great Exhibition of the Works of Industry of All Nations'. They assembled inside what resembled a vast cathedral of glass, so large that it was able to accommodate with ease the huge elm trees of the park. The building itself was revolutionary, Sir Joseph Paxton's engineering masterpiece, but so also were the exhibits within it. The guests, in court attire and uniforms decked with jewels and orders, awaited the arrival of their young queen, Victoria, accompanied by her husband, Prince Albert, one of the master-minds behind the exhibition. When the queen arrived, dressed in a pink crinoline sparkling with diamonds and silver embroidery, ornate iron gates were flung wide, the national anthem was sung, followed by prayers, speeches and choruses culminating in the boom of a mighty organ, trumpet fanfares, and salvoes of cannon. In this manner the Great Exhibition was declared open, an event which was to attract over six million visitors.

There were a hundred thousand objects to be seen from all over the world but the western half of the structure was devoted to British goods. There the greatest attraction by far was the machinery courts. 'Went to the machinery courts,' the queen wrote in her diary, 'where we remained two hours, and which is excessively interesting and instructive . . . what used to be done by hand and used to take months is now accomplished in a few instants by the most beautiful machinery.' There were printing presses, threshing machines, hydraulic pumps, railway carriages, locomotives and steam hammers, to name but a few. Those who went on the great day would have come away with two overwhelming impressions, one of the amazing machines, and

the other of the crush of humanity. Both were to be themes dominating the decades after the end of the Napoleonic Wars.

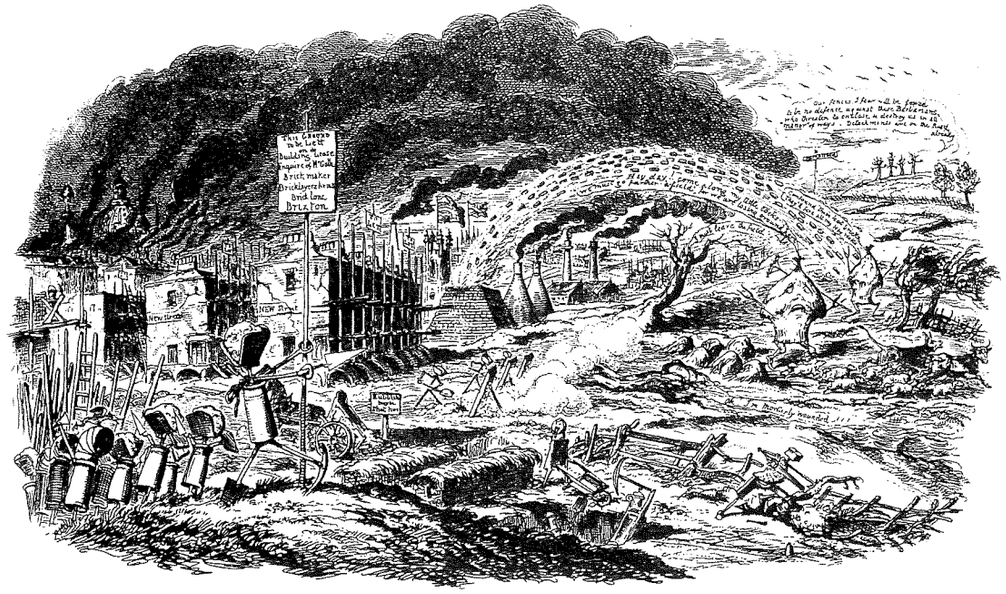
In the thirty-six years which separated the Battle of Waterloo from the Great Exhibition something tremendous had happened which changed everything, the Industrial Revolution. That was an expression invented in the twentieth century to explain an event which those who lived through it at the time were aware of, but to which they gave no name. No one has ever been able fully to explain why this revolution, which went by fits and starts through the century, should have happened in Britain. It had roots which stretched back several centuries to the enterprise of Tudor England, and certainly the pace quickened in the eighteenth century when many of the foundations were laid: the beginnings of the use of steam and water power, huge improvements in agriculture, and the development of more efficient communications through turnpike roads and the building of canals. But none of these developments signalled the most inexplicable factor of all, the huge rise in the population.

During the first half of the nineteenth century the population rose by 73%, increasing at the rate of two million a decade. The reasons for this were various: people married younger, produced more children and were nurtured on better food. The average life expectancy also rose to forty. This sudden enormous increase in the population meant that there were more people to buy things certainly, but they would only be able to buy them if they were in work producing income to be spent. In order to find such work, people drifted in increasingly large numbers from the countryside where they were born to the towns where the new industries offered far better employment prospects and higher wages. In 1800 25% of the population lived in cities or towns. By 1881, 80%. The year of the Great Exhibition was the first time that the number of urban dwellers exceeded those who dwelt in the countryside. Nothing comparable in terms of the movement of people and the change in work had been seen since the Dissolution of the Monasteries three hundred years before.

Nearly every city and town in the country grew. Certain of them virtually exploded. The boom towns were Manchester, Birmingham, Liverpool, Leeds, Sheffield and Bristol. In 1801 Birmingham had a population of 71,000, in 1831 144,000; Manchester's figures for the same dates are 75,000 and 182,000. There was no mechanism for dealing with such an unprecedented growth and the results were

The opening of the Great Exhibition, 1 May 1851. The royal family stand in the centre at the moment when the Archbishop of Canterbury uttered a prayer, signalling mass choirs singing the *Hallelujah Chorus*. Joseph Paxton, the designer of what became called the Crystal Palace, stands in the front row to the left, third in and with his hat tucked under his arm. The Chinaman to the right had gained admission by accident, but his exotic appearance secured him a place in the official procession of foreign representatives.


INDIA
PERSIA
TURKEY



LONDON going out of Town. — or — — The March of Bricks & Mortar.' —

George Cruikshank's biting satire *London going out of Town*. Kilns belch out bricks while prototype robots as jerry builders set to work swallowing up the countryside. The green fields of Islington and Hampstead vanished beneath the relentless march of bricks and mortar. The date of the satire is 1829 but nothing was to stop this perpetual encroachment until the creation of so-called 'green belts' in the 1930s.

often horrendous. Rows of small back-to-back houses and airless tenement blocks were built devoid of decent sanitation, thus leading to outbreaks of disease and a high infant mortality rate. Towns which in the past had been a pleasant mixture of high and low now began sharply to divide between unspeakable inner city ghettoes for workers, and comfortable airy suburbs where the superior artisans and middle classes lived in detached villas, away from the grime and filth engendered by the new factories. Such segregation, however, reflected status, not hostility, and there was always opportunity for those with talent to cross the divide and move upwards.

More people not only put appalling pressure on the urban authorities but also on agriculture, for they had to be fed. That there was no shortage of food was due entirely to a continuation of the farming improvements of the previous century. Enclosures meant far better farming, creating compact units in which tenant farmers could adopt the new crop rotation systems and experiment with the scientific breeding of stock.

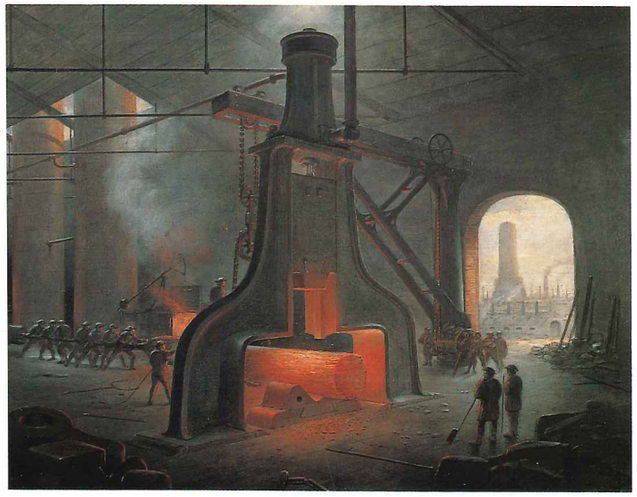
Areas which had previously been wastes and commons were brought into production. It was expensive to enclose, for the Church of England had to be paid off in lieu of their ancient feudal tithes, legal bills had to be met, new hedges planted and walls built. But there were good profits to be made for the new ease of transportation meant that foodstuffs could be got to the expanding markets in the towns. There was no lack of labour either, which partly accounts for the very slow mechanisation of agriculture. Although a mechanical threshing machine had been invented in 1786 it remained a rarity in the south-east of England, even in the 1850s. Only after that date, when labour became scarcer, did machines begin to take over.

The farmers thus prospered, being well able to meet the rise in rents imposed by the landowners. They in turn ploughed money back into improving their estates, that is until later in the century when they discovered that the financial returns from banking, commerce and industry were far greater. Investment by the aristocratic and landed classes in industry set them apart from their peers on the Continent, who looked down on trade. The agricultural revolution had enriched landowners, now the Industrial Revolution was to make them richer. They exploited to the full the natural resources on their estates: lead, iron, coal and tin. To their contribution can be added that of an ever-growing band of entrepreneurs, often men of lowly origins, whose determination, ambition and downright greed was to be a major driving force behind the Revolution. These were self-made men who started small businesses, who invented new methods of manufacture, and who possessed the energy to carry through single-handed every aspect of a project which today would call for a sizeable management team. They made their fortunes, reinvested in industry, and at the same time set themselves up as landowners, ensuring that their children were suitably educated for their new status in society.

The vast sums of money engendered by the Industrial Revolution demanded a multiplication of financial services to deal with it: banks, insurance companies and stock exchanges mushroomed. Business on the London Stock Exchange doubled during the 1860s, reflecting its newfound status as a centre of national and international business. Its open character attracted investors to such an extent that by 1875 it was handling investment out of the country worth £1,000 million.

Not only was there an ever-expanding home market but British goods, being the first in the world to be mass manufactured and therefore cheap, gradually conquered the globe. By 1850 over 90% of exports were of manufactured goods and a quarter of all international trade passed through British ports, mainly in British ships. It was cotton which led the way, opening up markets in Latin America in the 1820s and in India in the 1840s. Later in the century textiles gave place to metal and coal.

All of these industries interconnected. Machinery was constructed of metals like iron and steel, and these in turn called for coal to make and often fuel them. Even so, such developments would have been nullified had it not been for the invention of the railway and the advent of the steam ship. Both required large quantities of metal for their construction, and coal to operate them. In this way a whole cycle of dependency was created. Indeed, the new railways called for so much iron that by 1851 two and a half million tons was made a year. That output never flagged for the British, the earliest railway builders in the world, went on to construct rail systems in Europe and the United States. The numbers of ships needed to cope with the soaring export trade meant that between 1840 and 1870 the overall tonnage of British ships increased by more than 180%. As a result shipbuilding became a major industry, with important yards on Clydeside and in the north-east. Coal, as the basis of steam power, became central, so that by the 1860s a hundred million tons were being produced annually for home consumption and for export.



James Nasmyth's painting of a steam hammer captures the drama of industrial production by the third quarter of the century. Men toil away as pygmies trying to satisfy the hammer's devouring jaws from which erupts a massive iron bar.

In spite of all this, the progress of mechanisation was incredibly slow. The population explosion meant that there was no lack of human power and the workers naturally resented the introduction of any machine which would render them jobless. Even as late as 1870 human hands still accounted for most of the basic processes of manufacture, with machines only doing part of the work. Where machines did make inroads production inevitably shot up. Factories, however, were far from being gargantuan monsters. Most were small-scale affairs with about a hundred workers, and the majority of people plied their skill not in a factory at all but in groups in a

workshop. As the century wore on, the physical effects on the landscape became more and more visible as railways, coal mines and factories sprang up, tearing apart what had been countryside. Areas like the midlands changed beyond recognition but in the context of the country as a whole the disruption was localised.

Such developments by no means signalled a polarity between the old country and the new town way of life. Land and industry remained closely linked and indeed those in agriculture benefited from the close proximity of the industrial towns in terms both of work and markets. Women also benefited, for in the factories they enjoyed the status of full-time wage earners even though the hours could be long and arduous. The proliferation of shopkeeping and street trading gave women new opportunities, which enhanced both their position and independence. Less attractive was the exploitation of child labour. That, of course, was nothing new, for the rural economy had depended on it since time immemorial but now it was transferred to the factory floor. Children, like women, received only a third to a sixth of what a man was paid. They were fearfully overworked and abused, something which only began to be put to rights when a whole series of Factory Acts were passed from 1833 onwards and education became available through church and factory schools.

Mass production called for a very different approach to work from that prevailing in the countryside, where employment tended to be irregular and seasonal with plenty of time to accommodate local festivities. In contrast, factory work demanded discipline, set hours, good time-keeping and the need for equal quality of workmanship. What produced that attitude of mind were the virtues cultivated by the middle classes in the long puritan tradition which had been reinforced by the new evangelicalism. In this scheme of things thrift, hard work, sobriety and self-improvement went hand-in-hand with an acceptance of the woes of life. The imposition of these alien attitudes onto the shiftless lower classes took time to root, but root they did.

Unlike the landed and middle classes those who made up the work force of the Industrial Revolution were hugely diversified, forming an elaborately structured ladder. At the top were trades like tailoring, carpentry, printing, coach-building and clockmaking, all good earners, while on the bottom rungs were agricultural workers, handloom weavers and framework knitters, who were increasingly redundant in the new age of the machine. Each group of skilled workers guarded their patch fiercely and felt little if any kinship with the vast mass of the unskilled who, by 1870, made up 80% of the workforce.

Manufactured goods and markets ready to purchase them are one thing, a network of communications to get them there is another. The inheritance from the

previous century was good, and continued to be improved upon. Thomas Telford and John McAdam made huge advances in road construction producing a smooth metalled surface, which meant that horses could draw three times the weight at a far greater speed. But that was as nothing compared to the railway building of Victorian England. In 1825 the Stockton and Darlington Railway opened, a landmark less in invention, for the principles of steam power were already well-known, than in the realisation of its economic potential. The cost of coal transported on that track fell by three-quarters and those who had invested money in its construction reaped high

dividends. By 1850 more than 6,000 miles of track had been laid. By 1870, 13,000. Although depleted the system remains in use to this day, a tribute to the engineering genius of men like Samuel Morton Peto and Thomas Brassey. They carried the railways the length and breadth of the country, blasting tunnels and building bridges and viaducts, let alone hundreds of stations. The new railways meant that both the raw materials and the finished products of the Industrial Revolution could be transported at high speed across country and to the ports for export abroad. Export in its turn depended on shipping where another revolution took place, as sail gave way to steam

One of the most celebrated of all Victorian narrative paintings, William Powell Frith's *The Railway Station* painted in 1862. The station was Paddington and the artist used this quintessentially Victorian phenomenon as a setting for one of his epics of modern life in which onto one canvas he provides in paint a panorama of contemporary society parallel to that Dickens gave in the novel.

power. By the last quarter of the century the latter decisively took over, as Britain's sea-going shipping became equal in size to the rest of the world's put together.

The railways meant increased communication of another kind, firstly by post and secondly by telegraph (the telegraph poles were stationed along the rail track), making the dissemination of news almost instant. More people, more money, more means whereby to transport them, and everywhere as a consequence shops and stores multiplied. Where in the previous century a town would have a few small shops now it had many, as specialisation of both goods and services set in: drapers, china shops, booksellers, chemists, milliners, hairdressers, sprang up. In 1870 the first department store opened, and by the close of the decade the chain store was launched when Jesse Boot opened the first branch of Boots the chemist in Nottingham in 1877. A wide range of people now had money in their pockets to dispose of on things other than the bare necessities of life characteristic of earlier centuries. By 1870 advertising and promotion became a part of merchandising with brand-names leading the field, employing agents and travellers on the road to sell their wares.

Even in this bustling prosperous society life could take a sudden turn for the worse when trade took a downturn. Unlike former times prosperity was such that it was possible for a far greater number of people to make provision against the evil day. Friendly Societies by the 1850s could claim over a million and a half members. They had existed before but on nothing like the same scale, for such societies became the institutional embodiment of the skilled worker, with a scope of activity extending far beyond insurance to include bargaining with employers over hours and wages and ensuring exclusivity of skill. Their importance far surpassed that of the earliest trade unions which also represented the interests of the skilled workers. At the beginning of the century they were illegal, although they grew covertly under the guise of being Benefit, or Friendly Societies. They represented the increasing solidarity of the skilled worker as against the unskilled one. But skilled workers were also vulnerable, for the newly invented machines could render certain skills redundant, and could be used to make cheaper, shoddier goods. And always the workers were subject to fluctuations in the economy, never more so than in 1812 when Napoleon attempted his economic blockade of Britain. The first two decades were ones of industrial turbulence with frequent strikes and outbreaks of violence in which workers smashed the new machines which took their work from them. Those involved in this activity were known as Luddites. No one knows how many harboured aspirations to upset the established order of things and provoke a social revolution, but by the second decade the Luddites were a spent force. So much so that in 1824 the Combination Acts were repealed, and the following year an Act gave the unions legal status and the right to

collect funds. There was, however, a proviso: they were to be subject to the common law which covered conspiracy and coercion.

In October 1833 a group of farm workers in the Dorset village of Tolpuddle joined the Friendly Society of Agricultural Labourers whose aim was to secure a just regard for their work. Unfortunately the rituals and secret oaths attending their admittance brought them within an infringement of the laws governing political subversion. Six men were prosecuted and transported, in a notorious case known as that of the 'Tolpuddle Martyrs'. In the end the men were pardoned and brought back to England, but the damage was done. In the context of the growing trade unionism of the period, what was striking about the case was that it happened at all.

Indeed during the 1820s and 30s unions began to band together to form a regional and national network. They printed their own journals, giving voice to radical political views. Unity was brought about by creating a common enemy, the employer, and presenting a view of society in which the capitalist system he represented, dependent on investment by individuals in the enterprise, would be replaced by a co-operative system in which the workers would collectively own and manage their own business. Such ideas were developed by the wealthy magnate and model factory owner, Robert Owen. Under his aegis the trade union movement drew together, forming in 1834 the Grand National Consolidated Trades Union. But it was beyond Owen's abilities to hold together what were warring factions, and the whole organisation collapsed within months. In the aftermath, the unions reverted back to their craft and regional groupings dedicated to exerting pressure on employees to push up wages. Only after 1870 did the mood change. In 1871 the Trades Union Act sought to provide them with a clear status at law. Membership and organisation of the unions had developed on such a scale by now that full-time officers who were literate, numerate and well-informed were needed to run them. Gradually these unions of skilled workers, who controlled the sinews of industry in terms of raw materials and transport, began to realise their potentially enormous power.

The growing unions were the winners, but there were losers too. None more so than the agricultural workers. There were too many of them, and the labour market was glutted after 1815 with demobilised soldiers from the wars. As a consequence wages fell. The old system of living-in with the farmer gave way to part-time seasonal employment, leading to migration to where work existed. Those who lived near the new towns fared best, their women and children finding work. Enclosures made things even worse. Initially they brought work in the way of hedging and ditching, building walls and making roads, but then came the bitter reality. There was nothing to replace all the rights, which had been theirs for centuries as part of the rural way of

life, and which were now taken away from them without compensation: no opportunities any more for gleaning at harvest time, no common pasture for their cattle, no sources of free fuel or ponds to fish in. Poaching therefore became a way of life in order to supplement a family's meagre diet. Parliament passed a cruel set of game laws, protecting a whole range of birds and animals for slaughter by the landowner alone. In 1803 poaching was made a capital offence. What made this so savage was that many landowners were absentees, and never hunted the game they denied their luckless estate workers.

Agricultural workers were also threatened as machines took over. One result was the series of uprisings in 1830 and 1831 called the 'Swing Riots' in the south and east of England, in which labourers smashed the new threshing machines and went on to attack leaders of the rural community. In doing so they were emitting a cry from the heart for a lost way of life, the paternalism of pre-Industrial Revolution England. The riots were put down: five hundred people were transported, six hundred imprisoned and nineteen executed. Only after about 1850 did the plight of the agricultural workers begin to take an upturn.

These were the losers, tragic victims of a massive and irreversible revolution. But by the last quarter of the century more people were better off than ever before. The initial stages of change were hard, bringing few comforts, but in the context of the age the miracle was that there was not mass starvation. On the whole, the poor did not get poorer. It only seemed that they did, for the rich certainly got richer and there was an enormous expansion at every level of the middle classes. Both domestic service and factory work gave stable full-time employment to a large section of the population whereas, if the Industrial Revolution had not occurred, there would only have been untold poverty and degradation. Those who lost out were the workers whose skills were taken over by machines, and those who laboured on the land. To them we can add the many who slaved in what were known as the sweated trades like ribbon-making. What also lost out was the physical environment in which people lived and worked. For the first time pollution occurred on a gargantuan scale, lowering standards of public health. For those who lived through the changes the psychological impact of this new way of life must have been traumatic. But the clock could never be put back.