

Space for Notes



Karl Marx
***Capital* Volume One**

Part IV:
Production of Relative Surplus-Value

Chapter 15:
Machinery and Modern Industry

Section 5
The Strife Between Workman and Machine

The contest between the capitalist and the wage-labourer dates back to the very origin of capital. It raged on throughout the whole manufacturing period. [112] But only since the introduction of machinery has the workman fought against the instrument of labour itself, the material embodiment of capital. He revolts against this particular form of the means of production, as being the material basis of the capitalist mode of production.

In the 17th century nearly all Europe experienced revolts of the workpeople against the ribbon-loom, a machine for weaving ribbons and trimmings, called in Germany Bandmühle, Schnurmühle, and Mühlenstuhl. These machines were invented in Germany. Abbé Lancellotti, in a work that appeared in Venice in 1636, but which was written in 1579, says as follows: “Anthony Müller of Danzig saw about 50 years ago in that town, a very ingenious machine, which weaves 4 to 6 pieces at once. But the Mayor being apprehensive that this invention might throw a large number of workmen on the streets, caused the inventor to be secretly strangled or drowned.” In Leyden, this machine was not used till 1629; there the riots of the ribbon-weavers at length compelled the Town Council to prohibit it. “In hac urbe,” says Boxhorn (Inst. Pol., 1663), referring to the introduction of this machine into Leyden, “ante hos viginti circiter annos instrumentum quidam invenerunt textorium, quo solus plus panni et facilius conficere poterat, quam plures aequali tempore. Hinc turbae ortae et querulae textorum, tandemque usus hujus instrumenti a magistratu prohibitus est.” After making various decrees more or less prohibitive against this loom in 1632, 1639, &c., the States General of Holland at length permitted it to be used, under certain conditions, by the decree of the 15th December, 1661. It was also prohibited in Cologne in 1676, at the same time that its introduction into England was causing disturbances among the workpeople. By an imperial Edict of 19th Feb., 1685, its use was forbidden throughout all Germany. In Hamburg it was burnt in public by order of the Senate. The Emperor Charles VI., on 9th Feb., 1719, renewed the edict of 1685, and not till 1765 was its use openly allowed in the Electorate of Saxony. This machine, which shook Europe to its foundations, was in fact the precursor of the mule and the power-loom, and of the industrial revolution of the 18th century. It enabled a totally inexperienced boy, to set the whole loom with all its shuttles in motion, by simply moving a rod backwards and forwards, and in its improved form produced from 40 to 50 pieces at once.

About 1630, a wind-sawmill, erected near London by a Dutchman, succumbed to the excesses of the populace. Even as late as the beginning of the 18th century, sawmills driven by water overcame the opposition of the people, supported as it was by Parliament, only with great difficulty. No sooner had Everet in 1758 erected the first wool-shearing machine that was driven by water-power, than it was set on

fire by 100,000 people who had been thrown out of work. Fifty thousand workpeople, who had previously lived by carding wool, petitioned Parliament against Arkwright's scribbling mills and carding engines. The enormous destruction of machinery that occurred in the English manufacturing districts during the first 15 years of this century, chiefly caused by the employment of the power-loom, and known as the Luddite movement, gave the anti-Jacobin governments of a Sidmouth, a Castlereagh, and the like, a pretext for the most reactionary and forcible measures. It took both time and experience before the workpeople learnt to distinguish between machinery and its employment by capital, and to direct their attacks, not against the material instruments of production, but against the mode in which they are used. [113]

The contests about wages in Manufacture, pre-suppose manufacture, and are in no sense directed against its existence. The opposition against the establishment of new manufactures, proceeds from the guilds and privileged towns, not from the workpeople. Hence the writers of the manufacturing period treat the division of labour chiefly as a means of virtually supplying a deficiency of labourers, and not as a means of actually displacing those in work. This distinction is self-evident. If it be said that 100 millions of people would be required in England to spin with the old spinning-wheel the cotton that is now spun with mules by 500,000 people, this does not mean that the mules took the place of those millions who never existed. It means only this, that many millions of workpeople would be required to replace the spinning machinery. If, on the other hand, we say, that in England the power-loom threw 800,000 weavers on the streets, we do not refer to existing machinery, that would have to be replaced by a definite number of workpeople, but to a number of weavers in existence who were actually replaced or displaced by the looms. During the manufacturing period, handicraft labour, altered though it was by division of labour, was, yet the basis. The demands of the new colonial markets could not be satisfied owing to the relatively small number of town operatives handed down from the middle ages, and the manufactures proper opened out new fields of production to the rural population, driven from the land by the dissolution of the feudal system. At that time, therefore, division of labour and co-operation in the workshops, were viewed more from the positive aspect, that they made the workpeople more productive. [114] Long before the period of Modern Industry, co-operation and the concentration of the instruments of labour in the hands of a few, gave rise, in numerous countries where these methods were applied in agriculture, to great, sudden and forcible revolutions in the modes of production, and consequentially, in the conditions of existence, and the means of employment of the rural populations. But this contest at first takes place more between the large and the small landed proprietors, than between capital and wage-labour; on the other hand, when the labourers are displaced by the instruments of labour, by sheep, horses, &c., in this case force is directly resorted to in the first instance as the prelude to the industrial revolution. The labourers are first driven from the land, and then come the sheep. Land grabbing on a great scale, such as was perpetrated in England, is the first step in creating a field for the establishment of agriculture on a great scale. [115] Hence this subversion of agriculture puts on, at first, more the appearance of a political revolution.

The instrument of labour, when it takes the form of a machine, immediately becomes a competitor of the workman himself. [116] The self-expansion of capital by means of machinery is thenceforward directly proportional to the number of the workpeople, whose means of livelihood have been destroyed by that machinery. The whole system of capitalist production is based on the fact that the workman sells his labour-power as a commodity. Division of labour specialises this labour-power, by reducing it to skill in handling a particular tool. So soon as the handling of this tool becomes the work of a machine, then, with the use-value, the exchange-

value too, of the workman's labour-power vanishes; the workman becomes unsaleable, like paper money thrown out of currency by legal enactment. That portion of the working-class, thus by machinery rendered superfluous, i.e., no longer immediately necessary for the self-expansion of capital, either goes to the wall in the unequal contest of the old handicrafts and manufactures with machinery, or else floods all the more easily accessible branches of industry, swamps the labour-market, and sinks the price of labour-power below its value. It is impressed upon the workpeople, as a great consolation, first, that their sufferings are only temporary ("a temporary inconvenience"), secondly, that machinery acquires the mastery over the whole of a given field of production, only by degrees, so that the extent and intensity of its destructive effect is diminished. The first consolation neutralises the second. When machinery seizes on an industry by degrees, it produces chronic misery among the operatives who compete with it. Where the transition is rapid, the effect is acute and felt by great masses. History discloses no tragedy more horrible than the gradual extinction of the English hand-loom weavers, an extinction that was spread over several decades, and finally sealed in 1838. Many of them died of starvation, many with families vegetated for a long time on 2 1/2 d. a day. [117] On the other hand, the English cotton machinery produced an acute effect in India. The Governor General reported 1834-35: "The misery hardly finds a parallel in the history of commerce. The bones of the cotton-weavers are bleaching the plains of India." No doubt, in turning them out of this "temporal" world, the machinery caused them no more than "a temporary inconvenience." For the rest, since machinery is continually seizing upon new fields of production, its temporary effect is really permanent. Hence, the character of independence and estrangement which the capitalist mode of production as a whole gives to the instruments of labour and to the product, as against the workman, is developed by means of machinery into a thorough antagonism. [118] Therefore, it is with the advent of machinery, that the workman for the first time brutally revolts against the instruments of labour.

The instrument of labour strikes down the labourer. This direct antagonism between the two comes out most strongly, whenever newly introduced machinery competes with handicrafts or manufactures, handed down from former times. But even in Modern Industry the continual improvement of machinery, and the development of the automatic system, has an analogous effect. "The object of improved machinery is to diminish manual labour, to provide for the performance of a process or the completion of a link in a manufacture by the aid of an iron instead of the human apparatus." [119] "The adaptation of power to machinery heretofore moved by hand, is almost of daily occurrence ... the minor improvements in machinery having for their object economy of power, the production of better work, the turning off more work in the same time, or in supplying the place of a child, a female, or a man, are constant, and although sometimes apparently of no great moment, have somewhat important results." [120] "Whenever a process requires peculiar dexterity and steadiness of hand, it is withdrawn, as soon as possible, from the cunning workman, who is prone to irregularities of many kinds, and it is placed in charge of a peculiar mechanism, so self-regulating that a child can superintend it." [121] "On the automatic plan skilled labour gets progressively superseded." [122] "The effect of improvements in machinery, not merely in superseding the necessity for the employment of the same quantity of adult labour as before, in order to produce a given result, but in substituting one description of human labour for another, the less skilled for the more skilled, juvenile for adult, female for male, causes a fresh disturbance in the rate of wages." [123] "The effect of substituting the self-acting mule for the common mule, is to discharge the greater part of the men spinners, and to retain adolescents and children." [124] The extraordinary power of expansion of the factory system owing to accumulated practical experience, to the mechanical means at hand, and to constant technical progress, was proved to us by the giant

strides of that system under the pressure of a shortened working-day. But who, in 1860, the Zenith year of the English cotton industry, would have dreamt of the galloping improvements in machinery, and the corresponding displacement of working people, called into being during the following 3 years, under the stimulus of the American Civil War? A couple of examples from the Reports of the Inspectors of Factories will suffice on this point. A Manchester manufacturer states: "We formerly had 75 carding engines, now we have 12, doing the same quantity of work.... We are doing with fewer hands by 14, at a saving in wages of £10 a-week. Our estimated saving in waste is about 10% in the quantity of cotton consumed." "In another fine-spinning mill in Manchester, I was informed that through increased speed and the adoption of some self-acting processes, a reduction had been made, in number, of a fourth in one department, and of above half in another, and that the introduction of the combing machine in place of the second carding, had considerably reduced, the number of hands formerly employed in the carding-room." Another spinning-mill is estimated to effect a saving of labour of 10%. The Messrs. Gilmour, spinners at Manchester, state: "In our blowing-room department we consider our expense with new machinery is fully one-third less in wages and hands ... in the jack-frame and drawing-frame room, about one-third less in expense, and likewise one-third less in hands; in the spinning room about one-third less in expenses. But this is not all; when our yarn goes to the manufacturers, it is so much better by the application of our new machinery, that they will produce a greater quantity of cloth, and cheaper than from the yarn produced by old machinery." [125] Mr. Redgrave further remarks in the same Report: "The reduction of hands against increased production is, in fact, constantly taking place, in woollen mills the reduction commenced some time since, and is continuing; a few days since, the master of a school in the neighbourhood of Rochdale said to me, that the great falling off in the girls' school is not only caused by the distress, but by the changes of machinery in the woollen mills, in consequence of which a reduction of 70 short-timers had taken place." [126]

The following table shows the total result of the mechanical improvements in the English cotton industry due to the American Civil War.

Number of Factories	1857	1861	1868
England and Wales	2,046	2,715	2,405
Scotland	152	163	131
Ireland	12	9	13
United Kingdom	2,210	2,887	2,549
Number of Power Looms	1857	1861	1868
England and Wales	275,590	368,125	344,719
Scotland	21,624	30,110	31,864
Ireland	1,633	1,757	2,746
United Kingdom	298,847	399,992	379,329
Number of Spindles	1857	1861	1868
England and Wales	25,818,576	28,352,125	30,478,228
Scotland	2,041,129	1,915,398	1,397,546
Ireland	150,512	119,944	124,240
United Kingdom	28,010,217	30,387,467	32,000,014
Number of Persons Employed	1857	1861	1868

England and Wales	341,170	407,598	357,052
Scotland	34,698	41,237	39,809
Ireland	3,345	2,734	4,203
United Kingdom	379,213	452,569	401,064

Hence, between 1861 and 1868, 338 cotton factories disappeared, in other words more productive machinery on a larger scale was concentrated in the hands of a smaller number of capitalists. The number of power-loom decreased by 20,663; but since their product increased in the same period, an improved loom must have yielded more than an old one. Lastly the number of spindles increased by 1,612,541, while the number of operatives decreased by 50,505. The “temporary” misery inflicted on the workpeople by the cotton-crisis, was heightened, and from being temporary made permanent, by the rapid and persistent progress of machinery.

But machinery not only acts as a competitor who gets the better of the workman, and is constantly on the point of making him superfluous. It is also a power inimical to him, and as such capital proclaims it from the roof tops and as such makes use of it. It is the most powerful weapon for repressing strikes, those periodical revolts of the working-class against the autocracy of capital. [127] According to Gaskell, the steam-engine was from the very first an antagonist of human power, an antagonist that enabled the capitalist to tread under foot the growing claims of the workmen, who threatened the newly born factory system with a crisis. [128] it would be possible to write quite a history of the inventions, made since 1830, for the sole purpose of supplying capital with weapons against the revolts of the working-class. At the head of these in importance, stands the self-acting mule, because it opened up a new epoch in the automatic system. [129]

Nasmyth, the inventor of the steam-hammer, gives the following evidence before the Trades’ Union Commission, with regard to the improvements made by him in machinery and introduced in consequence of the wide-spread and long strikes of the engineers in 1851. “The characteristic feature of our modern mechanical improvements, is the introduction of self-acting tool machinery. What every mechanical workman has now to do, and what every boy can do, is not to work himself but to superintend the beautiful labour of the machine. The whole class of workmen that depend exclusively on their skill, is now done away with. Formerly, I employed four boys to every mechanic. Thanks to these new mechanical combinations, I have reduced the number of grown-up men from 1,500 to 750. The result was a considerable increase in my profits.”

Ure says of a machine used in calico printing: “At length capitalists sought deliverance from this intolerable bondage” [namely the, in their eyes, burdensome terms of their contracts with the workmen] “in the resources of science, and were speedily re-instated in their legitimate rule, that of the head over the inferior members.” Speaking of an invention for dressing warps: “Then the combined malcontents, who fancied themselves impregably entrenched behind the old lines of division of labour, found their flanks turned and their defences rendered useless by the new mechanical tactics, and were obliged to surrender at discretion.” With regard to the invention of the self-acting mule, he says: “A creation destined to restore order among the industrious classes.... This invention confirms the great doctrine already propounded, that when capital enlists science into her service, the refractory hand of labour will always be taught docility.” [130] Although Ure’s work appeared 30 years ago, at a time when the factory system was comparatively but little developed, it still perfectly expresses the spirit of the factory, not only by

its undisguised cynicism, but also by the *nalveté* with which it blurts out the stupid contradictions of the capitalist brain. For instance, after propounding the “doctrine” stated above, that capital, with the aid of science taken into its pay, always reduces the refractory hand of labour to docility, he grows indignant because “it (physico-mechanical science) has been accused of lending itself to the rich capitalist as an instrument for harassing the poor.” After preaching a long sermon to show how advantageous the rapid development of machinery is to the working-classes, he warns them, that by their obstinacy and their strikes they hasten that development. “Violent revulsions of this nature,” he says, “display short-sighted man in the contemptible character of a self-tormentor.” A few pages before he states the contrary. “Had it not been for the violent collisions and interruptions resulting from erroneous views among the factory operatives, the factory system would have been developed still more rapidly and beneficially for all concerned.” Then he exclaims again: “Fortunately for the state of society in the cotton districts of Great Britain, the improvements in machinery are gradual ‘ “It” (improvement in machinery) “is said to lower the rate of earnings of adults by displacing a portion of them, and thus rendering their number superabundant as compared with the demand for their labour. It certainly augments the demand for the labour of children and increases the rate of *their* wages.’ On the other hand, this same dispenser of consolation defends the lowness of the children’s wages on the ground that it prevents parents from sending their children at too early an age into the factory. The whole of his book is a vindication of a working-day of unrestricted length; that Parliament should forbid children of 13 years to be exhausted by working 12 hours a day, reminds his liberal soul of the darkest days of the middle ages. This does not prevent him from calling upon the factory operatives to thank Providence, who by means of machinery has given them the leisure to think of their “immortal interests.” [131]

Footnotes:

[112] See amongst others, John Houghton: *Husbandry and Trade Improved*. London, 1727. *The Advantages of the East India Trade*, 1720. John Bellers, l.c. “The masters and their workmen are, unhappily, in a perpetual war with each other. The invariable object of the former is to get their work done as cheaply as possible; and they do not fail to employ every artifice to this purpose, whilst the latter are equally attentive to every occasion of distressing their masters into a compliance with higher demands.” (“An Enquiry into the Causes of the Present High Price of Provisions,” pp. 61-62. Author, the Rev. Nathaniel Forster, quite on the side of the workmen.)

[113] In old-fashioned manufactures the revolts of the workpeople against machinery, even to this day, occasionally assume a savage character, as in the case of the Sheffield file cutters in 1865.

[114] Sir James Steuart also understands machinery quite in this sense. “Je considère donc les machines comme des moyens d’augmenter (virtuellement) le nombre des gens industriels qu’on n’est pas obligé de nourrir.... En quoi l’effet d’une machine diffère-t-il de celui de nouveaux habitants?” (French trans. t. I., l. I., ch. XIX.) More naïve is Petty, who says, it replaces “Polygamy.” The above point of view is, at the most, admissible only for some parts of the United States. On the other hand, “machinery can seldom be used with success to abridge the labour of an individual; more time would be lost in its construction than could be saved by its application. It is only really useful when it acts on great masses, when a single machine can assist the work of thousands. It is accordingly in the most populous countries, where there are most idle men, that it is most abundant.... It is trot called into use by a scarcity of men, but by the facility with which they can be brought to work in masses.” (Piercy Ravenstone: *Thoughts on the Funding System and its Effects*. London, 1824, p. 45.)

[115] [Note in the 4th German edition. — This applies to Germany too. Where in our country agriculture on a large scale exists, hence particularly in the East, it has become possible only in consequence of the clearing of the estates (“Bauernlegen”), a practice which became widespread in the 16th century and was particularly so since 1648. — F. E.]

[116] “Machinery and labour are in constant competition.” Ricardo, l.c., p. 479.

[117] The competition between hand-weaving and power-weaving in England, before the passing of the Poor Law of 1833, was prolonged by supplementing the wages, which had fallen considerably below the

minimum, with parish relief. "The Rev. Mr. Turner was, in 1827, rector of Wilmslow in Cheshire, a manufacturing district. The questions of the Committee of Emigration, and Mr. Turner's answers, show how the competition of human labour is maintained against machinery. 'Question: Has not the use of the power-loom superseded the use of the hand-loom? Answer: Undoubtedly; it would have superseded them much more than it has done, if the hand-loom weavers were not enabled to submit to a reduction of wages.' 'Question: But in submitting he has accepted wages which are insufficient to support him, and looks to parochial contribution as the remainder of his support? Answer: Yes, and in fact the competition between the hand-loom and the power-loom is maintained out of the poor-rates.' Thus degrading pauperism or expatriation, is the benefit which the industrious receive from the introduction of machinery, to be reduced from the respectable and in some degree independent mechanic, to the cringing wretch who lives on the debasing bread of charity. This they call a temporary inconvenience." (*A Prize Essay on the Comparative Merits of Competition and Co-operation*. Lond., 1834, p. 29.)

[118] "The same cause which may increase the revenue of the country" (i.e., as Ricardo explains in the same passage, the revenues of landlords and capitalists, whose wealth, from the economic point of view, forms the Wealth of the Nation), "may at the same time render the population redundant and deteriorate the condition of the labourer." (Ricardo, *l.c.*, p. 469.) "The constant aim and the tendency of every improvement in machinery is, in fact, to do away entirely with the labour of man, or to lessen its price by substituting the labour of women and children for that of grown-up men, or of unskilled for that of skilled workmen." (Ure, *l.c.*, t. I, p. 35.)

[119] *Rep. Insp. Fact. for 31st October, 1858*, p. 43.

[120] *Rep. Insp. Fact. for 31st October, 1856*, p. 15.

[121] Ure, *l.c.*, p. 19. "The great advantage of the machinery employed in brick-making consists in this, that the employer is made entirely independent of skilled labourers." (*Ch. Empl. Comm. V. Report*, Lond., 1866, p. 130, n. 46.) Mr. A. Sturrock, superintendent of the machine department of the Great Northern Railway, says, with regard to the building of locomotives, &c.: "Expensive English workmen are being less used every day. The production of the workshops of England is being increased by the use of improved tools and these tools are again served by a low class of labour.... Formerly their skilled labour necessarily produced all the parts of engines. Now the parts of engines are produced by labour with less skill, but with good tools. By tools, I mean engineer's machinery, lathes, planing machines, drills, and so on." (*Royal Com. on Railways*, Lond., 1867, Minutes of Evidence, n. 17, 862 and 17, 863.)

[122] Ure, *l.c.*, p. 20.

[123] Ure, *l.c.*, p. 321.

[124] Ure, *l.c.*, p. 23.

[125] *Rep. Insp. Fact., 31st Oct., 1863*, pp. 108, 109.

[126] *l.c.*, p. 109. The rapid improvement of machinery, during the crisis, allowed the English manufacturers, immediately after the termination of the American Civil War, and almost in no time, to glut the markets of the world again. Cloth, during the last six months of 1866, was almost unsaleable. Thereupon began the consignment of goods to India and China, thus naturally making the glut more intense. At the beginning of 1867 the manufacturers resorted to their usual way out of the difficulty, viz., reducing wages 5 per cent. The workpeople resisted, and said that the only remedy was to work short time, 4 days a-week; and their theory was the correct one. After holding out for some time, the self-elected captains of industry had to make up their minds to short time, with reduced wages in some places, and in others without.

[127] "The relation of master and man in the blown-flint bottle trades amounts to a chronic strike." Hence the impetus given to the manufacture of pressed glass, in which the chief operations are done by machinery. One firm in Newcastle, who formerly produced 350,000 lbs. of blown-flint glass, now produces in its place 3,000,500 lbs. of pressed glass. ("Ch. Empl. Comm., Fourth Rep.," 1865, pp. 262-263.)

[128] Gaskell. *The Manufacturing Population of England*, London, 1833, pp. 3, 4.

[129] W. Fairbairn discovered several very important applications of machinery to the construction of machines, in consequence of strikes in his own workshops.

[130] Ure, *l.c.*, pp. 368-370

[131] Ure, *l.c.*, pp. 368, 7, 370, 280, 281, 321, 370, 475.