

### 367. R. Guest on the cotton industry

*(A compendious history of the Cotton manufacture (1823).)*

Richard Guest was one of the first historians of the cotton industry. His book was written principally to assert the claim of Thomas Highs to be the inventor of both the spinning Jenny and the water frame. The Rev. Edmund Cartwright (1743–1823), a younger brother of Major John Cartwright, the parliamentary reformer, describes, in an account supplied by him to an early edition of *Encyclopaedia Britannica*, how he came to invent the first effective power loom for weaving wide cloth. The gradual application of the invention, which met much resistance from the cloth workers and needed many improvements before it could be generally adopted, is described in the second extract. By the time that it came into wide use, Cartwright's patents had expired; he was accordingly granted £10,000 by Parliament in 1809. He also invented a wool-combing machine in 1789.

#### *(a) Cartwright's account of his invention of the power-loom.*

Happening to be at Matlock, in the summer of 1784, I fell in company with some gentlemen of Manchester, when the conversation turned on Arkwright's spinning machinery. One of the company observed, that as soon as Arkwright's patent expired, so many mills would be erected, and so much cotton spun, that hands never could be found to weave it. To this observation I replied that Arkwright must then set his wits to work to invent a weaving mill. This brought on a conversation on the subject, in which the Manchester gentlemen unanimously agreed that the thing was impracticable; in defence of their opinion, they adduced arguments which I certainly was incompetent to answer or even to comprehend, being totally ignorant of the subject, having never at that time seen a person weave. I controverted, however, the impracticability of the thing, by remarking that there had lately been exhibited

in London, an automaton figure, which played at chess. Now you will not assert, gentlemen, said I, that it is more difficult to construct a machine that shall weave, than one which shall make all the variety of moves which are required in that complicated game.

Some little time afterwards, a particular circumstance recalling this conversation to my mind, it struck me, that, as in plain weaving, according to the conception I then had of the business, there could only be three movements, which were to follow each other in succession, there would be little difficulty in producing and repeating them. Full of these ideas, I immediately employed a carpenter and smith to carry them into effect. As soon as the machine was finished, I got a weaver to put in the warp, which was of such materials as sail cloth is usually made of. To my great delight, a piece of cloth, such as it was, was the produce.

As I had never before turned my thoughts to anything mechanical, either in theory or practice, nor had ever seen a loom at work, or knew any thing of its construction, you will readily suppose that my first loom must have been a most rude piece of machinery.

The warp was placed perpendicularly, the reed fell with a force of at least half an hundred weight, and the springs which threw the shuttle were strong enough to have thrown a Congreve rocket. In short, it required the strength of two powerful men to work the machine at a slow rate, and only for a short time. Conceiving in my great simplicity, that I had accomplished all that was required, I then secured what I thought a most valuable property, by a patent, 4 April, 1785. This being done, I then condescended to see how other people wove; and you will guess my astonishment, when I compared their easy modes of operation with mine. Availing myself, however, of what I then saw, I made a loom in its general principles, nearly as they are now made. But it was not till the year 1787, that I completed my invention, when I took out my last weaving patent, August 1st of that year. [pp. 44-45.]

(b) *The Adoption and spread of power-loom weaving.*

About 1790, Mr. Grimshaw, of Manchester, under a licence from Mr. Cartwright, erected a weaving factory turned by a steam engine. The great loss of time experienced in dressing the warp, which was done in small portions as it unrolled from the beam, and other difficulties arising from the quality of the yarn then spun, were in this instance formidable obstacles to success; the factory, however, was burnt down before it could be fully ascertained whether the experiment would succeed or not, and for many years no further attempts were made in Lancashire to weave by steam.

Mr. Austin, of Glasgow, invented a similar loom, in 1789, which he still further improved in 1798, and a building to contain 200 of these looms was erected by Mr. Monteith, of Pollockshaws, in 1800.

In the year 1803, Mr. Thomas Johnson, of Bradbury, in Cheshire, invented the dressing frame. Before this invention the warp was dressed in the loom in small portions as it unrolled from the beam, the loom ceasing to work during the operation. Mr. Johnson's machine dresses the whole warp at once; when dressed the warp is placed in the loom which now works without intermission. A factory for steam looms

was built in Manchester, in 1806. Soon afterwards two others were erected at Stockport, and about 1809, a fourth was completed in Westhoughton. In these renewed attempts to weave by steam, considerable improvements were made in the structure of the looms, in the mode of warping, and in preparing the weft for the shuttle. With these improvements, aided by others in the art of spinning, which enabled the spinners to make yarn much superior to that made in 1790, and assisted by Johnson's machine, which is peculiarly adapted for the dressing of warps for steam looms, the experiment succeeded. Before the invention of the dressing frame, one weaver was required to each steam loom, at present a boy or girl, 14 or 15 years of age, can manage two steam looms, and with their help can weave three and a half times as much cloth as the best hand weaver. The best hand weavers seldom produce a piece of uniform evenness; indeed, it is next to impossible for them to do so, because a weaker or stronger blow with the lathe immediately alters the thickness of the cloth, and after an interruption of some hours, the most experienced weaver finds it difficult to recommence with a blow of precisely the same force as the one with which he left off. In steam looms, the lathe gives a steady, certain blow, and when once regulated by the engineer, moves with the greatest precision from the beginning to the end of the piece. Cloth made by these looms, when seen by those manufacturers who employ hand weavers, at once excites admiration and a consciousness that their own workmen cannot equal it. The increasing number of steam looms is a certain proof of their superiority over the hand looms. In 1818, there were in Manchester, Stockport, Middleton, Hyde, Stayley Bridge, and their vicinities, 14 factories, containing about 2,000 looms. In 1821, there were in the same neighbourhoods 32 factories, containing 5,732 looms. Since 1821, their number has still farther increased, and there are at present not less than 10,000 steam looms at work in Great Britain.

It is a curious circumstance, that, when the cotton manufacture was in its infancy, all the operations, from the dressing of the raw material to its being finally turned out in the state of cloth, were completed under the roof of the weaver's cottage. The course of improved manufacture which followed, was to spin the yarn in factories and to weave it in cottages. At the present time, when the manufacture has attained a mature growth, all the operations, with vastly increased means and more complex contrivances, are again performed in a single building. The weaver's cottage with its rude apparatus of peg warping, hand cards, hand wheels, and imperfect looms, was the steam loom factory in miniature. Those vast brick edifices in the vicinity of all the great manufacturing towns in the south of Lancashire, towering to the height of 70 or 80 feet, which strike the attention and excite the curiosity of the traveller, now perform labours which formerly employed whole villages. In the steam loom factories, the cotton is carded, roved, spun, and woven into cloth, and the same quantum of labour is now performed in one of these structures which formerly occupied the industry of an entire district.

A very good hand weaver, a man 25 or 30 years of age, will weave 2 pieces of nine-eighths shirting per week, each 24 yards long, and containing 105 shoots of weft in an inch, the reed of the cloth being a 44, Bolton count, and the warp and weft 40 hanks to the pound. A steam-loom weaver, 15 years of age, will in the same time weave

7 similar pieces. A steam loom factory containing 200 looms, with the assistance of 100 persons under 20 years of age, and of 25 men, will weave 700 pieces per week, of the length and quality before described. To manufacture 100 similar pieces per week by the hand, it would be necessary to employ at least 125 looms, because many of the weavers are females, and have cooking, washing, cleaning and various other duties to perform; others of them are children, and consequently unable to weave as much as the men. It requires a man of mature age and a very good weaver to weave 2 of the pieces in a week, and there is also an allowance to be made for sickness and other incidents. Thus, 875 hand looms would be required to produce the 700 pieces per week; and reckoning the weavers, with their children, and the aged and infirm belonging to them, at  $2\frac{1}{2}$  to each loom, it may very safely be said, that the work done in a steam factory containing 200 looms, would, if done by hand weavers, find employment and support for a population of more than 2,000 persons.

The steam looms are chiefly employed in weaving printing cloth and shirtings; but they also weave thicksets, fancy cords, dimitics, cambrics and quiltings, together with silks, worsteds and fine woollen or broad cloth. Invention is progressive, every improvement that is made is the foundation of another, and as the attention of hundreds of skilful mechanics and manufacturers is now turned to the improvement of the steam looms, it is probable that its application will become as general, and its efficiency as great, in weaving, as the jenny, water frame and mule, are in spinning, and that it will, in this country at least, entirely supersede the hand loom. [pp. 46-48.]

(c) *The commercial traveller.*

About 1750 there arose a second rate class of merchants, called fustian masters; these resided in the country and employed the neighbouring weavers. . . .

The master attended the weekly market at Manchester, and sold his pieces in the grey to the merchant, who afterwards dyed and finished them. Instead of travelling with their goods on pack-horses, the merchants or their travellers now rode from town to town, carrying with them patterns or samples, and on their return home the goods sold during the journey were forwarded by the carriers' waggons.

This practice, far more commodious than the rude and inconvenient mode of carrying their merchandize from town to town, has become general, not only in this, but in every other business; and it may now be asserted, that the whole of the internal wholesale trade of England is carried on by commercial travellers—they pervade every town, village and hamlet in the kingdom, carrying their samples and patterns, and taking orders from the retail tradesmen, and afterwards forwarding the goods by waggons, or canal barges, to their destination;—they form more than one-half of the immense number of persons who are constantly travelling through the country in all directions, and are the principal support of our inns, the neatness and comfort of which are so much celebrated throughout Europe. The commercial travellers are in a great measure the causes of this neatness and comfort, for they soon find out the best houses of entertainment; and, being gregarious, the news is readily communicated, and the best houses of course become more frequented: a circumstance which excites emulation among the innkeepers. These travellers are a body of men exhibiting

intelligence and acuteness, combined in many instances, with self-conceit and the superficial information acquired by reading newspapers. [pp. 10-11.]

(d) *The social effects of industrialization in Lancashire.*

The progress of the cotton manufacture introduced great changes in the manners and habits of the people [of Lancashire]. The operative workmen being thrown together in great numbers, had their faculties sharpened and improved by constant communication. Conversation wandered over a variety of topics not before essayed; the questions of peace and war, which interested them importantly, inasmuch as they might produce a rise or fall of wages, became highly interesting, and this brought them into the vast field of politics and discussions on the character of their Government, and the men who composed it. They took a greater interest in the defeats and victories of their country's arms, and from being only a few degrees above their cattle in the scale of intellect, they became Political Citizens.

To these changes the establishing of Sunday Schools has very much contributed; they have been a great means of forwarding this wonderful alteration. Before their institution the lower orders were extremely illiterate; very few of them could read, and still fewer could write, and when one of them learned to read, write and cast accounts, those acquirements elevated him to a superior rank. His clerkly skill exempted him from manual labour, and as a shopman, book-keeper or town's officer—perchance in the higher dignity of parish clerk or schoolmaster—he rose a step above his original situation in life.

The labourers and operative workmen were formerly sunk in the depths of ignorance; they seldom formed an opinion of their own, and were content to believe everything their superiors told them. Sunday Schools have greatly assisted in dispelling this thick cloud of ignorance, they have taught the mass of the people to read, and the countless publications dispersed over the country, in monthly portions or numbers, at 6d. 9d. or 1s. per number, have taught them to reason and think for themselves. During the last 40 years the mind of the labouring class (taking them as a body) has been progressively improving, and within the last 20, has made an advance of centuries, and is still advancing with accelerated rapidity.

The facility with which the weavers changed their masters, the constant effort to find out and obtain the largest remuneration for their labour, the excitement to ingenuity which the higher wages for fine manufactures and skilful workmanship produced, and a conviction that they depended mainly on their own exertions, produced in them that invaluable feeling, a spirit of freedom and independence, and that guarantee for good conduct and improvement of manners, a consciousness of the value of character and of their own weight and importance.

The practical truth of these remarks must be obvious to every one who has served on the jury at Lancaster, and compared the bright, penetrating, shrewd and intelligent jurors from the south of the county, with the stupidity and utter ignorance of those from its northern parts; and to every one who witnessed the fervour and enthusiasm with which the people in the manufacturing districts flew to arms, in 1803, to defend their firesides against a foreign invader. What crowding to drills; what ardour and

alacrity to learn the use of arms there then was, and how much stronger and more rapid the feeling of independence, both national and individual, is found to be among a highly-civilized dense manufacturing population, than among a scattered half-informed peasantry!

The amusements of the people have changed with their character. The athletic exercises of quoits, wrestling, football, prison-bars, and shooting with the long-bow are become obsolete and almost forgotten; and it is to be regretted that the present pursuits of pleasures of the labouring class are of a more effeminate cast.—They are now pigeon-fanciers, canary-breeders and tulip-growers. The field sports, too, have assumed a less hardy and enterprising character. Instead of the squire with his merry harriers and a score or two of ruddy, broad-chested yeomen, scouring the fields on foot heedless of thorn or briar, and scorning to turn aside for copse or ditch, we now see half a dozen fustian masters and shopkeepers with three or four greyhounds and as many beagles, attacking the poor hare with such a superiority, both as respects scent and fleetness, as to give her no chance of escape, and pouncing upon their game like poachers, rather than pursuing it with the fairness and hardiness of hunters.  
[pp. 37-39.]