

BIRMINGHAM AT WORK.

(From the Times.)

(Continued.)

Hitherto we have devoted our attention for the most part to the district surrounding Birmingham, we must now visit the famous town itself, of which Leland wrote thus in 1535:—

"I came through a pretty street as ever I entered into Birmingham town. The street, as I remember, is called Dirty. In it dwell smiths and cutlers. . . . There be many smiths in the town that use to make knives and all manner of cutlery tools, and many lornes that make buttes, and a great many maylors, so that a great part of the town is maintained by smiths, who have their iron and sea-cole out of Staffordshire."

The cutlers and the knives since Leland's time have emigrated to Shropshire, although many cutting instruments, such as heavy-edged tools, are still made in Birmingham. The "lornes" have removed to Walsall, which is a great mart for saddlery; and the nailers are chiefly congregated about Dudley and Stourbridge. Camden speaks of Birmingham as swarming with inhabitants, and echoing with the noise of anvils. During the Civil War, Mr. Porter's works furnished the Parliamentary army with 15,000 blades. In 1689 we hear of the Birmingham manufacturers taking a contract for small arms. In 1709 the first thread of cotton was "spun by rollers" in a village near Birmingham. This was the discovery which Arkwright afterwards brought to perfection, but though cotton-spinning was carried on in Birmingham till near the end of the century, it never took kindly to the soil, and finally settled in its permanent abode further north. During the latter half of the 17th and throughout the 18th century the growth of Birmingham manufactures was marvellous. There were no trades' unions, no guilds or companies, every man was free to come or go as he pleased, Dissenters, Quakers, and heretics of every shade were welcomed and unmolested. One of the most important trades of the town a hundred years ago was that in buckles. They were made of all sorts and sizes, from a shilling to ten guineas a pair, from diminutive ornaments for the hat up to large excrescences almost covering the foot. But towards the end of the century a change took place in the fashions. Velvets, brocades, and buckles went out, broadcloth and buttons came in. We all recollect the horror of Louis XVI.'s courtiers when Dumouriez appeared at the last Royal levee, before the fatal 10th of August, in shoestring. It was the same in England; indeed, this new mode originated on this side of the Channel. In 1791, 20,000 buckle-makers addressed a piteous petition to the Prince of Wales. It was all in vain, Fashion was inexorable. The metal button trade was doomed to a similar decline. Many middle-aged persons may remember the deputations which visited royalty on this important subject. Their efforts were fruitless; metal buttons and buckles were alike swept away. But Birmingham had a soul far above buttons. Edmund Burke styled her "the toymshop of Europe"—in no invidious sense for by "toys" he meant all sorts of elegant trinkets and knickknackeries—but Birmingham was capable of many things besides toys. We need only mention the name of John Baskerville, the renowned printer; and of Matthew Boulton, the coadjutor of James Watt, without whose worldly wisdom and indomitable energy the timid inventor would probably have been unable to bring the steam-engine to perfection. The Soho Works still exist as the fittest monument of Boulton's reputation. We have condensed these remarks from a suggestive essay by Mr. Timmins on the "Industrial History of Birmingham." He concludes by claiming for Birmingham an unwonted large share of social and personal freedom. The small manufacturers are practically independent of the merchants and factors whom they supply. The workmen, unfettered for the most part by trades' unions, are paid according to their merits, and skilled labour is nearly always in demand. The enormous variety of occupations renders a state of general bad trade almost impossible. If misadventures are few, absolute poverty is rare. Dwellings are rarely overcrowded, and very seldom is more than one family found in a house.

Mr. John D. Goodman contributes an important and elaborate paper on the gun trade of which the most meagre summary would occupy all our remaining space. We must, therefore, commend it to the attention of our readers, and simply note some of its more salient features. Mr. Goodman gives a continuous history of the various improvements in muskets from the match-lock to the flint-lock, and thence to the percussion-cap; from the smooth-bore to the rifle the Minie the Enfield, and the breech-loader. Turning to the system of manufacture, cheap gunstocks are made of beech, the better sort of walnut wood. One contractor established saw-mills at Turin during the Crimean War, and has since then converted 100,000 Piedmontese walnut trees into gunstocks. An average-sized tree yields about thirty stocks. The iron for military gun barrels is selected with the utmost care, which is attested by the fact that not more than two in a thousand burst in the proof-house. Till recently all gun-locks were made by hand and forged on the anvil with wonderful skill. The steam hammer and stamp are now superseding the forge, but in no case can the filer be altogether dispensed with; the locks cannot be put together till all the limbs have passed through his hands to receive the final adjustment. In the higher branches of this trade good wages are earned. Barrel-boring is an operation of the utmost delicacy. A military barrel must be bored with such accuracy as to receive a plug measuring 67-1/1000ths of an inch. It is condemned as useless if it takes one of 6-1/2. A workman in this branch has been known to earn 45 or 50 a week, and, we may heartily add, he richly deserved it. To "set" a barrel—that is, to straighten it, also requires great skill.

"The practised eye of a barrel setter can detect a deviation from the straight line which no mechanical

contrivance can discover. He accomplishes his object by looking through the barrel while standing in front of a window, and causing the shade of the upper edge of the window to traverse up and down the tube. The irregularities in the outline of the shade show him where the inaccuracies exist. These he removes by well directed blows of a hammer, the perfecting blows being given with a light wooden mallet."

This mode of testing the accuracy of a gun-barrel was discovered by a Birmingham workman 40 or 60 years ago. This foolish fellow sold his secret—which was worth many thousand pounds—for five guineas and a pot of ale. The remainder of Mr. Goodman's paper is occupied with an account of gunmaking by machinery, a description of the small arms' factory, and a number of valuable statistics. Those interested in the subject will do well to read it.

(To be continued.)

STEEL RAILS—Steel has many important advantages over iron beyond that of its superior durability. It is a consideration of much importance that steel rails would not involve more than one-fifth the interruption of the line consequent upon relaying. But it is a very much more valuable property of Bessemer steel that it is secure against breaking. For when we speak of steel rails we assume that they are made under a contract by which any bar, taken at random, must withstand the blow of a weight of one ton falling 25 feet, the rail being laid upon 3 feet supports. Steel rails may be taken up during a hard frost and bent double under a steam hammer without breaking, although steel that would stand this test without cracking would be somewhat softer than would be desirable.

The test by a ton weight on a 25 feet fall should be enforced under all contracts for steel rails. Any good steel rail will withstand it perfectly, while an iron rail would be broken with the same weight on a 6 or at most a 10 feet fall. Steel rails, besides their greater durability and tensile strength, will bear as girders, nearly twice the load of iron rails of the same section, as carefully ascertained by Mr. George Horkley, the engineer to the Great Indian Peninsula Railway Company, and who has ordered many thousand tons of steel rails. The greater stiffness of the steel rail enables it to distribute the weight upon the wheels of a train over an increased surface of sleepers, and thus over an increased surface of ballast. The line, therefore, remains in better condition than when laid with iron rails, and there is far less weakness at the joints. The ends of steel rails, especially when they are not fished, have been fully proved to be at least ten times as durable as the ends of iron rails, being at once stiffer, harder, and tougher. Old steel rails, too, bear at least as high a proportion to their original value as iron rails. It is a fact that steel plates worth £30 per ton in the market are rolled from the crop ends of steel rails and these, which will pile and weld, are now worth from £7 to £8 per ton, new rails selling at prices varying between £12 and £16. Old steel rails can be melted in a cupola into white iron; they can be reconverted along with new metal in the converter; they can be cut, piled, and welded; or they can be at once heated and be rolled into bar steel and plate steel of good quality. Considering therefore, that they have no disadvantages as compared with iron rails, unless it be their greater first cost, which is much more than compensated by their far greater durability, it is not remarkable that they are coming into rapid use, nor that the London and North Western Railway Company should have established large and costly works of their own at Crewe, capable of making 360 tons of steel weekly. Sixty-three miles of the company's line were already laid with steel rails at the time of the last half-yearly meeting. The Great Northern Company have decided to lay steel rails through their principal stations and upon all the inclines upon their line; but when we consider that, with the exception of a short length of 1 in 100 near Kingcress, none of their inclines are steeper than 1 in 178, and that they are mostly 1 in 20, we cannot doubt that steel will soon be adopted for the whole line. As for other lines we may say that at least 1,000 tons of Bessemer rails are made weekly in England and Wales, and probably 400 tons on the continent of Europe. The evidence in favour of steel is now become so clear, and the reasons for its immediate adoption so obvious, that we cannot but think that it is a most mistaken policy for engineers and railway managers to longer postpone the use of steel, whether upon the ground that it will yet become cheaper or otherwise. A generation of iron rails will have worn out before any considerable reduction can be expected in the price of Bessemer steel. One cannot doubt that the time will come when iron rails will be obsolete, just as the old cast-iron tramps and, after them the fish belled rail passed out of existence.—*Engineering.*

THE STRIKE IN THE IRON TRADE—An interesting experiment in the iron trade was inaugurated on the 20th ult. at Middlesbrough. A strike has been going on in the iron districts of the north for eighteen weeks, in consequence of the masters having reduced the wages of the men ten per cent. Messrs. Fox, Head and Co., proposed to their workmen that they should commence work at the reduced wages, and that, after the payment of ten per cent. on the capital invested, the profits should be equally divided between capital and labour. There was a clause in the proposal that both masters and men should relinquish combination, to which the men for some time objected, but the masters persisted in this condition, and yesterday the works were fairly started. Most of the workmen are, however, said to be from a distance.

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