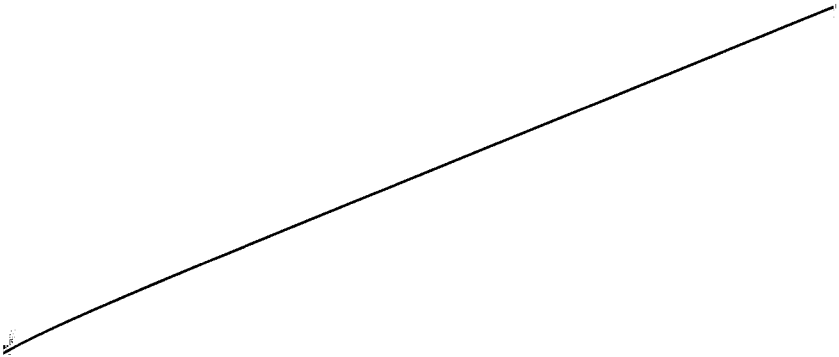
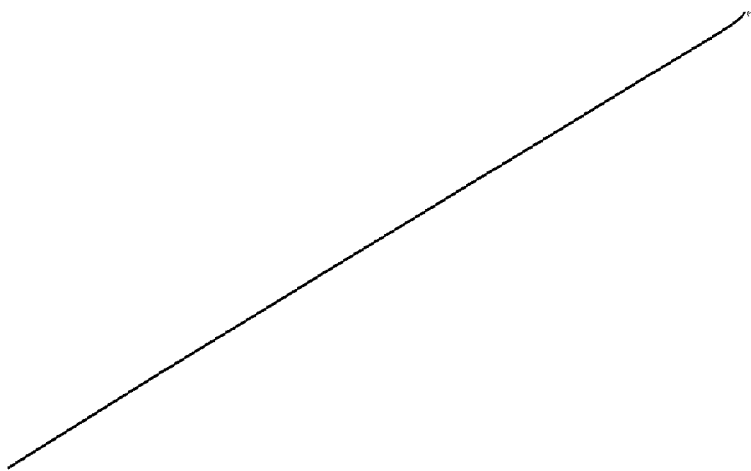


# Fragment on Machines

Karl Marx

1858





Once adopted into the production process of capital, the means of labour passes through different metamorphoses, whose culmination is the machine, or rather, an automatic system of machinery (system of machinery: the automatic one is merely its most complete, most adequate form, and alone transforms machinery into a system), set in motion by an automaton, a moving power that moves itself; this automaton consisting of numerous mechanical and intellectual organs, so that the workers themselves are cast merely as its conscious linkages.

In the machine, and even more in machinery as an automatic system, the use value, i.e. the material quality of the means of labour, is transformed into an existence adequate to fixed capital and to capital as such; and the form in which it was adopted into the production process of capital, the direct means of labour, is superseded by a form posited by capital itself and corresponding to it. In no way does the machine appear as the individual worker's means of labour. Its distinguishing characteristic is not in the least, as with the means of labour, to transmit the worker's activity to the object; this activity, rather, is posited in such a way that it merely transmits the machine's work, the machine's action, on to the raw material—supervises it and guards against interruptions. Not as with the instrument, which the worker animates and makes into his organ with his skill and strength, and whose handling therefore depends on his virtuosity. Rather, it is the machine which possesses skill and strength in place of the worker, is itself the virtuoso, with a soul of its own in the mechanical laws acting through it; and it consumes coal, oil etc., just as the worker consumes food, to keep up its perpetual motion. The worker's activity, reduced to a mere abstraction of activity, is determined and regulated on all sides by the movement of the machinery, and not the opposite. The science which compels the inanimate limbs of the machinery, by their construction, to act purposefully, as an automaton, does not

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exist in the worker's consciousness, but rather acts upon him through the machine as an alien power, as the power of the machine itself.

The appropriation of living labour by objectified labour—of the power or activity which creates value by value existing for-itself—which lies in the concept of capital, is posited, in production resting on machinery, as the character of the production process itself, including its material elements and its material motion. The production process has ceased to be a labour process in the sense of a process dominated by labour as its governing unity. Labour appears, rather, merely as a conscious organ, scattered among the individual living workers at numerous points of the mechanical system; subsumed under the total process of the machinery itself, as itself only a link of the system, whose unity exists not in the living workers, but rather in the living (active) machinery, which confronts his individual, insignificant doings as a mighty organism. In machinery, objectified labour confronts living labour within the labour process itself as the power which rules it; a power which, as the appropriation of living labour, is the form of capital. The transformation of the means of labour into machinery, and of living labour into a mere living accessory of this machinery, as the means of its action, also posits the absorption of the labour process in its material character as a mere moment of the realization process of capital. The increase of the productive force of labour and the greatest possible negation of necessary labour is the necessary tendency of capital, as we have seen. The transformation of the means of labour into machinery is the realization of this tendency. In machinery, objectified labour materially confronts living labour as a ruling power and as an active subsumption of the latter under itself, not only by appropriating it, but in the real production process itself; the relation of capital as value which appropriates value-creating activity is, in fixed capital existing as machinery, posited at the same time as the relation of the use value of capital to the use value of

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labour capacity; further, the value objectified in machinery appears as a presupposition against which the value-creating power of the individual labour capacity is an infinitesimal, vanishing magnitude; the production in enormous mass quantities which is posited with machinery destroys every connection of the product with the direct need of the producer, and hence with direct use value; it is already posited in the form of the product's production and in the relations in which it is produced that it is produced only as a conveyor of value, and its use value only as condition to that end. In machinery, objectified labour itself appears not only in the form of product or of the product employed as means of labour, but in the form of the force of production itself.

The development of the means of labour into machinery is not an accidental moment of capital, but is rather the historical reshaping of the traditional, inherited means of labour into a form adequate to capital. The accumulation of knowledge and skills, of the general productive forces of the social brain, is thus absorbed into capital, as opposed to labour, and hence appears as an attribute of capital, and more specifically of fixed capital, in so far as it enters into the production process as a means of production proper. Machinery appears, then, as the most adequate form of fixed capital, and fixed capital, in so far as capital's relations with itself are concerned, appears as the most adequate form of capital as such. In another respect, however, in so far as fixed capital is condemned to an existence within the confines of a specific use value, it does not correspond to the concept of capital, which, as value, is indifferent to every specific form of use value, and can adopt or shed any of them as equivalent incarnations. In this respect, as regards capital's external relations, it is circulating capital which appears as the adequate form of capital, and not fixed capital.

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Further, in so far as machinery develops with the accumulation of society's science, of productive force generally, general social labour presents itself not in labour but in capital. The productive force of society is measured in fixed capital, exists there in its objective form; and, inversely, the productive force of capital grows with this general progress, which capital appropriates free of charge. This is not the place to go into the development of machinery in detail; rather only in its general aspect; in so far as the means of labour, as a physical thing, loses its direct form, becomes fixed capital, and confronts the worker physically as capital. In machinery, knowledge appears as alien, external to him; and living labour [as] subsumed under self-activating objectified labour. The worker appears as superfluous to the extent that his action is not determined by [capital's] requirements.

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The full development of capital, therefore, takes place—or capital has posited the mode of production corresponding to it—only when the means of labour has not only taken the economic form of fixed capital, but has also been suspended in its immediate form, and when fixed capital appears as machine within the production process, opposite labour; and the entire production process appears as not subsumed under the direct skilfulness of the worker, but rather as the technological application of science. [It is,] hence, the tendency of capital to give production a scientific character; direct labour [is] reduced to a mere moment of this process. As with the transformation of value into capital, so does it appear in the further development of capital, that it presupposes a certain given historical development of the productive forces on one side—science too [is] among these productive forces—and, on the other, drives and forces them further onwards.

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Thus the quantitative extent and the effectiveness (intensity) to which capital is developed as fixed capital indicate the general degree to which capital is developed as capital, as power over living labour, and to which it has conquered the production process as such. Also, in the sense that it expresses the accumulation of objectified productive forces, and likewise of objectified labour. However, while capital gives itself its adequate form as use value within the production process only in the form of machinery and other material manifestations of fixed capital, such as railways etc., this in no way means that this use value—machinery as such—is capital, or that its existence as machinery is identical with its existence as capital; any more than gold would cease to have use value as gold if it were no longer money. Machinery does not lose its use value as soon as it ceases to be capital. While machinery is the most appropriate form of the use value of fixed capital, it does not at all follow that therefore subsumption under the social relation of capital is the most appropriate and ultimate social relation of production for the application of machinery.

To the degree that labour time—the mere quantity of labour—is posited by capital as the sole determinant element, to that degree does direct labour and its quantity disappear as the determinant principle of production—of the creation of use values—and is reduced both quantitatively, to a smaller proportion, and qualitatively, as an, of course, indispensable but subordinate moment, compared to general scientific labour, technological application of natural sciences, on one side, and to the general productive force arising from social combination in total production on the other side—a combination which appears as a natural fruit of social labour (although it is a historical product). Capital thus works towards its own dissolution as the form dominating production.

While, then, in one respect the transformation of the production process from the simple labour process into a scientific process, which

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subjugates the forces of nature and compels them to work in the service of human needs, appears as a quality of fixed capital in contrast to living labour; while individual labour as such has ceased altogether to appear as productive, is productive, rather, only in these common labours which subordinate the forces of nature to themselves, and while this elevation of direct labour into social labour appears as a reduction of individual labour to the level of helplessness in face of the communality represented by and concentrated in capital; so does it now appear, in another respect, as a quality of circulating capital, to maintain labour in one branch of production by means of coexisting labour in another. In small-scale circulation, capital advances the worker the wages which the latter exchanges for products necessary for his consumption. The money he obtains has this power only because others are working alongside him at the same time; and capital can give him claims on alien labour, in the form of money, only because it has appropriated his own labour. This exchange of one's own labour with alien labour appears here not as mediated and determined by the simultaneous existence of the labour of others, but rather by the advance which capital makes. The worker's ability to engage in the exchange of substances necessary for his consumption during production appears as due to an attribute of the part of circulating capital which is paid to the worker, and of circulating capital generally. It appears not as an exchange of substances between the simultaneous labour powers, but as the metabolism [*Stoffwechsel*] of capital; as the existence of circulating capital. Thus all powers of labour are transposed into powers of capital; the productive power of labour into fixed capital (posited as external to labour and as existing independently of it (as object [*sachlich*])); and, in circulating capital, the fact that the worker himself has created the conditions for the repetition of his labour, and that the exchange of this, his labour, is mediated by the coexisting labour of others, appears in such a way

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that capital gives him an advance and posits the simultaneity of the branches of labour. (These last two aspects actually belong to accumulation.) Capital in the form of circulating capital posits itself as mediator between the different workers.

Fixed capital, in its character as means of production, whose most adequate form [is] machinery, produces value, i.e. increases the value of the product, in only two respects: (1) in so far as it has value; i.e. is itself the product of labour, a certain quantity of labour in objectified form; (2) in so far as it increases the relation of surplus labour to necessary labour, by enabling labour, through an increase of its productive power, to create a greater mass of the products required for the maintenance of living labour capacity in a shorter time. It is therefore a highly absurd bourgeois assertion that the worker shares with the capitalist, because the latter, with fixed capital (which is, as far as that goes, itself a product of labour, and of alien labour merely appropriated by capital) makes labour easier for him (rather, he robs it of all independence and attractive character, by means of the machine), or makes his labour shorter. Capital employs machinery, rather, only to the extent that it enables the worker to work a larger part of his time for capital, to relate to a larger part of his time as time which does not belong to him, to work longer for another. Through this process, the amount of labour necessary for the production of a given object is indeed reduced to a minimum, but only in order to realize a maximum of labour in the maximum number of such objects. The first aspect is important, because capital here—quite unintentionally—reduces human labour, expenditure of energy, to a minimum. This will redound to the benefit of emancipated labour, and is the condition of its emancipation. From what has been said, it is clear how absurd Lauderdale is when he wants to make fixed capital into an independent source of value, independent of labour time. It is such a source only in so far as it is itself objectified labour time, and in so far

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as it posits surplus labour time. The employment of machinery itself historically presupposes [...] superfluous hands. Machinery inserts itself to replace labour only where there is an overflow of labour powers. Only in the imagination of economists does it leap to the aid of the individual worker. It can be effective only with masses of workers, whose concentration relative to capital is one of its historic presuppositions, as we have seen. It enters not in order to replace labour power where this is lacking, but rather in order to reduce massively available labour power to its necessary measure. Machinery enters only where labour capacity is on hand in masses.

[...] From the moment [...] when fixed capital has developed to a certain extent—and this extent, as we indicated, is the measure of the development of large industry generally—hence fixed capital increases in proportion to the development of large industry's productive forces—it is itself the objectification of these productive forces, as presupposed product—from this instant on, every interruption of the production process acts as a direct reduction of capital itself, of its initial value. The value of fixed capital is reproduced only in so far as it is used up in the production process. Through disuse it loses its use value without its value passing on to the product. Hence, the greater the scale on which fixed capital develops, in the sense in which we regard it here, the more does the continuity of the production process or the constant flow of reproduction become an externally compelling condition for the mode of production founded on capital.

In machinery, the appropriation of living labour by capital achieves a direct reality in this respect as well: It is, firstly, the analysis and application of mechanical and chemical laws, arising directly out of science, which enables the machine to perform the same labour as that previously performed by the worker. However, the development of machinery along this path occurs only when large industry has already reached a higher stage, and all the sciences have been pressed into

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the service of capital; and when, secondly, the available machinery itself already provides great capabilities. Invention then becomes a business, and the application of science to direct production itself becomes a prospect which determines and solicits it. But this is not the road along which machinery, by and large, arose, and even less the road on which it progresses in detail. This road is, rather, dissection [*Analyse*]—through the division of labour, which gradually transforms the workers' operations into more and more mechanical ones, so that at a certain point a mechanism can step into their places. [...] Thus, the specific mode of working here appears directly as becoming transferred from the worker to capital in the form of the machine, and his own labour capacity devalued thereby. Hence the workers' struggle against machinery. What was the living worker's activity becomes the activity of the machine. Thus the appropriation of labour by capital confronts the worker in a coarsely sensuous form; capital absorbs labour into itself—'as though its body were by love possessed'.<sup>1</sup>

[...] The exchange of living labour for objectified labour—i.e. the positing of social labour in the form of the contradiction of capital and wage labour—is the ultimate development of the value-relation and of production resting on value. Its presupposition is—and remains—the mass of direct labour time, the quantity of labour employed, as the determinant factor in the production of wealth. But to the degree that large industry develops, the creation of real wealth comes to depend less on labour time and on the amount of labour employed than on the power of the agencies set in motion during labour time, whose 'powerful effectiveness' is itself in turn out of all proportion to the direct labour time spent on their production, but depends rather on the general state of science and on the progress of technology, or the application of this science to production. (The development of

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1. 'Als hätt es Lieb im Leibe', Goethe, *Faust*, Pt I, Act 5, Auerbach's Cellar in Leipzig.

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this science, especially natural science, and all others with the latter, is itself in turn related to the development of material production.) Agriculture, e.g., becomes merely the application of the science of material metabolism, its regulation for the greatest advantage of the entire body of society. Real wealth manifests itself, rather—and large industry reveals this—in the monstrous disproportion between the labour time applied, and its product, as well as in the qualitative imbalance between labour, reduced to a pure abstraction, and the power of the production process it superintends. Labour no longer appears so much to be included within the production process; rather, the human being comes to relate more as watchman and regulator to the production process itself. (What holds for machinery holds likewise for the combination of human activities and the development of human intercourse.) No longer does the worker insert a modified natural thing [*Naturgegenstand*] as middle link between the object [*Objekt*] and himself; rather, he inserts the process of nature, transformed into an industrial process, as a means between himself and inorganic nature, mastering it. He steps to the side of the production process instead of being its chief actor. In this transformation, it is neither the direct human labour he himself performs, nor the time during which he works, but rather the appropriation of his own general productive power, his understanding of nature and his mastery over it by virtue of his presence as a social body—it is, in a word, the development of the social individual which appears as the great foundation-stone of production and of wealth.

The theft of alien labour time, on which the present wealth is based, appears a miserable foundation in face of this new one, created by large-scale industry itself. As soon as labour in the direct form has ceased to be the great well-spring of wealth, labour time ceases and must cease to be its measure, and hence exchange value [must cease to be the measure] of use value. The surplus labour of the mass has

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ceased to be the condition for the development of general wealth, just as the non-labour of the few, for the development of the general powers of the human head. With that, production based on exchange value breaks down, and the direct, material production process is stripped of the form of penury and antithesis. The free development of individualities, and hence not the reduction of necessary labour time so as to posit surplus labour, but rather the general reduction of the necessary labour of society to a minimum, which then corresponds to the artistic, scientific etc. development of the individuals in the time set free, and with the means created, for all of them. Capital itself is the moving contradiction, [in] that it presses to reduce labour time to a minimum, while it posits labour time, on the other side, as sole measure and source of wealth. Hence it diminishes labour time in the necessary form so as to increase it in the superfluous form; hence posits the superfluous in growing measure as a condition—question of life or death—for the necessary. On the one side, then, it calls to life all the powers of science and of nature, as of social combination and of social intercourse, in order to make the creation of wealth independent (relatively) of the labour time employed on it. On the other side, it wants to use labour time as the measuring rod for the giant social forces thereby created, and to confine them within the limits required to maintain the already created value as value. Forces of production and social relations—two different sides of the development of the social individual—appear to capital as mere means, and are merely means for it to produce on its limited foundation. In fact, however, they are the material conditions to blow this foundation sky-high. 'Truly wealthy a nation, when the working day is six rather than twelve hours. Wealth is not command over surplus labour time' (real wealth), 'but rather, disposable time outside that needed in direct production, for every individual and the whole society.'<sup>2</sup>

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2. C. W. Dilke, *The Source and Remedy of the National Difficulties* (1821), 6.

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Nature builds no machines, no locomotives, railways, electric telegraphs, self-acting mules etc. These are products of human industry; natural material transformed into organs of the human will over nature, or of human participation in nature. They are organs of the human brain, created by the human hand; the power of knowledge, objectified. The development of fixed capital indicates to what degree general social knowledge has become a direct force of production, and to what degree, hence, the conditions of the process of social life itself have come under the control of the general intellect and been transformed in accordance with it. To what degree the powers of social production have been produced, not only in the form of knowledge, but also as immediate organs of social practice, of the real life process.

[...] The creation of a large quantity of disposable time apart from necessary labour time for society generally and each of its members (i.e. room for the development of the individuals' full productive forces, hence those of society also), this creation of not-labour time appears in the stage of capital, as of all earlier ones, as not-labour time, free time, for a few. What capital adds is that it increases the surplus labour time of the mass by all the means of art and science, because its wealth consists directly in the appropriation of surplus labour time; since value is directly its purpose, not use value. It is thus, despite itself, instrumental in creating the means of social disposable time, in order to reduce labour time for the whole society to a diminishing minimum, and thus to free everyone's time for their own development. But its tendency always, on the one side, to create disposable time, on the other, to convert it into surplus labour. If it succeeds too well at the first, then it suffers from surplus production, and then necessary labour is interrupted, because no surplus labour can be realized by capital. The more this contradiction develops, the more does it become evident that the growth of the forces of production can no longer be

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bound up with the appropriation of alien labour, but that the mass of workers must themselves appropriate their own surplus labour. Once they have done so—and disposable time thereby ceases to have an antithetical existence—then, on one side, necessary labour time will be measured by the needs of the social individual, and, on the other, the development of the power of social production will grow so rapidly that, even though production is now calculated for the wealth of all, disposable time will grow for all. For real wealth is the developed productive power of all individuals. The measure of wealth is then not any longer, in any way, labour time, but rather disposable time. Labour time as the measure of value posits wealth itself as founded on poverty, and disposable time as existing in and because of the antithesis to surplus labour time; or, the positing of an individual's entire time as labour time, and his degradation therefore to mere worker, subsumption under labour. The most developed machinery thus forces the worker to work longer than the savage does, or than he himself did with the simplest, crudest tools.

If the entire labour of a country were sufficient only to raise the support of the whole population, there would be no surplus labour, consequently nothing that could be allowed to accumulate as capital. If in one year the people raises enough for the support of two years, one year's consumption must perish, or for one year men must cease from productive labour. But the possessors of [the] surplus produce or capital [...] employ people upon something not directly and immediately productive, e.g. in the erection of machinery. So it goes on.<sup>3</sup>

[...] Real economy—saving—consists of the saving of labour time (minimum [and minimization] of production costs); but this saving is identical with development of the productive force. Hence in no

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3. Dilke, *The Source and Remedy of the National Difficulties*, 4.

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way abstinence from consumption, but rather the development of power, of capabilities of production, and hence both of the capabilities as well as the means of consumption. The capability to consume is a condition of consumption, hence its primary means, and this capability is the development of an individual potential, a force of production. The saving of labour time [is] equal to an increase of free time, i.e. time for the full development of the individual, which in turn reacts back upon the productive power of labour as itself the greatest productive power. From the standpoint of the direct production process it can be regarded as the production of fixed capital, this fixed capital being man himself. It goes without saying, by the way, that direct labour time itself cannot remain in the abstract antithesis to free time in which it appears from the perspective of bourgeois economy. Labour cannot become play, as Fourier would like,<sup>4</sup> although it remains his great contribution to have expressed the suspension not of distribution, but of the mode of production itself, in a higher form, as the ultimate object. Free time—which is both idle time and time for higher activity—has naturally transformed its possessor into a different subject, and he then enters into the direct production process as this different subject. This process is then both discipline, as regards the human being in the process of becoming; and, at the same time, practice [*Ausübung*], experimental science, materially creative and objectifying science, as regards the human being who has become, in whose head exists the accumulated knowledge of society.

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4. Fourier, *Le Nouveau Monde industriel et sociétaire* (1829), Vol. VI, 242–52.