[5) THEORIES OF SURPLUS VALUE]  

I) PROLETARIAN OPPOSITION 
ON THE BASIS OF RICARDO

4) THOMAS HODGSKIN, POPULAR POLITICAL ECONOMY. 
FOUR LECTURES DELIVERED 
AT THE LONDON MECHANICS' INSTITUTION, LONDON, 1827

"Eas y labour is only transmitted skill" [(p.] 48).  
"As all the advantages derived from the division of labour naturally centre in and belong to the labourers, if they are deprived of them, and in the progress of society those only are enriched by their improved skill who never labour—this must arise from unjust appropriation; from usurpation and plunder in the party enriched, and from consenting submission in the party impoverished" [(pp.] 108-09).  
[XVIII-1085] "The labourers, to be sure, multiply too rapidly when that multiplication is only compared with the want of the capitalist for their services" (l.c. [p.] 120). "Malthus points out the effects which an increase in the number of labourers has in lessening the share which each one receives of the annual produce—the portion of that distributed amongst them being a definite and determinate quantity not regulated in any degree by what they annually create" (l.c.).  
"Labour, the exclusive standard of value, but labour, the creator of all wealth [is] no commodity" (l.c., [p.] 186).

Regarding the influence of money on the expansion of wealth, Hodgskin remarks correctly:

"As a man can dispose of small portions of produce that is corruptible, for what is incorruptible, he is under no temptation to throw it away; and thus the use of money adds to wealth, by preventing waste" [(p.] 197).

The chief advantage of retail trade derives from the fact that the quantity in which commodities are best produced is not that in which they are best distributed (l.c. [p. 146]).

"Both the theory relative to capital, and the practice of stopping labour at that point where it can produce, in addition to the subsistence of the labourer, a profit for the capitalist, seem opposed to the natural laws which regulate production" [(p.] 238).

With regard to the accumulation of capital, Hodgskin advances roughly the same ideas as those contained in his first book. Nevertheless—for the sake of completeness—we will reproduce the main passages.
"If one considers for example fixed capital, the most favourable position for the idea of capital aiding production, 3 classes of circumstances are to be distinguished under which [the results of] accumulation of capital are very different. 1) When made and used by the same persons. It is obvious that every accumulation in his possession of the instruments he makes and uses, facilitates his labour. \textit{The limit to such an accumulation is the power of the labourer to make and use the instruments in question.} 2) When made and used by different persons, who share between them in just proportion the produce of their combined labour. Capital may be made by one labourer and used by another; *they divide the commodity in proportion as each has contributed by his labour to produce it... I should rather express this fact, however, by saying that a part of the society employed in making instruments, while another part uses them, is a branch of division of labour which aids productive power and adds to the general wealth. As long as the produce of the two classes of labourers is divided between them, the accumulation and increase of such instruments as they can make and use, is as beneficial as if they were made and used by one person"* ([\textit{Labour Defended}... \textit{London}, 1825, pp.] 243-44). "3) When *owned by a class of persons who neither make nor use it" [p. 243]. "The capitalist being the mere owner of the instruments, is not, as such, a labourer. He in no manner assists production"* [pp. 244-45].

//In other words, production *is assisted by the instrument, but not by the title A holds to the instrument; not by the circumstance that the instrument is owned by a non-labourer.*//

*"He acquires possession of the produce of one labourer, which he makes over to another, either for a time* as is the case with *most kinds of fixed capital, or for ever, as is the case with wages, whenever he thinks it can be used or consumed for his advantage. He never does allow the produce of one labourer, when it comes into his possession, to be either used or consumed by another, unless it is for his benefit. He employs or lends his property to share the produce, or natural revenue, of labourers; and every accumulation of such property in his hands is a mere extension of his power over the produce of labour, and retards the progress of national wealth. This [is] at present the case... When the capitalist, being the owner of all the produce, will allow labourers neither to make nor use instruments, unless he obtains a profit over and above the subsistence of the labourer, it is plain that bounds are set to productive labour much within what nature prescribes. \textit{In proportion as capital in the hands of a third party is accumulated, so the whole amount of profits required by the capitalist increases, and so there arises an artificial check to production and population... In the present state of society, the labourers being in no case the owners of capital, every accumulation of it adds to the amounts of profit demanded from them, and extinguishes all that labour which would only procure the labourer his comfortable subsistence. ... when it is admitted that labour produces all things, even capital, it is nonsense to attribute productive power to the instruments labour makes and uses. \textit{...wages facilitate not production, like instruments. Labour, not capital, pays all wages}..." [XVIII-1086] The greater part of the \textit{advances of capitalists} consists of *promises to pay... The master manufacturer has either money or paper with which he pays wages; those wages his labourers exchange for the produce of other labourers, who will not keep the wages, whether money or paper, and it is returned to the manufacturer, who gives in exchange for it the cloth which his own labourers have made. With it he again pays wages, and the money or paper again goes the same round...*

"The invention and employment of paper money has revealed that capital is
by no means *something saved*. As long as the capitalist, to realise his wealth, or command over other people's labour, was obliged to have in his possession an actual accumulation of the precious metals or commodities, we might have supposed that accumulation of capital was the result of an actual saving, and that on it depended the progress of society. But when paper money and parchment securities were invented, when the possessor of nothing but *such a piece of parchment received an annual revenue in pieces of paper with which he obtained whatever was necessary for his own use and consumption,* and not giving away all the pieces of paper, was richer at the end of the year than at the beginning, or was entitled next year to receive a still greater number of pieces of paper, obtaining a still greater command over the produce of labour,* it became evident that capital was not any thing saved; and that the *individual capitalist did not grow rich by an actual and material saving, but by doing something which enabled him ... to obtain more of the produce of other people's labour...* "It ascribes to his" (the capitalist's) *"property merely, whether he employ it to pay wages, or whether it consist in useful instruments, all that vast assistance which knowledge and skill, when realised in machinery, give to labour... The united labours of the miner, the smelter, the smith, the engineer, the stoker, and of numberless other persons, and not the lifeless machines, perform whatever is done by steam engines... By the common mode of speaking, the productive power of this skill is attributed to its visible products, the instruments, the mere owners of which, who neither make nor use them, imagine themselves to be very productive persons" (p. 245 sqq.).*

With regard to his polemic against "*the danger of forcing capital out of the country*" [p. 253], and against the *interest of capital as [a] necessary stimulus for industry*, or concerning *the savings theory*, see IX, 47. 159 To be included in the chapter on the vulgar economists. 3

"As the population increases *both increased production and consumption take place, which is all that is ever meant by the terms accumulation or increase of national wealth*" (l.c., [p.] 257).

m) RAMSAY (GEORGE) (OF TRINITY COLLEGE), AN ESSAY ON THE DISTRIBUTION OF WEALTH, EDINBURGH, 1836

With Ramsay we return again to the political economists.

In order to find a place for commercial capital, he calls it "the transport of commodities from one place to another" ([p.] 19). He thus confuses trade with the *carrying industry*.

Ramsay's chief contribution:

*First:* That he does in fact make the distinction between *constant and variable capital*. True, this occurs in such a manner that the distinction between fixed and circulating capital which he takes from the circulation process is the only one which he nominally retains, but he defines fixed capital in such a way that it includes all the elements of constant capital. He therefore regards as *fixed* capital, not only machinery and instruments, buildings in which labour is carried on or in which the result of labour is stored,
draught and breeding animals, but also all raw materials (semi-manufactures, etc.), "THE SEED OF THE AGRICULTURIST AND THE RAW MATERIAL OF THE MANUFACTURER" ([p.]p. 22-23). Moreover "MANURE OF ALL KINDS, FENCES FOR AGRICULTURE AND THE FUEL CONSUMED IN MANUFACTURES" (l.c. [p. 23]) are fixed capital.

* "Circulating capital* consists only *of subsistence* and *other necessaries advanced to the workmen, previous to the completion of the produce of their labour*" (l.c.).

It can be seen therefore that by "CIRCULATING CAPITAL" he understands nothing but [XVIII-1087] the part of capital that can be resolved into wages, and by fixed capital, the part that can be resolved into the objective conditions—means and materials of labour. The mistake here, however, is the identification of this division of capital, which is directly derived from the production process, with the distinction which arises from the circulation process. This is due to his adherence to the tradition of political economy.

On the other hand, Ramsay again confuses the purely material element of the fixed capital thus defined with its existence as "capital". Circulating capital (i.e. variable capital) does not enter into the real labour process, but what does enter, is living labour, which is bought with circulating capital, and which replaces it. What enters in addition into the labour process is constant capital, that is, labour objectified in the objective conditions of labour, in the materials and means of labour. Ramsay therefore writes:

* "Fixed capital alone, not circulating, is properly speaking a source of national wealth" ([p.] 23). "Labour and fixed capital are the only elements of expense of production"* ([p.] 28).

What is really expended in the production of a commodity are raw materials, machinery, etc., and the living labour which sets them in motion.

"CIRCULATING" CAPITAL is superfluous, EXTRANEOUS TO THE PROCESS OF PRODUCTION.160

* "Were we to suppose the labourers not to be paid until the completion of the product, there would be no occasion whatever for circulating capital.* Production would be just as great. This proves that *circulating capital is not an immediate agent of production, not even essential to it at all, but merely a convenience rendered necessary by the deplorable poverty of the mass of the people*" ([p.] 24). "The *fixed capital alone constitutes an element of cost of production in a national point of view"* ([p.] 26).

In other words: the labour objectified in the conditions of labour—materials and means of labour—which we call "fixed capital", and the living labour, in short, embodied, objectified
labour and living labour, are necessary conditions of production, elements of the national wealth. On the other hand, it is a mere “convenience” due to the “deplorable poverty of the mass of the people” that the means of subsistence of the workers at all assume the form of “circulating capital”. Labour is a condition of production, but wage labour is not, and neither, therefore, is it necessary that the workers’ means of subsistence confront them as “capital”, as an “advance by the capitalist”. What Ramsay overlooks is that if the means of subsistence of the workers did not confront them as “capital” (as “circulating capital”, as he calls it), neither would the objective conditions of labour confront them as “capital”, as “fixed capital”, as he calls it. Ramsay attempts in earnest, and not merely in words as the other economists do, to reduce capital to “a portion of the national wealth, employed, or meant to be employed, in favouring reproduction” [p. 21]; he therefore declares wage labour and consequently capital—that is the social form which the means of reproduction assume on the basis of wage labour—to be unimportant and due merely to the poverty of the mass of the people.

Thus we have arrived at the point where political economy itself—on the basis of its analysis—declares the capitalist form of production, and consequently capital, to be not an absolute, but merely an “accidental”, historical condition of production. 

Ramsay, however, does not go far enough to draw the correct conclusions from his premisses, from the new definition which he has given to capital in the immediate production process.

Ramsay comes indeed close to the correct definition of surplus value. 

*A circulating capital will always maintain more labour than that formerly bestowed upon itself. Because, could it employ no more than had been previously bestowed upon itself, what advantage could arise to the owner from the use of it as such?* * ([p.] 49). Or will people assert that the *quantity of labour* which any circulating capital will employ is no more than equal to that previously bestowed upon it? * This would mean that *the value of the capital expended was equal to that of the product* * ([p.] 52).

This means, therefore, that the capitalist exchanges less objectified labour for more living labour and that this surplus of unpaid living labour constitutes the excess of the value of the product over the value of the capital consumed in its production, in other words, the *surplus value* (profit, etc.). If the amount of labour for which the capitalist pays wages—the amount which he receives back from the worker in the product, then the value of the product would be no greater than that of the capital and there would be no profit. Although Ramsay is very close here to the real
origin of surplus value, he is nevertheless too bound up in the tradition of the economists not to begin immediately straying again along false paths. First of all, the way he explains this exchange between variable capital [XVIII-1088] and labour is ambiguous. If he had been quite clear about this, then further misunderstanding would have been impossible. He says:

“Circulating capital, for instance, RAISED BY THE LABOUR OF 100 MEN, will set in motion 150 men. THEREFORE THE PRODUCT AT THE END OF THE YEAR will, in this case, be the result of the labour of 150 men” ([p.] 50).

Under what circumstances can the product of 100 men buy [the labour of] 150 men?

If the wages received by a worker for 12 hours’ labour = the value of 12 hours’ labour, then only one working day could be bought back with the product of his labour and only 100 [working days] with the product of 100 working days. But if the value of the daily product of his labour = 12 labour hours and the value of the daily wage he receives = 8 labour hours, then $1 \frac{1}{2}$ working days or [the labour of] $1 \frac{1}{2}$ men can be paid for, bought back, for the value of his daily product. And 100 ($1 + \frac{1}{2}$ men or working days) = 100 + 50 = 150 men can be employed with the product of 100 working days. Thus, the condition in which the product of 100 men sets 150 in motion is that each of the 100 men and, in general, every worker, spends half as much time working gratis for the capitalist as he works for himself, or that he spends $\frac{1}{3}$ of the working day working gratis. Ramsay does not make this clear. The ambiguity appears in the conclusion: “THEREFORE THE PRODUCT AT THE END OF THE YEAR WILL, IN THIS CASE, BE THE RESULT OF THE LABOUR OF 150 MEN.” It will indeed be the result of the labour of 150 men in the same way as the product of 100 men was the result of the labour of 100 men. The ambiguity (and certainly the lack of clarity, plus ou moins derived from Malthus) is to be found in this: It appears as if the profit arises merely from the fact that 150 men are now employed instead of 100. Just as if the profit derived from the 150 workers arose from the fact that 225 workers can now be set in motion by the product of the 150 (100:150 = 150:225) (4:6 = 6:9). But that is not the point.

The labour which the 100 men supply = $x$, if $x$ is their total working day. The wages they receive [will then equal] $\frac{2}{3}x$. Hence the value of their product = $x$, the value of their wages = $x - \frac{1}{3}x$, and the surplus value made on them = $\frac{1}{3}x$.

If the entire product of the labour of 100 men is again laid out

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a More or less.—Ed.
in wages, then 150 men can be employed with it and their product will be equal to the wages of 225 men. The labour time of 100 men is the labour time of 100 men. But the labour they are paid for is the product of $66\frac{2}{3}$ men, that is, only $\frac{2}{3}$ of the value embodied in their product. The ambiguity arises because it appears as if the 100 men or the 100 working days (it makes no difference whether they are days calculated over a year or separate days) produce 150 working days—a product embodying the value of 150 working days; while, conversely, the value of 100 working days suffices to pay for 150 working days. If the capitalist continues to employ 100 men as he did previously, then his profit remains the same. He will continue to pay the 100 men a product—the labour time of $66\frac{2}{3}$ men and pocket the rest as he did before. If, on the other hand, he lays out the whole product of the 100 men in wages once again, then he accumulates and appropriates a new amount of surplus labour equal to 50 working days instead of only $33\frac{1}{3}$ as he did previously.

It is immediately apparent that Ramsay is not clear on the point, since he once again advances against the determination of value by labour time the otherwise "inexplicable" phenomenon that the rates of profit are equal for capitals which exploit different masses of labour.48

*"The use of fixed capital modifies to a considerable extent the principle that value depends upon quantity of labour. For some commodities on which the same quantity of labour has been expended, require very different periods before they are fit for consumption. But as during this time the capital brings no return, in order that the employment in question should not be less lucrative than others in which the product is sooner ready for use, it is necessary that the commodity, when at last brought to market, should be increased in value by all the amount of [the] profit withheld." This shows how *capital may regulate value independently of labour*"* ([p.] 48).

It shows rather that capital regulates average prices161 independently of the value of the particular product and that it exchanges commodities not according to their value, but in such a way that one employment of capital ... should not be less [XVIII-1089] productive than others. Since empty tradition is more powerful in political economy than in any other science, Ramsay does not fail either to reproduce the "wine in the cellar"162 argument which has been notorious since the time of [James] Mill. And he therefore concludes that "capital [is] a source of value independent of labour" ([p.] 55), whereas the most he would have been justified in concluding was that the surplus value realised by capital in a particular employment does not depend upon the quantity of labour employed by that particular capital. [XVIII-1090] This false conception of Ramsay's in
this case is all the more surprising since, on the one hand, he grasps
the natural basis, so to speak, of surplus value, and, on the other hand,
he affirms with regard to one instance that the distribution of surplus
value—its equalisation to the general rate of profit—does not
increase the surplus value itself.

"The source of profit is the law of the material world, whereby the
*beneficence of nature, when aided and directed by the labour and skill of men, gives
so ample a return to national industry as to leave a surplus of products over and above
what is absolutely necessary for replacing in kind the fixed capital consumed, and for
perpetuating the race of labourers employed."

("perpetuating the race of labourers" [XVIII-1091] is a fine result
of capitalist production. Of course, if labour only sufficed to
reproduce the conditions of labour and to keep the workers alive,
no surplus would be possible, hence no profit and no capital. But that
nature has nothing whatever to do with it and that the race of
labourers perpetuates itself despite this surplus and that the surplus
assumes the form of profit and on this basis the race of capitalists
"perpetuates" itself, has been admitted by Ramsay himself since he
declares that "circulating capital", by which he means wages, wage
labour, is not an essential condition of production, but is due
merely to the "deplorable poverty of the mass of the population" [p. 24].
He does not draw the conclusion that it is capitalist production
which "perpetuates" this "deplorable poverty", although he admits it
when he says that it "perpetuates the race of labourers" and leaves them
only as much as is necessary for that perpetuation. In the sense indicated
above it can be said that surplus value, etc., rests on a natural law,
that is, on the productivity of human labour in its exchange with
nature. But Ramsay himself states that a source of surplus value is
the absolute lengthening of labour time (p. 102) as well as the
increased productivity of labour brought about by industry.)

*"... Let the gross produce be ever so little more than is strictly essential for the
above purposes, and the separation of a distinct revenue from the general mass,
under the appellation of profit, and belonging to another class of men, becomes
possible" ([p.] 205). "The very existence of the master-capitalists as a distinct class is
dependent on the productiveness of industry"* ([p.] 206).

Secondly, with regard to the equalisation of the rate of profit as a
result of the rise in prices in some branches caused by increases in
wages, Ramsay observes:

The rise in prices in some branches of industry resulting from increases in
wages "by no means exempted the master-capitalists from suffering in their
profits, nor even at all diminished their total loss, but only served to distribute it more
generally among the different orders composing that body"* ([p.] 163).

a Ramsay has "equally".—Ed.
And if the capitalist whose wine is the product of 100 men (Ramsay's example) sells it for the same price as a capitalist whose commodity is the product of 150 men, in order that "THE EMPLOYMENT [of capital] IN QUESTION BE NO LESS LUCRATIVE THAN OTHERS" [p. 43], then it is clear that thereby the SURPLUS VALUE embodied in the wine and in the other commodity is not increased, but only DISTRIBUTED EQUALLY between DIFFERENT ORDERS OF CAPITALISTS [XVIII-1091].

[XVIII-1089] He also brings up again Ricardo's exceptions.163 These latter will have to be discussed in that part of our text where we speak of the conversion of VALUE into PRICE OF PRODUCTION.164 That is, very briefly, as follows. Provided that in the different TRADES the length of the working day (in so far as this is not compensated by the INTENSITY OF LABOUR, the unpleasantness of the work, etc.) is the same, or rather the SURPLUS LABOUR is the same [as well as] the rate of exploitation, the rate of surplus value can change only if wages rise or fall. Such variations in the rate of surplus value—the rise or fall in wages, will affect the production prices of commodities in different ways according to the organic composition of capital. Capital in which the variable part is large compared to the constant part, would acquire more surplus labour as a result of a fall in wages and would appropriate less surplus labour as a result of a rise in wages than capital with a larger proportion of the constant part to the variable part. A rise or fall in wages would therefore have opposite effects on the rate of profit in the two branches or on THE GENERAL RATE OF PROFIT. In order to maintain the general rate of profit, if wages rise, the prices of the first kind of commodities will rise, and those of the second kind will fall. (Either type of capital will of course be directly affected by variations in wages only in proportion to the greater or less quantity of living labour it employs in comparison with the total capital expended.) Conversely, if wages fall, the prices of the first kind of commodities will fall and those of the second kind will rise.

Strictly speaking, all this hardly belongs to the discussion of the original conversion of VALUES into production prices and the original establishment of the general rate of profit, since it is much more a question of how a GENERAL RISE OR FALL IN WAGES will affect production prices regulated by the general rate of profit.

Still less has this problem Anything to do with the difference between FIXED AND CIRCULATING CAPITAL. Bankers and merchants employ almost exclusively circulating capital and hardly any variable capital; that is, they lay out relatively small amounts of capital on
living labour. Contrariwise, a mine-owner employs incomparably more fixed capital than a capitalist engaged in tailoring. But it is very questionable whether he employs relatively as much living labour. It is merely because Ricardo advanced this special, relatively insignificant case as the only instance of a divergence between production price and value (or, as he incorrectly put it, as an exception to the determination of value by labour time) and presented it in the form of a difference between fixed and circulating capital, that this blunder—and in an incorrect form at that—has survived as an important dogma in all subsequent political economy. (The mine-owner should be counterposed not to the tailor but to the banker and the merchant.)

*"The rise of wages is limited by the productiveness of industry. In other words, ... a man can never receive more for the labour of a day or year than with the aid of all the other sources of wealth, he can produce in the same time... His pay must be less than this, for a portion of the gross produce always goes to replace fixed capital"* (i.e. constant capital, raw materials and machinery, etc., according to Ramsay) *"with its profit"* ([p.] 119).

Here Ramsay confuses two things. The amount of "fixed capital" embodied in the daily product is not the product of the day’s labour of the worker; in other words, this portion of the value of the product represented by a portion of the product in natura is not the product of this day’s labour. On the other hand, profit is indeed a deduction from the daily product of the worker or from the value of this daily product.

Although Ramsay has not clearly elaborated the nature of surplus value and although in particular he remains firmly rooted in the old prejudices with regard to the relation of value and production price and the conversion of surplus value into average profit, he has on the other hand drawn another, correct [XVIII-1090] conclusion from his conception of fixed and circulating capital.

Before coming to this [here is another passage about “value”]:

*"Value must be in proportion not merely to the capital truly consumed, but to that also which continues unaltered, viz. to the total capital employed."* ([p.] 74).

By this he means that profit, and therefore also the production price, must be in proportion [to the total capital employed] whereas the value obviously cannot be altered by that part of the capital which does not enter into the value of the product. With the advance of society (i.e. of capitalist production) the fixed portion of capital increases at the expense of the circulating capital, i.e. that laid out in labour. Therefore the demand for labour declines relatively as wealth increases or capital is accumu-
lated. In manufacture, the "evils" which the development of the productive power generate for the workers are temporary, but reappear constantly. In agriculture, they are continuous, especially in connection with the conversion of arable land into pasture. The general result is: With the advance of society, i.e. with the development of capital, here with that of national wealth, the condition of the workers is affected less and less by this development, alias, it *worsens* relatively in the same ratio as the general wealth increases, i.e. as capital is accumulated, or, what amounts to the same thing, as the scale of reproduction increases. One can see that it is a far cry from this conclusion to the naive conceptions of Adam Smith or the apologetics of vulgar political economy. For Adam Smith, the accumulation of capital is identical with growing demand for labour, *continual rise of wages*, and *consequently* with a *fall of profits*. In his time, the demand for labour did in fact grow at least in the same proportion in which capital was accumulated, because manufacture still predominated at that time and large-scale industry was only in its infancy.

"The demand for labour depends only" (directly, immediately) "upon the amount of circulating capital." ([pp.] 86-87). (This is tautology on Ramsay's part, since he equates circulating capital with capital laid out in wages.) "With the progress of civilisation *the fixed capital of the country is increased at the expense of the circulating*" ([pp.] 88-89). "The demand for labour will not therefore generally increase as capital augments, at least not in the same proportion" ([p.] 88). "It is not, until, favoured by the new inventions, circulating capital shall have become increased beyond what it formerly was,"

//here again the wrong assumption creeps in that an increase of necessaries in general and increase of that portion of necessaries intended for the workers are the same thing//

*"that a greater demand for labour will spring up. Demand will then rise, but not in proportion to the accumulation of the general capital. In countries where industry has much advanced, fixed capital comes gradually to bear a greater and greater proportion to circulating. Every augmentation, therefore, in the national stock destined for reproduction, comes, in the progress of society, to have a less and less influence upon the condition of the labourer" ([pp.] 90-91). "Every addition to fixed capital is made at the expense of the circulating",* i.e. at the expense of the demand for labour ([p.] 91). *"The evils resulting from the invention of machinery, to the labouring population employed in manufactures, will probably be but temporary, liable to be perpetually renewed however, as fresh improvements are constantly making for economising labour"* [p. 91].

And for the following reasons. [Firstly:] The capitalists who *use the new machinery* obtain *extraordinary profits*; consequently their capacity to save and to increase their capital grows. A portion of this is also used as *circulating capital*. Secondly: The price of the manufactured commodities falls in proportion to the *diminished cost*
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of production; thus the consumers save, and this facilitates the accumulation of capital, a portion of which may find its way to the manufacturing industry in question. Thirdly: The fall in the price of these products increases the demand for them ([pp.] 92-93).

"Thus though the machinery may throw out of employment a considerable body of persons, this will yet probably be followed, after a longer or shorter period, by the re-engagement of the same, or even a greater number of labourers" ([pp.] 92-93). "In agriculture the case is widely different. The demand for raw produce cannot increase in that rapid way in which it may for manufactured goods... The most fatal to the country people is *the conversion of arable land into pasture... Almost all the funds which formerly supported men, are now vested in cattle, sheep, and other elements of fixed capital*" ([p.] 93).

[XVIII-1091] Ramsay remarks correctly:

"*Wages as well as profits are to be considered each of them as really a portion of the finished product, totally distinct in a national point of view from the cost of raising it" ([p.] 142). "Fixed capital *independent of its results... is a pure loss...* But, besides this, labour, not wages, not what is paid for it, is an element of cost of production. Labour is a sacrifice. The more of it is expended in one employment, the less for another, and, therefore, when applied to unprofitable undertakings, the nation suffers from the waste of the principal source of wealth...* The reward of labour does not constitute an element of cost" ([pp.] 141-43). (This is quite right: labour, and not paid labour or wages, must be considered as an element of value.)

Ramsay describes the real reproduction process correctly:

"In what manner is a comparison to be instituted between the product and the stock expended upon it?... With regard to a whole nation... it is evident that all the various elements of the stock expended must be reproduced in some employment or another, otherwise the industry of the country could not go on as formerly. The raw material of manufactures, the implements used in them, as also in agriculture, the extensive machinery engaged in the former, the buildings necessary for fabricating or storing the produce, must all be parts of the total return of a country, as well as of the advances of all its master-capitalists. Therefore, the quantity of the former may be compared with that of the latter, each article being supposed placed as it were beside that of a similar kind*" ([pp.] 137-39).

"Now as regards the individual capitalist

//this is a false abstraction. The nation does not exist, or exists only as the capitalist class, and the whole class operates in exactly the same way as the individual capitalist. The two methods of approach differ from one another only in that one clings to and isolates use value, the other exchange value//,

"since he does not replace his outgoings in kind, by far the greater number must be obtained by exchange, a certain portion of the product being necessary for this purpose. Hence each *individual master-capitalist comes to look much more to the exchangeable value of his product than to its quantity" ([pp.] 145-46).

[XVIII-1092] "The more the value of his product exceeds the value of the capital advanced, the greater will be his profit. Thus, then, will he estimate it, by comparing
value with value, not quantity with quantity.* This is the first difference to be remarked in the mode of reckoning profits between nations and individuals."

"The nation too—supposing it to be something else than the sum of capitalists—can so far compare value with value: it can calculate the total labour time which it has to expend *to replace the used-up part of its constant capital and the part of the product consumed individually, and the time of labour spent in producing a surplus destined to enlarge the scale of reproduction.*//

"The second is, that, since the master-capitalist always makes an advance of wages to the labourers, instead of paying them out of the finished commodity, he considers this as well as the fixed capital consumed, a part of his expenses, though they, nationally speaking, are not an element of cost."

"This difference too disappears in fact in the process of reproduction as a whole. *The capitalist always pays out of the finished commodity, that is to say, out of the commodity finished by the labourer yesterday he pays his wages tomorrow, or in point of fact, he gives him, in the form of wages, only an assignation of products to be finished in future or almost produced (i.e. finally produced) by the time they are bought.* The advance disappears as a mere illusion in reproduction, i.e. in the continuity of the process of production.//

"Hence his rate of profit will depend *upon the excess in the value of his product over and above the value of the capital, both fixed and circulating*" ([p.] 146).

"This is likewise true in a "national point of view". His profit always depends on what he himself pays for the product, whether finished or not, when he pays wages.//

Ramsay has the merit, firstly, that he contradicts the false notion—current since Adam Smith—of the value of the whole produce dissolving into revenue under different names; secondly, that he determines the rate of profit in two ways, [once] by the rate of wages, i.e. the rate of surplus value, and a second time, by the value of the constant capital. But he transgresses in the opposite direction to Ricardo. Ricardo arbitrarily seeks to equalise the rate of profit and the rate of surplus value. On the other hand, the twofold determination of the rate of profit—1) by the rate of surplus value (hence by the rate of wages) and 2) by the ratio of this surplus value to the total capital advanced, that is, in fact determined by the ratio of the constant capital to the total capital—is irrationally presented by Ramsay as two parallel circumstances which determine the rate of profit. He does not grasp the transformation which surplus value undergoes before it becomes profit. Whereas therefore Ricardo arbitrarily seeks to reduce the rate of profit to
the rate of surplus value in order to work out the theory of value consistently, Ramsay seeks to reduce surplus value to profit. We shall see later that the way he describes the influence of the value of constant capital on the rate of profit is very inadequate, and even incorrect.

* "Profit must rise or fall exactly as the proportion of the gross produce, or of its value, required to replace necessary advances, falls or rises..." The rate of profit, therefore, depends upon two circumstances: 1) the proportion of the whole produce which goes to the labourers; secondly, the proportion which must be set apart for replacing, either in kind or by exchange, the fixed capital"* ([pp.] 147-48).

In other words, therefore, [the rate of profit depends] on the excess of the value of the product over the sum of circulating and fixed capital; hence on the proportion which, firstly, the circulating capital, and, secondly, the fixed capital, bear to the value of the whole produce. If we know where this surplus comes from, then the whole matter is very simple. But if we only know that the profit depends on the ratio of the surplus to these outlays, then we can acquire the most inaccurate notions about the origin of this surplus, for example we can, like Ramsay, imagine that it originates in part in fixed (constant) capital.

[XVIII-1093] "It is certain *that an increased facility of raising the various objects which enter into the composition of fixed capital, tends, by diminishing this proportion, to raise the rate of profit, just as in the former case of an augmented return of the elements of circulating capital, which serves to maintain labour"* ([p.] 164).

With regard to the tenant farmer, for example:

* "... be the [amount of gross] return small or great, the quantity of it required for replacing what has been consumed in these different forms, can undergo no alteration whatsoever. This quantity must be considered as constant, so long as production is carried on on the same scale. Consequently, the larger the total return, the less must be the proportion of the whole which the farmer must set aside for the above purposes"* (l.c., [p.] 166).

"The more easily the farmer who produces food and raw materials such as flax, hemp, wood, etc., can reproduce them, [the more] his profit will increase. The farmer's profit [increases] as a result of the increase in the quantity of his produce, the total value of which remains the same, but a smaller proportion of this total, and consequently of its value, is required for restoring the various elements of fixed capital, with which the farmer can supply himself; while the manufacturer would benefit because his product would have a greater purchasing power"[pp.] 166-67).

Let us assume that the harvest=100 qrs and the seed corn=20 qrs, that is, \( \frac{1}{5} \) of the harvest. Let us assume further that the harvest is doubled the following year (with the expenditure of the same amount of labour) and now=200 qrs. If the scale of production remains the same, then the seed corn=20 qrs as
previously, but this is now only 1/10 of the harvest. One has to take into account however that the value of the 100 qrs [previously harvested]=that of the 200 qrs [now obtained], therefore 1 qr of the first harvest=2 of the second. 80 qrs remain over in the first case, 180 in the 2nd. Since wages are irrelevant to the present problem, which concerns the influence that a change in the value of constant capital exerts on the rate of profit, let us assume that the value of wages remains unchanged. Then, if [wages were] 20 qrs in the first case, [they are] 40 in the second. Finally, let us assume that the value of the other ingredients of constant capital which the farmer does not reproduce in natura=20 qrs in the first case and therefore 40 in the second.

We now have the following calculation:

1) The product=100 qrs. The seed corn=20 qrs. The other elements of constant capital=20 qrs, wages=20 qrs, profit=40 qrs.

2) The product=200 qrs. The seed corn=20 qrs. The other elements of constant capital=40 qrs, wages=40 qrs and profit=100 qrs, [i.e. its value]=50 qrs in the first case. There would therefore be a surplus profit of 10 qrs [in the second case].

Thus not [only] the rate of profit, but also the profit itself would have increased here, as a result of a change in the value of constant capital. Although wages remained the same in both 1) and 2), the ratio of profit to wages, that is, the rate of surplus value, would have risen. But this is only an illusion. The profit would consist firstly of 80 qrs, equal to 40 qrs in case 1), and the ratio to wages would remain the same; secondly, [in case] 2), of 20 qrs, equal only to 10 qrs in case 1), which would have been converted into revenue from constant capital.

But is this calculation correct? We must assume that the result [in case] 2) was due to a harvest which came about although work was carried on in the same conditions as prevailed in [case] 1). In order to clarify the matter, let us assume that 1 qr=£2 in [case] 1).

This means that for the harvest which has yielded him 200 qrs, the farmer has laid out: 20 qrs for seed corn (=£40), 20 qrs for other elements of constant capital (=£40), 20 qrs for wages (=£40). A total of £120, and the product=200 qrs. In the first case he likewise laid out only £120 (60 qrs) and the product=100 qrs=£200. The profit remaining was £80, or 40 qrs. Since the 200 qrs [in case 2)] are the product of the same amount of labour [as the 100 qrs in case 1)], then once again they are likewise=only £200. Thus, only £80 profit remains, which is now, however,=140 qrs. Consequently, a qr now [costs the farmer] only £4/7; and not £1. In other words, the value of a qr has fallen
from [£]2 to [£]4/7, that is, by 1³⁄₇, and not from 2 to 1, that is, by a half as we assumed above in [case] 2) as opposed to [case] 1).

His total product [in case 2])= 200 qrs=£200. But £120 out of this £200 replaces the 60 qrs which he has expended, each one of which cost him £2. There thus remains a profit of £80 which=the remaining 140 qrs. How does this happen? The qr is now=£1, but each of the 60 qrs expended in production cost £2. They cost the farmer as much as if he had expended 120 of the new qrs. The remaining 140 qrs therefore=£80, or no more than the remaining 40 were worth previously. It is true that he sells each of the 200 qrs for £1 (if he sells his total product) and receives £200 for them. But of the 200 qrs, 120 have cost him £2 each, the remaining qrs therefore only yield him £4/7 each.

If he now again lays out 20 qrs [for seed] (=£10 [if one reckons 10s. for a qr]), 40 qrs for wages (=£20), and 40 qrs for the other elements of constant capital (=£20), that is, a total of 100 qrs instead of 60 as previously and he harvests 180 qrs, then these 180 have not the same value as did the 100 previously [if one reckons £1 for a qr]. True, he has employed as much living labour as he did previously, and consequently the [XVIII-1094] value of the variable capital has remained the same and so [has the value] of the surplus produce. But he has laid out less objectified labour, since the 20 qrs, which were=£20 previously, are now worth only 10.

The account will therefore work out as follows:

<table>
<thead>
<tr>
<th>Constant capital</th>
<th>Variable capital</th>
<th>Surplus value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 20 qrs seed corn =£20</td>
<td>20 qrs (£20)</td>
<td>40 qrs (£40)</td>
</tr>
<tr>
<td>20 qrs instruments of labour, etc. =£20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) 20 qrs [seed corn] =£10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 qrs [instruments of labour, etc.] =£20</td>
<td>40 qrs (£20)</td>
<td>80 qrs (£40)</td>
</tr>
</tbody>
</table>

In the first case the product comes to 100 qrs=£100.
In the second case the product comes to 180 qrs=£90.

Nevertheless the rate of profit would have risen [despite the fall in the value of the product], for in the first case the return on an outlay of [£] 60 was £40 and in the 2nd it was 40 for an outlay of 50. In the first case it amounted to 66²⁄₃%, in the second to 80%.

Anyhow, the rise in the rate of profit is not due to the value remaining unchanged, as Ramsay supposes. Since one part of the labour expended, i.e. the part contained in the constant capital (in seeds in this case), has diminished, the value of the product falls if
production continues on the same scale, just as the value of 100 lbs of twist falls if the cotton it is made of becomes cheaper. But the ratio of variable to constant capital increases (without the value of the variable capital increasing). In other words, the ratio of the total capital outlay declines in relation to the surplus. Hence the rate of profit rises.

If what Ramsay says were correct, if the value remained the same, then the profit, the amount of profit, and consequently also the rate of profit, would rise. There can be no question of a rise merely in the rate of profit.

The question is not however disposed of for the special case. In agriculture this special case takes the following form: A certain amount of seed corn at the old price of the product figures in the harvest, this part is incorporated in the harvest in natura. The other expenses are defrayed by the sale of the corn at its old price. The old outlay yields a product which is twice as big as before. Thus, in the above-mentioned case, for example, where 20 qrs are used as seed corn (=£40) and the other outlays=40 qrs (=£80), the harvest yields 200 qrs and not, as the previous harvest, 100 qrs (=£200), of which 40 qrs=£80 were profit on a total outlay of 60 qrs=£120. The outlay in connection with this [second] harvest is absolutely the same as it was in the first—60 qrs, the value of which is £120, but instead of a surplus of 40 qrs, the surplus is now 140 qrs. The surplus in natura has in this case increased considerably. But because the labour expended is the same in both cases, the 200 qrs have no greater value than did the 100, that is, £200. In other words [the value of] the qr has fallen from £2 to £1. But since there was a surplus of 140 qrs, it seemed that it had to come to £140, for one qr is worth just as much as any other.

The matter would be simplified if we considered it d'abord without regard to the reproduction process, that is, if we assumed that the tenant farmer was withdrawing from the business and selling his whole product. Then he would indeed have to sell 120 qrs to recover his outlay of £120 (to reimburse himself). In this way he would recover the capital advanced. Thus a surplus of 80 qrs would remain, and not of 140, and since these 80 qrs=£40, they are worth in absolute terms as much as the surplus in the first case.

In the course of the reproduction process, however, the matter is altered to a certain extent. For the farmer replaces the 20 qrs of seed corn in natura out of his own product. [As far as their value is concerned] they are replaced by 40 qrs in the product. But in the reproduction process he only needs to replace them with
20 qrs in *natura*, as was the case previously. The rest of his expenditure [expressed in quarters] increases in the same ratio as the qr is devalued (provided wages do not fall). To replace the remaining portion of constant capital, he now needs 40 qrs and not 20 as previously, and to replace wages he also needs 40 qrs instead of 20. Altogether he must now lay out 100 qrs, compared to 60 previously; but he need not lay out 120, the amount corresponding to the depreciation of the corn, because the 20 qrs [used as seed] which were worth £40, are replaced by 20 [quarters] (since in this context only their use value matters) which are worth [£]20. So evidently he has made a gain [XVIII-1095] of these 20 qrs, now worth £20. His *surplus* is therefore not £80 but £100, not 80 qrs, but 100. (Expressed in qrs of the old value, not 40 but 50.) This is an unquestionable *fact*, and if the market price does not fall as a result of *abundance*, the farmer can sell 20 qrs more at the new value, thus gaining £20. In the course of *reproduction*, moreover, the farmer obtains this *surplus* of £20 on the same outlay, because labour has become more productive, without the rate of surplus value having risen or the workers having performed more *surplus* labour than previously or having received a smaller portion of the *reproduced part* of the product (which represents living labour). On the contrary, it is assumed that in the reproduction process the worker receives 40 qrs, whereas he received only 20 previously. This then is a rather peculiar phenomenon. It does not occur without reproduction, but it takes place in connection with it and it takes place [moreover] because the farmer replaces a *part of his advances* in *natura*. Not only the rate of profit could increase in this case, but the amount of profit as well. (With regard to the reproduction process itself, the farmer can either carry on on the old scale, in which case the price of the product will fall if he again obtains as good a harvest, because a portion of the constant capital has cost less, but the rate of profit will rise; or the farmer can increase the scale of production, sow more with the same outlay, and then both the rate of profit and the amount of profit will rise.)

Let us consider the manufacturer. Let us assume that he has laid out £100 in cotton twist and made a profit of [£]20. The product therefore=£120. It is assumed that [£]80 out of the outlay of £100 has been paid for cotton. If the price of cotton falls by half, he will now need to spend only 40 on the cotton and £20 on the rest, that is £60 in all (instead of £100); the profit will be [£]20 as previously and the total product will amount to £80 (if he does not increase the scale of his production). £40 thus remains in
his pocket. He can either spend it or invest it as additional capital. If he invests it, he will lay out [an additional] £26\(\frac{2}{3}\) on cotton and 13\(\frac{1}{3}\) on labour, etc., on the new scale. The profit [will amount to] £13\(\frac{1}{3}\). The total product will now be 60+40+33\(\frac{1}{3}\), or £133\(\frac{1}{3}\).

Thus it is not the fact that the farmer replaces his seed corn in \textit{natura} which is the key, for the manufacturer buys his cotton and does not replace it out of his own product. What this phenomenon amounts to is this: release of a portion of the capital previously tied up in constant capital, or the conversion of a portion of the capital into revenue. If exactly the same amount of capital is laid out in the reproduction process as previously, then it is the same as if \textit{additional capital had been employed} on the old scale of production. This is therefore a kind of accumulation which arises from the increased productivity of those branches of industry which supply the productive ingredients of capital. However, such a fall in the [price of] raw materials, if due to the seasons, is counteracted by unfavourable seasons, in which the raw materials appreciate. The capital released in this way in one or several seasons is, therefore, to a certain extent, reserve capital for the other seasons. For instance, the manufacturer whose [fixed capital] turns over once every 12 years, must arrange things in such a way that he can continue to produce—at least on \textit{the same scale}—throughout the 12 years. One has therefore to take into account that the \textit{prices} [of the raw materials] he has to \textit{replace} fluctuate and even themselves out \textit{more or less} over a long period of years.

A rise in prices of the ingredients [of constant capital] has the opposite effect to a fall of the prices. (We are leaving variable capital out of account here, although if wages fall, less variable capital—in terms of value—will need to be laid out, and if they rise, more.) If production is to be continued on the old scale, then a greater outlay of capital is necessary. Therefore, apart from a fall in the rate of profit, extra \textit{capital must be employed} or a part of the \textit{revenue must be converted into capital}, although it will not have the effect of \textit{additional capital}.

\textit{Accumulation} has taken place in the one case although the value of the capital advanced has remained the same (but its physical elements have been increased). The rate of valorisation increases, and the absolute magnitude of profit increases, because the effect is the same as if \textit{additonal capital} had been advanced on the old scale. \textit{Accumulation} has taken place in the other case in so far as the value of the capital advanced, i.e. that part of the value of the total output which functions as capital, has increased. But the physical elements have not been increased. The rate of profit falls. (The
amount of profit only falls if either a different number of workers is employed or if their wages rise as well.)

This phenomenon of the conversion of capital into revenue should be noted, because it creates the illusion that the amount of profit grows (or in the opposite case decreases) independently of the amount of surplus value. We have seen that, under [XVIII-1096] certain circumstances, a part of rent can be explained by this phenomenon.166

In the way mentioned above (that is, if the remaining 20 qrs = £20 are not used immediately to extend the scale of production, i.e. if they are not accumulated), a money capital of £20 is set free. This is an example of how redundant money capital can be extracted from the reproduction process although the aggregate value of commodities remains the same, namely, by a portion of the capital which existed previously in the form of fixed (constant) capital being converted into money capital.

How little the above phenomenon has to do with the determination of the rate of profit, becomes clear if one considers the case of a farmer (or *manufacturer) who enters business under the new conditions of production. Formerly he wanted a capital of £120 to enter the business, £40 to buy 20 qrs [of] seeds, £40 for other ingredients of constant capital, and £40 to pay wages. And his profit was £80.* 80 on 120 = 8 on 12 = 2 on 3 = 66\%.

He now has to advance £20 to buy 20 qrs of seed, £40 as previously [to buy the other elements of constant capital], £40 for wages, so that his outlay of capital = [£]100. And profit is 80, that is 80%. The amount of profit has remained the same, but its rate has increased by 20%. Thus one can see that the fall in the value of seed (or of the price which has to be paid to replace the seed) has in itself nothing to do with the increase in the amount of profit, but implies merely an increase in the rate of profit.

Moreover, the farmer in the one case—or the manufacturer in the other—will not consider that he has obtained a larger profit, but that a portion of the capital previously tied up in production has been freed. And his view will be based on the following simple calculation. Previously, the capital advanced in production was = [£]120; now it = 100, while 20 is now in the hands of the farmer as free capital, money which can be invested in any way he likes. But in either case the capital = 120 only, its size has therefore not been increased. The fact, however, that \( \frac{1}{6} \) of the capital has been divested of the form in which it is inseparable from the reproduction process does indeed have the same effect as an additional capital.
Ramsay has not got to the bottom of this matter because he has not at all clearly worked out the relationship between value, surplus value and profit.

Ramsay correctly expounds to what extent machinery, etc., in so far as it affects variable capital, influences profit and the rate of profit. That is to say, he shows that this influence results from the depreciation of labour capacity, the increase of relative surplus labour or, if the reproduction process is considered as a whole, also the reduction of the part of the gross return which goes to replace wages.

"An increased or diminished productiveness* of the industry *employed in raising commodities which do not enter into the composition of fixed capital,* can have no influence on the rate of profit, *except by affecting the proportion of the gross amount which goes to maintain labour"* ([p.] 168).

"If the manufacturer has doubled his output as a result of improvements in machinery, the value of his goods must, in the end, fall in the same proportion as their quantity has increased."

"...and the manufacturer benefits only in so far as he is able to clothe the worker more cheaply so that a smaller proportion of the gross return goes to the worker. The farmer too benefits //as a result of the increased industrial productivity// only in so far as a portion of his outlay is expended on clothing for the labourer and he can buy this more cheaply now; that is, in the same way as the manufacturer" ([pp.] 168-69).

A fall [or rise] in the value of the ingredients of constant capital affects the rate of profit by altering the ratio of surplus value to the total capital outlay. A fall (or rise) in wages, on the other hand, [affects the rate of profit] by influencing the rate of surplus value directly.

Suppose for example, that, in the above-mentioned case, the price of the seed (assuming the farmer grows flax) remains the same, that is, £40 (20 qrs) and the rest of the constant capital costs £40 (20 qrs), but that wages—that is, wages for the same number of workers—fall from £40 to 20 (from 20 qrs to 10). In this case, the total [newly created] value, which = the wages + surplus value, remains unchanged. Since the number of workers remains the same, their labour is embodied in a value of 40+80=£120, as it was previously. But from this £120, 20 now goes to the workers
and the surplus value now amounts to 100. //It is assumed that no improvements have taken place which affect the number of labourers employed in this branch.// The capital advanced is now 100 instead of 120 just as in the case where the value of the seed fell by half. But the profit is now £100, i.e. 100%, whereas in the other case, where the capital advanced was likewise reduced from 120 to 100, it was 80%. And as in that other case £20, or 1/6 of the capital, [XVIII-1097] is set free. But in the former case, the surplus value remained unchanged—[£]80—(and since 40 was paid as wages, [the rate of surplus value] was 200%). In the latter case, the surplus value rises to 100 (and, since wages now come to [£]20, [the rate of surplus value increases] to 500%).

In this case, not only has the rate of profit risen but the profit itself, because the rate of surplus value has risen and consequently the surplus value itself. This differentiates this case from the other, something which Ramsay does not grasp. This always takes place when the increase in profit is not nullified by a corresponding reduction in the rate of profit resulting from a simultaneous change in the value of constant capital. In the above-mentioned case, for example, the capital laid out is £120 and the profit 80%, that is, 66⅔%. In the present case, the capital outlay is 100 and the profit 100=100%. If, however, the capital outlay had risen from 100 to 150 as a result of a change in the price of constant capital, then the profit—which has increased from 80 to 100—would only give a rate of 66⅔%.

[Because] “such commodities help to make up neither fixed capital nor circulating, [it follows that] profit can in no way be affected by any alteration in their productiveness. *Such are luxuries of all kinds*” ([pp.] 169-70).

“Master-capitalists gain by the abundance of luxuries because their profits will command a greater quantity for their private consumption; but the rate of this profit is in no degree affected either by their plenty or scarcity*” ([p.] 171).

_D'abord, a portion of the luxuries can be used as one of the ingredients of constant capital._ Grapes, for example, in [the production of] wine, gold in luxury articles, diamonds in glass cutting, etc. But Ramsay excludes this case in so far as he says: commodities which do not enter into fixed capital. In that case, however, the concluding sentence—“_Such are luxuries of all kinds_”, is incorrect.

However, productivity in the luxury industries can only increase in the same way as it does in all others—either because natural resources such as the land, mines, etc., from which the raw materials for luxuries are procured, become more productive, or new, more productive sources are discovered; or again by
application of the division of labour, or, especially, by the use of machinery (or of better tools) and of natural forces. //The improvement of tools and their increasing differentiation belongs to the division of labour.// (One should not forget chemical processes.)

Let us now assume that the production time for luxuries is reduced due to machinery (or chemical processes), that less labour is required to produce them. This cannot have the slightest influence on wages, on the value of labour capacity, since these articles do not enter into the consumption of the workers (at least never into that part of their consumption which determines the value of their labour capacity). //It can influence the market price of labour, if workers are thrown onto the streets as a result of these developments and the influx onto the labour market is thereby increased.// Increased productivity in the luxury industries, therefore, has no influence on the rate of surplus value nor, consequently, on the rate of profit in so far as this is determined by the rate of surplus value. Nevertheless, it can indeed influence the rate of profit in so far as it affects either the amount of surplus value or the ratio of variable capital to constant capital and to the total capital. If, for example, machinery makes it possible to employ 10 workers where 20 were previously employed, then, indeed, the rate of surplus value is not modified in any way. The cheapening of luxury articles does not enable the worker to live more cheaply. He requires the same amount of labour time to reproduce his labour capacity as he did previously.

//In practice, therefore, the manufacturer of luxury articles seeks to depress the wages of labour below its value, [below] its minimum. This he is able to do because of the relative surplus population engendered by increasing productivity in other branches of industry, for example among knitters. Or—as likewise happens in these branches—he seeks to extend the absolute labour time, thus, in fact, producing absolute surplus value. It is correct, however, that productivity in the luxury industries cannot reduce the value of labour capacity, it cannot produce any relative surplus value and, in general, cannot produce that form of surplus value which results from the growing productivity of industry as such.//

The amount of surplus value is determined in two ways: by the rate of surplus value, that is, the surplus labour (absolute or relative) of the individual workers; secondly, by the number of workers simultaneously employed. In so far therefore as increasing productivity in the luxury industry reduces the number of workers which a certain quantity of capital employs, it reduced the
amount of surplus value. Hence all other circumstances remaining the same, [it reduces also] the rate of profit. The same thing occurs if the number of workers is reduced, or remains the same, but the capital laid out on machinery and raw materials is increased; in other words, [it occurs] wherever there is any diminution in the ratio of variable capital to the total capital which is not balanced or partially offset by a reduction in wages. But since the rate of profit in this sphere [XVIII-1098] enters into the equalisation process of the general rate of profit just as much as that in any other sphere, increased productivity in the luxury industry would, in the case under consideration, bring about a fall in the general rate of profit.

Conversely: If the increased productivity in the luxury industry was [due to improvements carried out] not in that industry itself, but in those branches of industry which provide it with constant capital, then the rate of profit would rise in the luxury industry.

//Surplus value (that is, its size, its quantity, its total amount) is determined by the rate of surplus value multiplied by the number of workers employed. Certain circumstances may affect both factors simultaneously either in the same direction or in opposite directions, or they may affect only one of the factors. Apart from the absolute lengthening of the working day, increased productivity in the luxury industry can affect only the number [of workers employed]. The inevitable consequence therefore is a reduction in the amount of surplus value and hence in the rate of profit, even if no increase in constant capital takes place. If the constant capital does increase, however, a reduced amount of surplus value is calculated on an increased total capital.//

Ramsay comes closer to a correct understanding of the rate of profit than the others. The shortcomings too are therefore more conspicuous in his exposition. He brings out all the factors involved, but he does it one-sidedly and therefore incorrectly.

Ramsay sums up his view of profit in the following passage:

“The rate of profit in individual cases is therefore determined by the following causes: 1) The productiveness of the industry engaged in raising the articles of first necessity which are required by the labourer for food, clothing, etc.; 2) the productiveness of the industry employed in raising the objects which enter into the composition of fixed capital; 3) the rate of real wages.”

//Here this must mean the quantity of necessaries, etc., which the worker receives, whatever be the price of the articles composing it.//

“A variation in the 1st and 3rd of these *causes acts upon profit by altering the proportion of the gross produce which goes to the labourer: a change in the
second affects the same, by modifying the proportion necessary for replacing, either directly or by means of exchange, the fixed capital consumed in production; for profit is essentially a question of proportion*" ([p.] 172).

He rightly reproaches Ricardo (although Ramsay's own presentation is also inadequate):

"Ricardo overlooks the fact that the whole product is not only divided up between wages and profits, but that a part of it is also necessary for replacing fixed capital" ([p.] 174, note).

//It can already be noted in the first description of accumulation, i.e. of the conversion of surplus value into capital, that the entire surplus labour takes the form of capital (constant and variable) and of surplus labour (profit, interest, rent). For this conversion reveals that surplus labour itself assumes the form of capital and that the unpaid labour of the worker confronts him as the totality of the objective conditions of labour. In this form it confronts him as alien property with the result that the capital which is antecedent to his labour, appears to be independent of it. [It appears] as a ready-made value of a given magnitude, whose value the worker merely has to augment. It is never the product of his past labour (nor any circumstances which, independently of the particular labour process into which the past labour of his enters, affect or increase its value) which, or the replacement of which, appears as exploitation, but it is always merely the manner and the rate in which his present labour is exploited. As long as the individual capitalist continues to operate on the same scale of production (or on an expanding one), the replacement of capital appears as an operation which does not affect the worker, since, if the conditions of production belonged to the worker, he would likewise have to replace them out of the gross produce in order to continue reproduction on the same scale or on an expanded scale (and the latter too is necessary because of the natural increase of population). But this affects the worker in three respects: 1) The perpetuation of the conditions of production as property alien to him, as capital, perpetuates his condition as wage worker and hence his fate of always having to work part of his labour time for a third person for nothing; 2) the extension of these conditions of production, alias accumulation of capital, increases the extent and the size of the classes who live upon his surplus labour; it worsens his position relatively by augmenting the relative wealth of the capitalist and his co-partners, by further increasing his relative surplus labour through the division of labour, etc., and reduces that part of the gross produce which is used to pay wages; [3] finally, since the conditions of labour confront the individual worker in an ever
more gigantic form and increasingly as social forces, the chance of
his taking possession of them himself as is the case in small-scale
industry, disappears. //

[VIII-1099] Ramsay uses the term *GROSS PROFIT* for what I call
simply profit. He divides this *GROSS PROFIT* into *NET PROFIT* (interest)
and *PROFIT OF ENTERPRISE* (industrial profit).

Ramsay, like Ricardo, takes issue with Adam Smith on the
question of the *fall in the GENERAL RATE OF PROFIT*.

Refuting Smith, he writes:

"*COMPETITION of the master-capitalists can indeed LEVEL the profits rising
especially high above the level*" //this LEVELLING is by no means a sufficient
explanation for the formation of a *GENERAL RATE OF PROFIT*// "but it is wrong to say
*THAT THIS ORDINARY LEVEL ITSELF IS LOWERED*" ([pp.] 179-80).\a

"Were it possible that the price *of every commodity, both raw and fabricated,
should fall in consequence of the competition among the producers, yet this could
not in any way affect profit. Each master-capitalist would sell his produce for less
money, but,* on the other hand, *every article of his expenses, whether belonging
to fixed capital or to circulating, would cost him a proportionally smaller sum"
([pp.] 180-81).

*Ditto against Malthus:*

*"The idea of profits being paid by the consumers, is, assuredly, very absurd.
Who are the consumers? They must be either landlords, capitalists, masters,
labourers, or else people who receive a salary, etc."* ([p.] 183).

"*The only competition which can affect the general rate of gross profits, is that
between master-capitalists and labourers*"* ([p.] 206).

The last sentence expresses the true gist of Ricardo's proposi-
tion. The rate of profit can fall independently of the *COMPETITION
BETWEEN CAPITAL and LABOUR, but this is the *only kind of COMPETITION
which can bring about its decrease. Ramsay himself, however,
does *not* advance *any* reasons why the general rate of profit has a
tendency to fall. The only thing he says—and which is correct—is
that the *rate of interest* can fall quite independently of the *RATE OF
GROSS PROFITS* in a given country, namely:

"But were we even to suppose, that *CAPITAL WAS NEVER BORROWED WITH ANY
VIEW BUT TO PRODUCTIVE EMPLOYMENT*, it is possible that interest might vary without
ANY CHANGE IN THE RATE OF GROSS PROFITS. For, *AS A NATION ADVANCES IN THE
CAREER OF WEALTH, A CLASS OF MEN SPRINGS UP AND INCREASES more and more, who
by the labours" //EXPLOITATION, ROBBERY// "of their ANCESTORS find themselves in
the possession of FUNDS sufficiently ample to afford a handsome maintenance from
the interest alone. Very many also who during youth and middle age were actively
engaged in business, retire in their latter days to live quietly on the interest of the
sums they have themselves accumulated. These two classes have a tendency to
INCREASE with the increasing riches of the country, FOR THOSE WHO BEGIN WITH A

\a This is not a quotation but Marx's rendering of the ideas developed by
Ramsay.—*Ed.*
TOLERABLE STOCK ARE LIKELY TO MAKE AN INDEPENDENCE SOONER THAN THEY WHO COMMENCE WITH LITTLE. Therefore, in old and rich countries, the AMOUNT of NATIONAL CAPITAL belonging to those who are unwilling to take the trouble of employing it themselves, BEARS A LARGER PROPORTION TO THE WHOLE PRODUCTIVE STOCK OF THE SOCIETY, than in Newly Settled and Poor Countries. How numerous [is] the class of Rentiers in England! As the class of Rentiers increases, so also does that of Lenders of Capital, for they are one and the same. For this reason alone, interest must have had a tendency to fall in old countries” ([p.] 201 sqq.).

Ramsay says about the RATE OF NET PROFIT (interest) that it “depends partly upon the RATE OF GROSS PROFITS, partly on the proportion in which these are separated into interest and industrial profit. This proportion depends upon the competition between the Lenders and Borrowers of Capital. This competition is influenced, though by no means entirely regulated, by the rate of gross profit expected to be realised. And the competition is not exclusively regulated by this cause because on the one hand many borrow without any view to productive employment, and, on the other, because the proportion of the *whole national capital to be lent, varies with the riches of the country independent of any change in gross profits” ([pp.] 206-07). “The profits of enterprise depend upon the net profits of capital, not the latter upon the former”* ([p.] 214).

[XVIII-1100] Apart from the circumstance mentioned earlier, Ramsay says—rightly:

“Interest is only a measure of industrial profits where the level of civilisation is such that the want of certainty of repayment is not a factor which enters into the calculation...a In England, for instance, at the present day, we cannot consider compensation for risk as at all entering into the interest received from funds [lent] on what would be called good security” ([p.] 199, note).

Speaking of the industrial capitalist, whom he calls the master-capitalist, Ramsay remarks:

“The industrial capitalist is the general distributior of wealth; he pays to the labourers, the wages, to the capitalist, the interest, to the proprietor, the rent. On the one hand are masters, on the other, Labourers, Capitalists and *landlords. The interests of these two grand classes are diametrically opposed to each other. It is the master who hires labour, capital, and land, and of course tries to get the use of them on as low terms as possible; while the owners of these sources of wealth do their best to let them as high as they can”* ([pp.] 218-19).

**Industrial profit.** (Labour of superintendence.)

What Ramsay writes about industrial profit (and especially, about the labour of superintendence) is on the whole the most reasonable part of his book, although part of his demonstration is borrowed from Storch.b

The exploitation of labour costs labour. In so far as the labour performed by the industrial capitalist is rendered necessary only because of the contradiction between capital and labour, it enters

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a This sentence is a paraphrase of Ramsay by Marx.—Ed.
b See H. Storch, Cours d'économie politique..., Vol. I, Paris, 1823, Ch. 12-13.—Ed.
into the cost of his overlookers (the industrial non-commissioned officers) and is already included in the category of wages in the same way as costs caused by the slave overseer and his whip are included in the production costs of the slave-owner. These costs, like the greater part of the trading expenses, belong to the faux frais of capitalist production. As far as the general rate of profit is concerned, the labour of the capitalists arising from their competition with one another and their attempts to ruin one another counts just as little as the greater or lesser skill of one industrial capitalist compared to another in extracting the largest amount of surplus labour from his workers for the smallest expenditure and making the best use of this extracted surplus labour in the process of circulation. These matters should be dealt with in the analysis of the competition of capitals.\textsuperscript{67} Such an analysis deals in general with the struggle of the capitalists and their effort to acquire the greatest possible amount of surplus labour and it is concerned only with the division of the surplus labour amongst the different individual capitalists, and not with the origin of surplus labour or its general extent.

All that remains for the labour of superintendence is the general function of organising the division of labour and the cooperation of certain individuals. This labour is fully taken into account in the wages of the general manager in the larger capitalist enterprises. It has already been deducted from the general rate of profit. The best practical proof of this is provided by the cooperative factories set up by the English workers,\textsuperscript{168} for these, despite the higher rate of interest they have to pay, yield profits higher than average, although the wages of the general manager, which are naturally determined by the market price for this kind of labour, are deducted. The industrial capitalists who are their own general managers save one item of the production costs, pay wages to themselves, and consequently receive a rate of profit above the average. If this assertion of the apologists were taken literally tomorrow, and the profit of the industrial capitalist limited to the wages of management and direction, then capitalist production, the appropriation of the surplus labour of others and its transformation into capital would come to an end the day after tomorrow.

However, if we consider this [payment of the] labour of superintendence as wages concealed in the general rate of profit, then the law established by Ramsay\textsuperscript{a} and others applies, namely, that

while profit (industrial profit as well as gross profit) is proportional to the amount of capital advanced, this portion of the profit stands in inverse ratio to the size of the capital, it is infinitesimally small in the case of large capital and enormously large where the capital is small, i.e. where the capitalist production is purely nominal. Whereas the small capitalist, who does almost all the work himself, seems to obtain a very high rate of profit in proportion to his capital, what happens in fact is that, if he does not employ a few workers whose surplus labour he appropriates, he actually makes no profit at all and his enterprise is only nominally a capitalist one (whether he is engaged in industry or in commerce). What distinguishes him from the wages worker is that, because of his nominal capital, he is indeed the master and owner of his own conditions of labour and consequently has no master over him; [XVIII-1101] and hence he appropriates his whole labour time himself instead of it being appropriated by someone else. What appears to be profit here, is merely the excess over ordinary wages, an excess which results from the fact that he appropriates his own surplus labour. However, this phenomenon belongs exclusively to those spheres which have not as yet been really conquered by the capitalist mode of production.

"The profits of enterprise may be considered as made up of 3 parts: 1) the salary of the master; 2) [an insurance for] his risk; 3) his surplus gains" ([p.] 226).

As regards point 2) it is quite irrelevant here. Corbet* (and Ramsay himself b) has stated that the insurance which covers the risk only distributes the losses of the capitalists uniformly or distributes them more generally amongst the whole class. The profits of the insurance companies—that is, of the capitals which are employed in the business of insurance, and take over this distribution—must be deducted from these uniformly distributed losses. These companies receive a part of the surplus value in the same way as mercantile or coined capitalists do, without participating in its direct production. This is a question of the distribution of the surplus value amongst the different sorts of capitalists and of the deductions which are consequently made from [the surplus value accruing to] the individual capitalists. It has nothing to do either with the nature or with the extent of the surplus. The worker obviously cannot provide any more than his surplus labour. He cannot make an additional payment to the capitalist so that the

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*a See this volume, p. 243.—Ed.
latter may *insure* the fruits of this *surplus* labour *against* loss. At most one could say that, even *apart from* capitalist production, the producers themselves might have certain expenses, that is, they would have to spend a part of their labour, or of the products of their labour in order to insure their products, their wealth, or the elements of their wealth, against accidents, etc. Instead of each capitalist insuring himself, it is safer as well as cheaper for him if one section of capital is entrusted with this job. *Insurance* is paid out of a portion of *surplus value*, its protection and distribution between the capitalists has nothing to do with its origin and extent.

What is left is 1) the *salary* and 2) the *surplus gains*, as Ramsay calls that part of *surplus value* which falls to the industrial capitalist as opposed to the interest-grabber and which, consequently, is determined absolutely by the ratio of interest to industrial profit;[i.e. the ratio between] the two parts into which the *surplus value* accruing to capital (in contrast to landed property) is divided.

As far as 1), the *salary*, is concerned, it is *d'abord* self-evident that in capitalist production, the function of capital as lord over labour falls to the capitalist, or a clerk or a representative paid by him. Even this function would disappear together with the capitalist production, in so far as it does not arise from the nature of cooperative labour but from the domination of the conditions of labour over labour itself. Ramsay himself however sweeps away this element or reduces it to such an extent that it is not worth speaking of.

"The salary [of the employer], like the labour [of superintendence], remains roughly the same, be the concern large or small" ([pp.] 227, 229). "A worker will never be able to say that he can do the same amount of work as 2, 3 or more of his workmates. But one industrial capitalist or farmer can take the place of 10 or 15" ([p.] 255).

The 3rd part, the *surplus gains*, includes [compensation for] risks—which are only *possible* risks, nothing but the possibility of losing the *gains* and the capital—it in fact however takes the form of *insurance* and therefore of a share which certain capitals in a particular branch receive in the total *surplus value*.

"These surplus gains," Ramsay writes, *"do truly represent the revenue derived from the power of commanding the use of capital"* //in other words from the *power of commanding other people's labour/* whether belonging to the person himself or borrowed from others...* the net profits* (interest) *"vary exactly as the amount of capital; on the contrary, the larger the capital, the larger the proportion of the surplus gains to the stock employed"* ([p.] 230).

In other words, this means nothing more than that the *salaries of masters* stand in inverse ratio to the size of the capital. The larger
the scale on which the capital operates, the more capitalist the mode of production, the more negligible is the element of industrial profit which is reducible to salary, and the more clearly appears the real character of industrial profit, namely, that it is a part of the surplus gains, i.e. of surplus value, i.e. of unpaid surplus labour.

The whole contradiction between industrial profit and interest only has meaning as a contradiction between the rentier and the industrial capitalist, but it has not the slightest bearing on the relationship of the worker to capital, the nature of capital, or the origin of the profit capital yields, etc.

With regard to rent not derived from corn, Ramsay says:

*"In this manner the rent paid for one species of produce becomes the cause of the high value of others"* ([p.] 279).

"Revenue," says Ramsay in the final chapter, *"differs from the annual gross produce, simply by the absence of all those objects which go to keep up fixed capital"* (by which he means constant capital, raw materials in all stages of production, matières instrumentales and machinery, etc.) ([p.] 471).

[XVIII-1102] Ramsay has already said* and repeats in the final chapter that

"CIRCULATING CAPITAL" (that is, his term for capital laid out in wages) is superfluous, it is *"neither an immediate agent in production, nor even essential to it at all"* ([p.] 468).

But he does not draw the obvious conclusion that by denying that wage labour and capital laid out in wages are essential, the necessity for capitalist production in general is denied and the conditions of labour consequently cease to confront the workers as "capital" or, to use Ramsay's term, as "fixed capital". One part of the conditions of labour appears as fixed capital only because the other part appears as circulating capital. But once capitalist production is presupposed as a fact, Ramsay declares that wages and gross profits of capital (industrial profit or, as he calls it, profit of enterprise, included) are necessary forms of revenue ([pp.] 478, 475).

These are naturally the two forms of revenue which, in their simplicity and generality, indeed epitomise the essence of the capitalist production and of the two classes on which it is based. On the other hand, Ramsay declares that rent, in other words landed property, is a superfluous form of capitalist production ([p.] 472), but forgets that it is a necessary product of this mode of production. The same applies to his statement that the "net profit of capital", that is, interest, is not a necessary form.

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* See this volume, pp. 256-57.— Ed.
"It would only be necessary for the rentiers to become industrial capitalists. As regards national wealth this makes no difference... The net profit need certainly not be so high as to afford separate incomes to the owner and the employer" ([pp.] 476-77).

Here he again forgets what he has said himself, namely that, as a necessary consequence of the development of capital, a constantly growing class of rentiers comes into being.\(^b\)

"Gross profits of capital and enterprise [are] ... essential in order that production should go on" ([p.] 475).

Naturally. Without profit, no capital and without capital, no capitalist production.

Thus, the conclusion at which Ramsay arrives is, on the one hand, that the capitalist mode of production based on wage labour is not really a necessary, i.e. not an absolute form of social production (which Ramsay himself expresses only in a rather limited form by stating that "circulating capital" and "wages" [would be] superfluous if the mass of the people were not so poor that they had to receive their share of the product in advance, before it was completed); on the other hand, [he concludes] that interest (in contrast to industrial profit) and rent (that is, the form of landed property created by capitalist production itself) are superfetations which are not essential to capitalist production and of which it can rid itself. If this bourgeois ideal were actually realisable, the only result would be that the whole of the surplus value would go to the industrial capitalist directly, and society would be reduced (economically) to the simple contradiction between capital and wage labour, a simplification which would indeed accelerate the dissolution of this mode of production.

//In The Morning Star (December 1, 1862), a manufacturer moans:

\*"Deduct from the gross produce the wages of labour, the rent of land, the interest on capital, the cost of raw material, and the gains of the agent, merchant, or dealer, and what remained was the profit of the manufacturer, the Lancashire resident, the occupier, on whom the burden of maintaining the workmen for so many partakers in the distribution of the gross produce is thrown."\*\(^c\)

//If one disregards the value and considers the gross produce in natura, it is clear that after the replacement of the constant capital

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\(^a\) Ramsay has "gross".—Ed.

\(^b\) See this volume, pp. 278-79.—Ed.

\(^c\) "Lancashire Profits and Lancashire Rates", The Morning Star, No. 2101, December 1, 1862, p. 5.—Ed.
and the capital laid out in wages, that portion of the product which remains constitutes the surplus value. From this however has to be deducted a portion for rent and the gains of the agents, merchants or dealers, all of whom, whether they use capital of their own or not, also share in that part of the gross produce which constitutes surplus value. All these therefore are deductions for the manufacturer. His profit itself is subdivided into industrial profit and interest—if he has borrowed capital.//

With regard to differential rent: The work of the labourer working on more fertile soil is more productive than that of a man working on less fertile soil. If, therefore, he were to be paid in natura, he would receive a smaller share of the gross produce than the labourer working on less fertile soil. Or, what amounts to the same thing, his relative surplus labour would be greater than that of the other labourer, although he worked the same number of hours per day. But the value of the wage of the one is equal to that of the other. Hence the profit of his employer is no greater [than that of the other employer]. The surplus value contained in the additional amount of his product, the greater relative productivity of his labour, or the differential surplus labour performed by him, is pocketed by the landlord.//

n) CHERBULIEZ, RICHESSE OU PAUVRETÉ, PARIS, 1841
(REPRINT OF THE GENEVA EDITION)
[PUBLISHED UNDER THE TITLE RICHE OU PAUVRE]

(It is questionable whether we should specially include this fellow in this group [of economists] since most of what he writes is based on Sismondi, or whether we should on occasion insert his pertinent remarks in the form of quotations.165)

[XVIII-1103] "Capital," says Cherbuliez, consists of "the raw materials, the tools, the means of subsistence [approvisionnement]" (p. 16). "There is no difference between a capital and any other part of wealth. A thing only becomes capital by the use that is made of it, that is to say, when it is employed in a productive operation, as raw material, as instrument, or as means of subsistence" ([p.] 18).a

This is the standard way of reducing capital to the material elements in which it presents itself in the labour process, i.e. means of labour and means of subsistence. The latter category, moreover, is not accurate since, though means of subsistence are indeed a condition for the producer, a prerequisite enabling him to exist during production, they themselves do not enter into the

a Marx quotes in French.—Ed.
labour process, into which nothing enters but the object of labour, the means of labour and labour itself. Thus the objective factors of the labour process—which are common to all forms of production—are here called *capital*, although the *approvisionnement* (in which wages are already included) tacitly implies the *capitalist* form of these conditions of labour.

Cherbuliez, like Ramsay, [assumes] that the *approvisionnement*—which Ramsay calls *circulating capital*—diminishes (relatively, at any rate, to the total amount of capital and absolutely in so far as machinery continually throws workers out of employment). But both he and Ramsay appear to think that there is an inevitable reduction in the amount of means of subsistence, of *necessaries*, which can be employed as productive capital. But this is by no means the case. In this context, people always confuse that part of the *gross product* which replaces capital and is employed as capital, with that part which represents the *surplus produce*. The *approvisionnement* decreases because a large portion of capital, that is, the part of the *gross produce* employed as capital, is reproduced as constant capital instead of as variable capital. A large portion of the *surplus produce*, consisting of means of subsistence, is consumed by unproductive workers or idlers or exchanged for *luxuries*. *Voilà tout.*

True, the fact that a constantly smaller part of the total capital is converted into variable capital can also be expressed in other ways. The part of capital which consists of variable capital = that part of the total product which the worker himself appropriates, produces for himself. Therefore, the smaller this part is the smaller accordingly is the portion of the total number of workers which is required to reproduce it (just as in the case of the individual worker, who works correspondingly less labour time for himself). The total product, like the total labour, of the workers falls into 2 parts. One part the workers produce for themselves; the other part they produce for the capitalist. Just as the [labour] time of the individual worker can be divided into 2 parts, so can the [labour] time of the whole working class. If the surplus labour = $1/2$ day, it is the same as if half the working class produces means of subsistence for the working class and the other half produces raw materials, machinery and finished products for the capitalists, partly as producers and partly as consumers.

It is ridiculous that Cherbuliez and Ramsay believe that the part of the *gross produce* which can be consumed by the workers and can

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*a* That's all.—*Ed.*
enter into their consumption in natura has been reduced of necessity or reduced at all. Only that part has been reduced which is consumed in this form and therefore as variable capital. On the other hand, a larger portion is eaten up by servants, soldiers, etc., or exported and exchanged for more sumptuous means of subsistence.

The only important thing in both Ramsay and Cherbuliez is that they actually counterpose variable and constant capital and do not confine themselves to the distinction between fixed and circulating capital derived from circulation. For Cherbuliez counterposes that part of capital which goes on approvisionnement to that which consists of matières brutes, matières instrumentales and means of labour, i.e. instruments, machines. Although two constituent elements of constant capital—matières brutes and instrumentales—belong to circulating capital as far as the mode of circulation is concerned.

The important thing in variations in the constituent elements of capital is not that relatively more workers are occupied in the production of raw materials and machinery than in that of direct means of subsistence—this concerns only the division of labour—but the proportion of the product which has to be used to replace past labour (i.e. to replace constant capital) to that which has to be used to pay living labour. The larger the scale of capitalist production, and hence the greater the accumulation of capital—the greater is the share in the value of the product falling to the machinery and raw material into which the capital employed in the production of machinery and raw material can be resolved. A correspondingly larger portion of the product must therefore be returned to production either in natura or by the producers of constant capital exchanging some of their products amongst themselves. The part of the product which belongs to production becomes larger, and the part which represents living, newly added labour becomes relatively smaller. Of course, this part grows in terms of commodities—use values, since the development described is synonymous with increased productivity of labour. But the portion of this part which the worker receives falls relatively all the more. And the same process gives rise to a continuous relative redundancy of the working population.

[XVIII-1104] //It is an incontrovertible fact that, as capitalist production develops, the portion of capital invested in machinery and raw materials grows, and the portion laid out in wages declines. This is the only question with which both Ramsay and

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\(\text{a} \) Raw materials, instrumental materials.—Ed.
Cherbuliez are concerned. For us, however, the main thing is: does this fact explain the decline in the rate of profit? (A decline, incidentally, which is far smaller than it is said to be.) Here it is not simply a question of the quantitative ratio but of the value ratio.

If 1 worker can spin as much cotton as 100 [workers spun previously], then the [supply of] raw material must be increased a hundredfold, and this is moreover brought about only by the spinning machine which enables one worker to control 100 spindles. But if simultaneously one worker produces as much cotton as 100 workers did previously and 1 worker produces a spinning machine whereas previously he produced only a spindle, then the ratio of value remains the same, that is, the labour expended in the spinning, [in the production of] the cotton and the spinning machine remains the same as that expended previously in spinning, the cotton and the spindle.

As far as the machinery is concerned, its cost is not as great as that of the labour it displaces, although the spinning machine is much more expensive than the spindle. The individual capitalist who owns a spinning machine must possess a greater amount of capital than the individual spinner who buys a spinning wheel. But the spinning machine is cheaper than the spinning wheel in relation to the number of workers it employs. Otherwise it would not have displaced the spinning wheel. The place of the spinner is taken by a capitalist. But the capital which the former laid out on the spinning wheel was larger relative to the size of the product, than that which the capitalist lays out on the spinning machine.//

The increasing productivity of labour (in so far as [it is] connected with machinery) is identical with the decreasing number of workers relatively to the number and extent of the machinery employed. Instead of a simple and cheap instrument a collection of those instruments (albeit modified) is put in place, and besides that collection the whole part of the machinery consisting of the moving and conducting parts; besides the materials used (like coal, etc.) to produce the moving agent (as steam). Finally, the buildings. If one worker is in charge of 1,800 spindles instead of driving a spinning wheel, it would be quite ridiculous to ask why these 1,800 spindles are not as cheap as the single spinning wheel. The productivity in this case is brought about precisely by the amount of capital employed as machinery. The ratio of the wear and tear

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* The passage within double oblique lines was crossed out by Marx.— Ed.
of the machinery affects only the commodity; the worker confronts the total amount of machinery and similarly the value of the capital laid out in labour confronts the value of the capital laid out in machinery.

There can be no doubt that machinery becomes cheaper, and this for two reasons: [1] The application of machinery to the production of raw materials from which the machinery is made. [2] The application of machinery in the transformation of these materials into machinery. In saying this, we already say two things. Firstly, that in both these branches, compared with the instruments required in the manufacturing industry, the value of the capital laid out in machinery also grows as compared with that laid out in wages. Secondly, what becomes cheaper is the individual machine and its component parts, but a system of machinery develops; the tool is not simply replaced by a single machine, but by a whole system, and the tools which perhaps played the major part previously, the needle for example (in the case of a stocking loom or a similar machine), are now assembled in thousands. Each individual machine confronting the worker is in itself a colossal assembly of instruments which he formerly used singly, e.g. 1,800 spindles instead of one. But in addition, the machine contains elements which the old instrument did not have, etc. Despite the cheapening of individual elements, the price of the whole aggregate increases enormously and the [increase in] productivity consists in the continuous expansion of the machinery. Further, one factor in the cheapening of machinery apart from that of its elements, is the cheapening of the source of the motive power (the steam-boiler, for example) and of the transmission mechanism. Economy of power. But this results precisely from the fact that to an increasing extent the same motor can drive a larger system of machines. The motor becomes relatively cheaper (or its cost does not grow in the same ratio as the increase in the size of the system in which it is employed; the motor becomes more expensive as its power grows, but not in the same proportion); even when its cost increases absolutely, it declines relatively. This is therefore a new motive, quite apart from the price of the individual machine, for increasing the capital that is laid out in machinery and confronts labour. One element—the increasing speed of machinery—increases productive power enormously but it does not affect the value of the machinery itself in any way.

It is therefore self-evident or a tautological proposition that the increasing productivity of labour caused by machinery corresponds to increased value of the machinery relative to the amount of
labour employed (consequently to the value of labour, the variable capital).

[XVIII-1105] All circumstances which result in the use of machinery leading to a reduction in the price of commodities can be attributed, firstly, to a decrease in the amount of labour embodied in each individual commodity, secondly, however, to a decrease in the wear and tear of the machinery whose value enters into the individual commodity. The less rapid the wear and tear of the machinery, the less labour is required for its reproduction. This therefore increases the amount and the value of the capital existing as machinery as compared with that existing in labour.

Only the question of raw material therefore remains to be dealt with. It is obvious that the quantity of raw material must increase proportionally with the productivity of labour; that is, the amount of raw material must be proportionate to that of labour. This relationship is closer than it appears. Let us assume, for example, that 10,000 lbs of cotton are consumed weekly. Calculating 50 weeks to the year, this would amount to 10,000×50, that is, 500,000 lbs. Let us also assume that the amount paid out in wages=£5,000 over the year. And if a pound of cotton is assumed to cost 6d. this comes to 250,000s.=£12,500. Let us assume that the capital turns over 5 times during the year. This means that in the course of a fifth of a year, 100,000 lbs of cotton is used=£2,500. And £1,000 goes on wages in the same fifth of a year. This is more than \( \frac{1}{3} \) of the value of the capital laid out on the cotton.\(^{170} \) This does not alter the ratio. If the value of the cotton=[£]10,000 every \( \frac{1}{5} \) of a year and that of the labour=1,000, then it will be \( \frac{1}{10} \). (If one considers the product of the whole year, 50,000 on one side and 5,000 on the other—it is also \( \frac{1}{10} \).

//The value of a commodity, *quoad* machinery,\(^{a} \) is determined by the wear and tear of the machinery, that is, solely by the value of the machinery in so far as it enters into the valorisation process, in other words, in so far as it is used up in the labour process. Profit, on the contrary, is determined (leaving raw materials out of account) by the value of the whole of the machinery which enters into the labour process irrespective of the degree to which it is used up. Profit must therefore decline as the total amount of [living] labour employed declines compared with the part of capital laid out in machinery. It does not decline in the same proportion because surplus labour increases.//

One may ask with regard to raw material: If, for example,

\(^{a} \) As far as machinery is concerned.—Ed.
productive power in spinning increases tenfold, that is, 1 worker spins as much as ten did previously, why should not 1 NIGGER produce as much cotton as 10 did previously, that is, why should the value ratio not remain the same? The spinner uses 10 times as much cotton in the same time, but the NIGGER produces 10 times as much cotton in the same time. The 10 times larger amount of cotton therefore costs no more than a tenth of this amount cost previously. This means that despite the increase in the amount of the raw material, its value ratio to variable capital remains the same. In fact it was only the large fall in the price of cotton which enabled the cotton industry to develop in the way it did. The dearer the material (gold and silver, for example) the less are machinery and the division of labour applied in transforming it into articles of luxury. This is because too much capital has been advanced for the raw materials and the demand for these products is limited owing to the expensive raw materials.

To this it is quite easy to answer that some kinds of raw materials, such as wool, silk, leather, are produced by animal organic processes, while cotton, linen, etc., are produced by vegetable organic processes; capitalist production has not yet succeeded, and never will succeed in mastering these processes in the same way as it has mastered purely mechanical or inorganic chemical processes. Raw materials such as skins, etc., and other animal products become dearer partly because the insipid law of rent increases the value of these products as civilisation advances. As far as coal and metal (wood) are concerned, they become much cheaper with the advance of production; this will however become more difficult as mines are exhausted, etc.

//While it can be said with regard to corn rent and mine rent that they do not increase the value of the product (only its market price) but are rather the expression of the value of the product (the excess of its value over the production price), there is, on the other hand, no doubt that animal rent, house rent, etc., are not consequences but causes of the increasing values of these things.

The cheapening of raw materials, and of matières instrumentales, etc., checks but does not cancel the growing value of this part of capital. It checks it to the degree to which it brings about the fall in profit.//
//This rubbish is herewith disposed of.// (If tomorrow the price of cotton were to drop by 90 per cent, the spinning industry would develop even more rapidly the day after tomorrow, etc.)

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a See p. XI of the Preface.—Ed.
//In considering profit, surplus value is assumed as given. And only the variations in constant capital and their influence on the rate of profit are considered. There is only one way in which surplus value directly affects constant capital, namely through absolute surplus labour, lengthening of the working day, as a result of which the relative value of constant capital is reduced. Relative surplus labour—where the working day remains unaltered (apart from the greater intensification of labour)—increases the value ratio of profit to total capital by increasing the surplus itself. Absolute surplus labour time reduces the cost of constant capital relatively.//

[XVIII-1106] Let us return to Cherbuliez.

The formulas he uses for the rate of profit are either mathematical expressions for profit as it is commonly understood, without involving any kind of law, or they are quite wrong, although he has an inkling of the matter, approaches close to it.

"Commercial profit is determined by the value of the products compared with the different elements of productive capital."

//In point of fact, profit is the relationship of the surplus value of the product to the value of the total capital advanced regardless of the differences in its elements. But the surplus value is itself determined by the size of the variable capital and the rate of its valorisation, and the ratio of this surplus value to the total capital is again determined by the ratio of the variable to the constant capital and also by changes in the value of constant capital.//

"Evidently the two chief elements in this determination are the price of the raw materials and amount of approvisionnement required to work them up. The economic progress of society affects these two elements in an opposite way and it tends to make raw materials dearer by increasing the value of all the products of the extractive industries, which are carried out on land that is privately owned and limited in extent" (p. 70). On the other hand, the approvisionnement decreases (relatively), a matter to which we shall return presently.

"The total amount of products, less the total amount of capital expended in producing them, provides us with the total amount of profit gained during a definite period of time. The growth in the total amount of products is proportionate to the capital advanced and not to the capital consumed. The rate of profit, or the ratio of profit to capital, is therefore the result of the combination of two other ratios, namely, the ratio between the capital advanced and that consumed, and the ratio between the capital consumed and the product" (I.c., [p.] 70).

Cherbuliez first states correctly that profit is determined by the value of the product in relation to the "different elements" of productive capital. Then he flies off suddenly to the product itself,

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Marx quotes partly in German and partly in French.—Ed.
to the total amount of products. But the amount of products may increase without its value increasing. Secondly, a comparison between the amount of the product and the quantity of products of which the capital—used up and not used up—consisted, can at best only be made in the way Ramsay does, by comparing the aggregate natural product with the ingredients expended in *natura.* But as regards capital, the form taken by the product is different from its ingredients in every particular sphere of production (even in those branches of industry in which, as in agriculture, etc., one part of the product is used in *natura* as a production element of the product). Why does Cherbuliez stray on to this *faux fuyant*? Because, despite his vague idea that the organic composition of capital is decisive for the rate of profit, he in no way uses the contradiction between variable capital and the other part of capital in order to explain surplus value—which, like value itself, he does not explain at all. He has not shown how surplus value arises and therefore has recourse to surplus produce, i.e. to use value.

Although all surplus value takes the form of surplus produce, surplus produce as such does not represent surplus value. //A product may contain no surplus value, as, for example, in the case of a peasant who owns his own implements (as well as his own land) and only works exactly the same amount of time as any wage worker does to reproduce his own wages, say 6 hours. In a good year, he might produce twice as much [as usual]. But the value would remain the same. There would be no surplus value, although [there would be] surplus produce. //</br>

In itself it was already a mistake on the part of Cherbuliez to represent variable capital in the "passive" and purely material form of approvisionnement, that is, as use value, a form which it obtains in the hands of the workers. If, on the other hand, he had considered it in the form in which it actually appears, namely, as money (as the form in which exchange value, i.e. a certain amount of social labour time as such, exists), then for the capitalist it would resolve in the labour which he exchanges for it (and, as a result of this exchange of objectified labour for living labour, the variable capital would be set in motion and would grow); variable capital in the shape of labour—but not if it is regarded as approvisionnement—becomes an element of productive capital. Approvisionnement, on the other hand, is the use value, the material existence of

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*a* See this volume, p. 264.—*Ed.*

*b* False path.—*Ed.*
the variable capital when it becomes the revenue of the worker. Variable capital regarded as *approvisionnement* is, therefore, just as "passive" an element as both the other parts of capital which Cherbuliez describes as "passive".

The same distortion of views prevents him from elaborating the rate of profit out of the *relationship* of this active element to the passive element, and from showing that it declines as society advances. Cherbuliez in fact reaches no other conclusion but that the *approvisionnement* [XVIII-1107] declines as a consequence of the development of the productive power while the working population grows, and so, as a result of the *redundant population*, wages are consequently pushed down below their value. None of his explanations are based on the exchange of [equal] values—or the payment of labour capacity at its value—and profit thus *actually* appears to be a *deduction from wages* (although he doesn't say so). This deduction may indeed occasionally constitute a part of real profits, but it can never serve as the foundation for the elaboration of the category of profit.

Let us *d'abord* reduce the first proposition to its correct formulation.

"The value of the total amount of products, less the value of the total amount of capital expended in producing them, provides us with the total amount of profit gained during a definite period of time."\(^{173}\)

This is the primary (usual) form in which profit appears and it is likewise the form in which it appears in the consciousness of capitalists. Alias [profit is] the excess of the value of the product gained during a definite period of time over the value of the capital expended. Or the excess of the value of the product over the cost price of the product. Even "the definite period of time" in Cherbuliez's statement appears like a bolt from the blue, since he has not dealt with the circulation process of capital. The first proposition, therefore, is nothing but the usual *definition of profit*, of the immediate form in which it appears.

*The second proposition:*

"The growth in the total amount of products is proportionate to the capital employed and not to the capital used up."

Paraphrased again, it would read thus:

"The growth in the *value* of the total amount of products is proportionate to the capital advanced" (*whether consumed or not*).

The only purpose of this is the *surreptitious introduction* of the completely unproven and, in the way it is formulated, quite false proposition (for it already presupposes equalisation to the general
rate of profit) that the amount of profit depends on the amount of capital employed. But an apparent causal nexus is to be introduced because "the growth in the total amount of products is proportionate to the capital employed and not to the capital used up".

Let us take this sentence in both its formulations—that in which it is written and that in which it ought to have been written. In this context—and in accordance with the conclusion which it is intended to serve as medius terminus—a—it should be written as follows:

"The growth in the value of the total amount of products is proportionate to the capital employed and not to the capital used up."

Here, evidently, surplus value is to be evolved on the basis of the fact that the excess of the capital employed over that used up creates the excess value of the products. But the capital which is not used up (machinery, etc.) retains its value (for the fact that it is not used up means precisely that its value has not been used up); it retains the same value after the conclusion of the production process as it had before this process started. If any change in value has taken place, it can only have happened in that part of the capital which has been used up, and which therefore entered into the valorisation process. In point of fact it is also wrong to say that, for example, a capital of which \( \frac{1}{3} \) is not used up and \( \frac{2}{3} \) are used up in production, would inevitably yield a higher profit than one in which \( \frac{2}{3} \) are not used up and \( \frac{1}{3} \) is used up, provided the rate of the exploitation of labour is the same (and disregarding the equalisation of the rate of profit). For obviously, the second capital contains more machinery, etc., and other elements of constant capital, while the first capital contains less of these elements and sets more living labour in motion, and therefore produces more surplus labour as well.

If we take the proposition as formulated by Cherbuliez himself, then it must be said d’abord that it is of no use to him, because the amount of products or the amount of use values as such by no means determines either the value or the surplus value or the profit. But what is behind all this? A part of constant capital consisting of machinery, etc., enters into the labour process without entering into the valorisation process, and thereby helps to increase the amount of products without adding anything to their value. (For in so far as its wear and tear adds value to the product, it belongs to the capital used up and not to the capital employed as

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\( a \) Intermediate clause. Here, a second proposition.—Ed.
opposed to that used up.) But, by itself, this unconsumed part of constant capital does not bring about a *growth in the amount of products*. It helps to produce a greater output in a given labour time. Therefore, if only the same amount of labour time were expended as is contained in the *approvisionnement*, the same amount of products would be produced. The excess of products is therefore due to a *change* which takes place in this part of the *capital used up* and not to the excess of the capital employed over that used up (assuming that it is not a matter of branches of industry in which—as in agriculture—the *amount* of products is, or can be, independent of the amount of capital laid out, [because] the productivity of labour is, in part, dependent on uncontrollable natural conditions).

If however he considers constant capital—used up or otherwise—as independent of the labour time, independent of the *change* in the variable capital which takes place in the valorisation process, then he might just as well say:

"The growth in the total amount [XVIII-1108] of products" (at least in the manufacturing industry) "is proportionate to the growth of the part of capital consisting of raw materials which is used up."

For the increase of products is physically identical with the growth of this part of capital. In agriculture on the other hand (and likewise in the extractive industries), where only a small proportion of the capital laid out is not used up (i.e. constant capital) and a relatively large proportion of capital is used up (as wages for example), the amount of products, provided the land is fairly fertile, can be much larger than in the advanced countries where the ratio of capital laid out to capital used up is infinitely greater. The second proposition thus amounts to an attempt to bring in surreptitiously *surplus value* (the indispensable basis of profit).

"The *rate of profit*, or the *ratio* of the profit to capital, is therefore the result of the combination of two other ratios, namely, the *ratio between the capital advanced and that used up*, and the *ratio between the capital used up and the product*" (p. 70).

Previously *profit* ought to have been explained. But nothing emerged except a *definition* of it which merely states the form in which it appears, i.e. the fact that profit=the excess of the value of the total product over the cost price of the product or over the value of the capital used up, which is the *vulgar definition of profit*.

Now the *rate of profit* ought to be explained. But once again nothing emerges except the *vulgar definition*. The rate of profit=the ratio of profit to the total capital, or, what amounts to the same thing, it=the ratio of the excess of the value of the
product over its cost price to the total capital advanced for production. The distorted conception and bungling application of the approximately correct distinction between the elements of capital, and the vague idea that profit and rate of profit are directly connected with the ratio of these elements to one another, only lead to a repetition of the generally known phrases in a rather doctrinaire fashion, in fact merely to a statement that profit and rate of profit exist, without, however, anything being said about their nature. The matter is not improved by the fact that Cherbuliez expresses his doctrinaire formulae in algebraic language:

"Let $P$ be the aggregate product of a given period of time, $C$ the capital invested, $\pi$ the profit, $r$ the ratio of profit to capital (rate), $c$ the capital used up, then $P-c=\pi$, $r=\frac{\pi}{C}$, therefore $Cr=\pi$. Therefore $P-c=Cr$; therefore $r=\frac{P-c}{C}$" ([p.] 70, Note 1).

Which means nothing more than that the rate of profit=the ratio of profit to capital and that profit=the excess of the value of the product over its cost price.

In general, when Cherbuliez speaks about consumed and unconsumed capital he has at the back of his mind the difference between fixed and circulating capital, and not the distinction which he himself has drawn, namely, that between the different types of capital based on the production process. Surplus value is antecedent to circulation and no matter how much the differences arising out of circulation affect the rate of profit, they have nothing to do with the origin of profit.

"Productive capital is composed of a consumable part and a non-consumable part. The more wealth and population increase, the more the consumable part tends to increase, because the extractive INDUSTRIES demand an ever greater supply of labour. On the other hand, this same progress causes the amount of capital advanced to increase at a much faster rate than the amount of capital consumed. Thus although the total mass of capital consumed tends to increase, the effect is neutralised, because the mass of products grows in more rapid progression and the total amount of profit must be considered as growing at a rate at least as high as that at which the total amount of capital advanced grows" ([p.] 71).a "The amount of profit grows, not the rate, which is the ratio of this amount to the capital advanced, $r=\frac{P-c}{C}$. It is clear that $P-c$ or the profit, since $P-c=\pi$, can grow although $r$ declines, if $C$ grows more rapidly than $P-c$" ([p.] 71, Note 1).

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a Marx quotes partly in German and partly in French.—Ed.
Here the reason for the decline in the rate of profit is touched on, but in view of the preceding distortions, it can only lead to confusion and contradictions which cancel each other out. First the amount of capital consumed grows but the amount of products grows even more rapidly (i.e. the excess of the value of the products over their cost price in this case), for it grows in proportion to the capital advanced and this grows more rapidly than the capital consumed. Why the fixed capital grows more rapidly than the mass of raw materials, for example, is not explained anywhere. But never mind. The amount of profit grows in proportion to the capital advanced, to the total capital, but [XVIII-1109] the rate of profit is nevertheless supposed to fall, because the total capital grows more rapidly than the mass of products or rather than the amount of profit. First the amount of profit grows at a rate at least as great as that at which “the total amount of capital advanced” grows, and then the rate of profit falls, because the total amount of capital advanced grows more rapidly than the amount of profit. First $P-c$ grows “at least” proportionally to $C$, and then $\frac{P-c}{C}$ falls, because $C$ increases even more rapidly than $P-c$, which “increases at least as rapidly as $C$”. If we throw aside all this confusion, then all that remains is the tautology that $\frac{P-c}{C}$ can fall although $P-c$ increases, that is, that the rate of profit can fall although profit increases when the rate falls. The rate of profit simply signifies the ratio of $P-c$ to $C$, [and this ratio declines] when capital increases more rapidly than the amount of profit.

Thus the final pearl of wisdom is that the rate of profit can fall, that is, the ratio of an increasing amount of profit to capital can fall when the capital increases more rapidly than the amount of profit, or if the amount of profit, despite the absolute growth, declines relatively in comparison with the capital. This is nothing but a different expression for the decline in the rate of profit. But that this phenomenon is within the bounds of possibility, and even its existence, has never been called to question. The sole point at issue was precisely to explain the cause of this phenomenon, and Cherbuliez explains the decline in the rate of profit, the decline in the amount of profit in relation to the total capital, by the relative increase in the amount of profit which is at least proportionate to the growth of the capital. He obviously surmises that the mass of living labour employed declines relatively to past labour, although
it increases absolutely, and that therefore the rate of profit must decline. But he never arrives at a clear understanding. The closer one comes to the threshold of understanding, the more distorted the statements become, unless the threshold is actually crossed, and [the greater is] the illusion of having crossed it.

On the other hand, what he says about the equalisation of the general rate of profit is very much to the point.

//In the second chapter of Part III, on “Capital and Profit”, where the formation of the general rate of profit is dealt with, the following must be considered:

1) Different organic composition of capitals, partly conditioned by the difference between variable and constant capital in so far as this arises from the stage of production—the absolute quantitative relations between machinery, raw materials and the quantity of labour which sets them in motion. These differences relate to the labour process. The differences between fixed and circulating capital arising from the circulation process have also to be considered—differences which lead to valorisation variations, in a given period of time, in different spheres.

2) Differences in the relative value of the parts of different capitals which do not arise from their organic composition. These arise from the difference of value particularly of the raw materials, even assuming that the raw materials absorb an equal quantity of labour in two different spheres.

3) The result of those differences is diversity of the rates of profit in different spheres of capitalist production. It is true only for capitals of equal composition, etc., that the rate of profit is the same and the amount of profit is in proportion to the size of the capital employed.

4) For the total capital, however, what has been explained in Chapter I holds good. In capitalist production each capital is assumed to be a unit, an aliquot part of the total capital. Formation of the general rate of profit. (Competition.)

5) Transformation of values into prices of production. Difference between value, cost price, and production price.//

//6) To take up also the Ricardian point: The influence of general variations in wages on the general rate of profit and hence on prices of production.//

“After the deduction of rent, what remains of the amount of profit, that is, of the excess of products over the capital consumed, is divided between the capitalist producers in proportion to the capital each has advanced, whereas the portion of the product which corresponds to the capital consumed and is intended to replace it, is divided in proportion with the capital actually used up. This dual law of division
comes about as a result of competition, which tends to equalise the advantages of all investments of capital. Finally, this dual law of division determines the respective values and prices of the different kinds of products" ([pp.] 71-72).

This is very good. Only the concluding words are wrong, namely, that the formation of the general rate of profit determines the values and prices (it should be prices of production) of commodities. On the contrary, the determination of the value is the prius, antecedent to the rate of profit and to the establishment of production prices. How can any division at all of the "amount of profit", i.e. of the surplus value [XVIII-1110]—which is itself only a part of the total value of commodities—determine the "amount of profit", that is, the surplus value, that is, the value of the commodities? This is only correct if, by relative values of commodities, one means their production prices. The whole lopsidedness of Cherbuliez's presentation arises from the fact that he does not examine the origin and the laws of value and surplus value independently. In other respects, he describes the relation between wage labour and capital more or less correctly.

"People who neither receive anything by devolution" (legal transfer, inheritance, etc.), "nor have any possessions they can exchange, can obtain what they need only by offering their labour to the capitalist. They only acquire the right to the things which are allocated to them as the price of labour, but they have no right to the product of their labour, nor to the value which they have added" ([pp.] 55-56). "By exchanging his labour for a certain volume of approvisionnement, the worker completely renounces all right to the other portions of capital. The attribution of these products remains the same as it was previously; it is not modified in any way by the above-mentioned convention. The products continue to belong exclusively to the capitalist who has provided the raw materials and the approvisionnement. This is an inescapable sequence of the law of appropriation, the fundamental principle of which was, conversely, the exclusive right of every worker to the product of this labour" (p. 58).

This fundamental principle, according to Cherbuliez, is as follows:

"The worker has an exclusive right to the value resulting from his labour" (p. 48).b

Cherbuliez does not understand nor does he explain how the law of commodities, according to which commodities are equivalents and exchange with one another in proportion to their value, i.e. to the labour time embodied in them, unexpectedly leads to the result that on the contrary capitalist production—and only on the basis of capitalist production is it essential for the product to

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a Primary factor.—Ed.
b Marx quotes in French.—Ed.
be produced as a commodity—depends on the fact that one portion of labour is appropriated without exchange. He only senses that a *transformation* has suddenly taken place.

This fundamental principle is a pure fiction. It arises from the surface appearance of *commodity circulation*. Commodities are exchanged with one another according to their value, that is, according to the labour embodied in them. Individuals confront one another only as commodity owners and can therefore only acquire other individuals’ commodities by alienating their own. It therefore *appears* as if they exchanged only their own labour since the exchange of commodities which contain *other people’s labour*, in so far as they themselves were not acquired by the individuals in exchange for their own commodities, presupposes different relations between people than those of [simple] commodity owners, of buyers and of sellers. In capitalist production this appearance, which its surface displays, disappears. What does not disappear, however, is the illusion that originally men confront one another only as commodity owners and that, consequently, a person is only a property owner in so far as he is a worker. As has been stated, this “originally” is a delusion arising from the surface appearance of capitalist production and has never existed historically. In general, man (isolated or social) always comes on to the stage as a property owner before he appears as a worker, even if the property is only what he procures for himself from inorganic nature (or what he as a member of the family, tribe, communal organisation, procures partly from nature, partly from the means of production which have already been produced in common). And as soon as the first animal state is left behind, man’s property in nature is mediated by his existence as a member of a communal body, family, tribe, etc., by his relationship to other men, which determines his relationship to nature. The “propertyless labourer” as a “fundamental principle” is rather a creature of civilisation and, on the historical scale, of “capitalist production”. This is a law of “expropriation” not of “appropriation”, at least not simply of appropriation in the way Cherbuliez imagines it, but a kind of appropriation which corresponds to a definite, specific mode of production.

“Every accumulation of wealth provides the means for accelerating further accumulation” ([p.] 29).a

On page 59, Cherbuliez calls *matières brutes* and machinery, etc., “the two *passive elements of capital*” in contrast to the *approvisionnement*.

a Marx quotes in French.—Ed.
Ricardo's view (derived from Smith) that all accumulation can be reduced to expenditure on wages, would be incorrect even if no accumulation *in natura* took place—[which is the case,] for example, when the farmer sows more seed, the stock-breeder increases his stock of cattle for breeding or for fattening, the owner of engineering works uses part of his surplus value in the form of machine tools—and even if all producers who produce the elements of some part of capital did not overproduce regularly, counting on the fact of annual accumulation, i.e. the expansion of the general scale of production. Moreover, the farmer can exchange part of his surplus corn with the stock-breeder, who may convert this corn into variable capital while the farmer converts his corn into constant capital [by means of this exchange]. The flax-grower [XVIII-1111] sells part of his surplus product to the spinner, who converts it into constant capital. With this money the flax-grower can buy tools and the tool-maker can buy iron, etc., so that all these elements are turned directly into constant capital.

But disregarding all this, let us assume that a manufacturer of machines wants to convert an additional capital of £1,000 into elements of production. He will of course lay out part of it on wages, say £200. But he buys iron, coal, etc., with the remaining 800. Let us assume that this iron, coal, etc., has first to be produced. Then, if the iron or coal producers either have no excess (accumulated) stocks of their commodities, and likewise have no additional machinery and are unable to buy it immediately (for in this case too constant capital would be exchanged for constant capital), they can only [produce the required iron and coal] if they work their old machinery longer. As a result, they would have to replace it more rapidly, but a part of its value would enter into the new product. Irrespective of this, however, the iron manufacturer needs more coal in any case and must therefore transform at least part of his share in the £800 directly into constant capital. Both coal and iron producers sell their wares in such a way that they contain unpaid surplus labour. And if this amounts to a \( \frac{1}{4} \), then this alone means that 200 out of the £800 is not converted into wages, not to mention the part which has to make good the wear and tear of the old machinery.

The surplus consists always of the articles produced by the particular capital, i.e. coal, iron, etc. Part of the surplus is converted directly into constant capital when the producers whose commodities serve as elements of production for other producers exchange these commodities with one another. That part [of the
surplus value], however, which is exchanged against the products of those who produce means of subsistence and replaces their constant capital, provides the necessary variable capital. The producers of means of subsistence that can no longer enter as elements into their production (except as variable capital) acquire additional constant capital through the same process which provides the other [producers] with additional variable capital.

The following features distinguish reproduction—in so far as it constitutes accumulation—from simple reproduction.

**Firstly:** Both the constant and variable elements of production which are accumulated consist of newly added labour. They do not amount to revenue, although they arise from profit. They amount to profit or surplus labour, whereas in the case of simple reproduction part of the product represents past labour (i.e. in this context, labour which has not been performed in the current year).

**Secondly:** If the labour time in certain branches is lengthened, that is, if no additional instruments or machines are employed, the new product must indeed, to a certain extent, pay for the more rapid wear and tear of the old [tools or machines], and this accelerated consumption of the old constant capital is likewise an aspect of accumulation.

As a result of the additional money capital which arises in the process of reproduction—partly through the freeing of capital, partly through the conversion of part of the product into money, partly because, as a result of the money collected by the producer, the demand for other [commodities], e.g., [those offered by the] sellers of luxury goods, is reduced—the systematic replacement of the elements [of production] is by no means a necessity, as it is in the case of simple reproduction. With the additional money anyone can buy or command products, although the producer from whom the purchase is made may neither expend his revenue on the product of the purchaser nor replace his capital with it.//

//**Addtional capital** (constant or variable) must appear in the form of money capital on one side, even if this only exists in the form of outstanding claims, whenever it is not balanced by a corresponding addition on the other side.//

For the rest, Cherbuliez presents a remarkable amalgam of Sismondian and Ricardian contradictory views.

Cherbuliez says:

"The products are appropriated before they are converted into capital; and this conversion does not eliminate such appropriation" ([p.] 54).a

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a Marx quotes partly in German and partly in French.—*Ed.*
But this applies not only to the products, but also to labour. Raw materials, etc., and means of labour belong to the capitalist. They are the converted form of his money. On the other hand, when he has bought labour capacity or the daily (say 12 hours) use of labour capacity, with a sum of money—the product of 6 hours of labour, then the labour of 12 hours belongs to him; it is appropriated by him before it is carried out. The process of production itself turns labour into capital. But this transformation is an act which takes place later than its appropriation. The “products” are converted into capital, physically converted in so far as in the labour process they function as conditions of labour, conditions of production, objects and means of labour, and formally converted in so far as not only their value comes to be perpetuated but as they become means for absorbing labour and surplus labour, in so far as they in fact function as absorbers of labour.

[XVIII-1112] On the other hand: the labour capacity appropriated before the [production] process is turned directly into capital in the course of the process by being converted into the conditions of labour and into surplus value; as a result of its embodiment in the product, it not only preserves the constant capital but replaces the variable capital and adds surplus value.

Sismondian:

“The hypothesis that an invariable ratio exists between the different elements of capital is not substantiated at any stage of the economic development of society. The relationship is essentially variable and for two reasons: a) the division of labour, and b) the replacement of human labour by natural agents” ([p.] 61).

“These two factors tend to reduce the ratio of the approvisionnement to the other two elements of capital” ([pp.] 61-62).

“In this situation, the increase in productive capital does not necessarily lead to an increase in the amount of approvisionnement intended to constitute the price of labour; it can be accompanied—at least temporarily—by an absolute diminution of this element of capital, and consequently by a reduction in the price of labour” ([p.] 63).a

//This is Sismonian; the effect on the wage level is the only aspect considered by Cherbuliez. This problem does not arise at all in an investigation where the *value* of labour is always supposed to be paid, and the fluctuations of the market price of labour beyond or below that point (the value) are not taken into consideration.*/

“The producer who wishes to introduce a new division of labour in his enterprise or to exploit some natural force, will not wait until he has accumulated sufficient capital to be able to employ in this new way all the workers he needed previously. In the case of division of labour, he will perhaps be satisfied to produce

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a Marx quotes partly in German and partly in French.— Ed.
with 5 workers what he previously produced with 10. In the case of the exploitation of a natural force, he will perhaps use only 1 machine and 2 workers. The *approvisionnement* will, in consequence, be reduced to 1,500 in the first case and to 600 in the second. But since the number of workers remains the same, *their competition* will soon force the price of labour below its original level” ([pp.] 63-64).a “This is one of the most astonishing results of the *law of appropriation*. The absolute increase in wealth, that is, in the products of labour, does not give rise to a proportional increase and may lead to a diminution in the *approvisionnement* for the workers, in the portion they receive of all kinds of products” ([p.] 64). “The factors determining the *price of labour* //in this context it is always a question only of the *market price of labour*// “are the absolute amount of productive capital and the ratio between the different elements of capital, two social facts on which the will of the workers can exercise no influence” ([p.] 64). “Nearly all the odds are against the worker” (l.c.).

The ratio between the different elements of productive capital is determined in two ways. *First*: By the organic composition of productive capital. By this we mean the technological composition. With a given productive power of labour, which can be taken as constant so long as no change occurs, the amount of raw material and means of labour, that is, the amount of constant capital—in terms of its material elements—which corresponds to a definite quantity of living labour (paid or unpaid), that is, to the material elements of variable capital, is determined in every sphere of production.

If the proportion of the objectified labour to the living labour employed is small, then the portion of the product that represents living labour will be large regardless of how this portion is divided between capitalist and worker. If the reverse is the case, the contrary result will occur. With a given rate of exploitation of labour, the surplus labour too will be large in the former case and small in the latter. This can only change as a result of a change in the mode of production which alters the technological relationship between the two parts of capital. Even in this case, the absolute amount of living labour employed by the capital which uses a greater proportion of constant capital may be equal or even larger if capitals of different size are compared. But it must be smaller relatively. For capitals of the same size, or calculated in proportion to the total capital—100 for example—it must be smaller both relatively and absolutely. All changes arising from the development (not the decline) of the productive power of labour, reduce that part of the product which represents living labour, that is, they reduce variable capital. Regarding capitals [XVIII-1113] invested in different branches of production, one can say [that these

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a Marx quotes partly in German and partly in French.— Ed.
changes] reduce the variable capital absolutely in those branches which have reached a higher level of production, since wages are assumed to be equal.

So much with regard to the changes arising from changes in the mode of production.

Secondly, however, if one assumes that the organic composition of capitals is given and likewise the differences which arise from the differences in their organic composition, then the value ratio can change although the technological composition remains the same. What can happen is: a) a change in the value of the constant capital; b) a change in the value of the variable capital; c) a change in both, in equal or unequal proportions.

a) If the technological composition remains the same and a change in the value of constant capital takes place, its value will either fall or rise. If it falls, and only the same amount of living labour is employed as previously, i.e. if the scale or level of production remains the same, if, for example, 100 men are employed as previously, the same physical amount of raw material and means of labour continues to be required. But the surplus labour bears a greater proportion to the whole capital advanced. The rate of profit rises. In the opposite case it declines. In the former case, *for the capitals already employed in that sphere (not those newly invested in* it *after the change of value in the elements of constant capital has taken place), the total sum of the capital employed diminishes or some portion of that capital is set free, although production continues to be carried on on the same scale; or the capital so liberated is added to the production and then works like an accumulation of capital. The scale of production is enlarged, and the absolute amount of surplus labour is increased proportionally.* With a given mode of production, every accumulation of capital results in an increase in the total amount of surplus value whatever the rate of surplus value may be.

Conversely, if the value of the elements of constant capital increases, then *either the scale of production (hence the mass of the total capital advanced) must increase to employ the same quantity of labour (the same variable capital—unchanged in its value) as before; and then, although the absolute amount of surplus value, and the rate of surplus value, remains the same, its proportion to the whole capital advanced sinks, and, hence, the rate of profit falls.* Or the scale of production and the total sum of capital advanced is not enlarged. In the latter case the variable capital must decrease whatever the circumstances. If the same sum as previously is laid out in constant capital, it now represents a smaller amount of
material elements and since the technological conditions remain the same, *less labour is to be employed. The whole capital advanced is then diminished by the labour dismissed; the total value of the capital advanced is diminished, but of that diminished capital the constant capital bears (value considered) a greater proportion. The surplus value is diminished absolutely, because less labour is employed; and the proportion of the remaining surplus value to the total capital advanced is diminished, because variable capital bears a less proportion to constant capital.

On the other hand, if the whole capital is employed as before—the less value of the variable capital (representing a less quantity of the whole of labour (living labour) employed) being absorbed by the greater value of the constant capital; the one being diminished in the same proportion as the other is augmented—then the absolute quantity of surplus value sinks, because less labour is employed, and, at the same time, the proportion of this surplus value to the whole capital advanced falls. Thus the rate of profit sinks from two causes, the diminution in the amount of surplus labour, and the decreasing proportion borne by that surplus labour to the total capital advanced.*

In the first case (with sinking value of the elements of constant capital) where the rate of profit rises in all circumstances the scale of production must be extended if the amount of profit is to increase. Let us assume that the capital is 600—half constant, half variable. If the constant capital were to lose 1/2 its value, it would only amount to 150, although the variable capital would remain 300. The total capital employed would be only 450, 150 being freed. If the 150 are added to the capital again, then 128\(\frac{4}{7}\), of the 150 will now be laid out in variable [XVIII-1114] capital. Thus the scale of production is expanded and more labour employed, if the same capital continues to be used in the production process.

In the opposite case, where with rising value of the elements of constant capital the rate of profit falls in all circumstances, the scale of production, and therefore the capital advanced, must be increased if the amount of profit is not to decrease and the amount of labour employed (and therefore surplus value) is to remain the same. If this is not done, if only the old or less than the old capital is advanced, then not only does the rate of profit decline, but also the amount of profit.

The rate of surplus value remains unchanged in both cases; it changes, however, if any change in the technological composition of capital takes place: it increases if the constant capital increases (because labour is then more productive) and declines when it falls (because labour is then less productive).
b) If there is any change in the value of variable capital independent of the *organic composition*, it can only occur because of a fall or a rise in the price of means of subsistence that are not produced in the sphere of production under consideration but enter into it as commodities from outside.

If the *value of variable* capital falls, it nevertheless represents the same amount of living labour as before. The same quantity of labour merely costs less. If therefore the *scale of production* remains the same (since the value of constant capital is unchanged), then the part of the total capital used for the purchase of labour is diminished. Less capital needs to be laid out in order to pay the same number of workers. Thus, in this case, if the *scale of production remains the same*, the amount of capital laid out diminishes. The rate of profit increases, and this for two reasons. The *surplus value* has increased; the ratio of living labour to objectified labour has remained the same, but the increased *surplus value* correlates with a smaller total capital. If, on the other hand, the capital freed is again invested, then this = *accumulation*.

If the *value of the variable capital* increases, then a greater total capital must be laid out in order to employ the same number of workers as before, because the value of the constant capital remains the same and that of the variable capital has risen. The amount of labour remains the same, but a smaller part of it is *surplus labour*, and this smaller part corresponds to a larger capital. This takes place when the *scale of production remains the same*, while the value of the total capital increases. If the value of the total capital does not increase, the *scale of production* must be reduced. The amount of *labour* declines and a smaller portion of this reduced amount constitutes *surplus labour*, which, too, bears a smaller proportion to the whole capital advanced.

The *organic changes* and those brought about by changes of value can have a similar effect on the rate of profit in certain circumstances. They differ however in the following way. If the latter are not due simply to *fluctuations of market prices* and are therefore not temporary, they are invariably caused by an *organic change* in the spheres that provide the elements of constant or of variable capital.

It is not necessary here to examine *case 3* in detail.

In the case of capitals of equal size—or if the calculation is based on equal amounts of the total capital, 100, for example—the *organic composition* may be *the same in different spheres of production*, but the *value ratio* of the primary component parts of constant and variable capital may be *different* according to the
different values of the amount of instruments and raw materials used. For example, copper instead of iron, iron instead of lead, wool instead of cotton, etc.

On the other hand, is it possible for the organic composition to be different if the value ratio remains the same? If the organic composition is the same, the relative amounts which constitute constant capital and living labour are the same per 100. The quantitative proportions are the same. The value of the constant capital may be the same, although the relative amounts of labour set in motion are different. If the machinery or raw materials are dearer (or cheaper), less labour, for example, may be required, but in this case the value of the variable capital is also relatively smaller or vice versa.

[XVIII-1115] Let us take A and B. c' and v' are the component parts (in terms of value) of A, and c and v those of B (in terms of value). If \( c' : v' = c : v \), then \( c'v = v'c \). Consequently likewise \( \frac{c'}{c} = \frac{v'}{v} \).

Since the value ratios [of constant to variable capital] are equal, only the following variations are possible. If in one sphere more surplus labour is carried out [than in another sphere] (for example, night-work is impossible in agriculture, and although the individual agricultural labourer can be overworked, nevertheless the total amount of labour which can be expended on a given area of land, etc., is limited by the object being produced (corn), whereas in a factory of a given size the amount produced depends (δύναμεν") on the hours of labour worked) (that is to say, it is due to the different modes of production that more surplus labour can be employed in one sphere at a given level of production than in another), then, even if the value ratio of constant and variable capital is the same, the amount of labour employed in proportion to the total capital will nevertheless be different.

Or, let us assume that the [raw] material is dearer and labour (of greater skill) is dearer, in the same proportion. In this case A employs 5 workers, where B employs 25, and they cost him £100—as much as the 25 workers, because their labour is dearer (their surplus labour is therefore also worth more). These 5 workers work up 10 lbs of raw material, \( y_r = 500 \) and B's workers work up 1,000 lbs of raw material, \( x \), worth 500, because the raw material is dearer and the productive power of labour is less highly developed in the case of A. The value ratio here—£100 v to

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\( ^{a} \) Potentially.—Ed.
500 $c$—is the same in both cases, but the *organic composition* is different.

The *value ratio* is the same: the value of constant capital in A is the same as in B, and proportionately A lays out the same amount of capital in wages as B. But the quantity of his products will be smaller. Although he employs the same absolute quantity of labour as B, he uses more relatively, because his constant capital is dearer. He processes less raw material, etc., in the same time, but this smaller quantity costs him as much as the larger quantity processed by B. The *value ratio* in this case is the same, the organic composition is different. In the other case the value ratio being assumed to be the same, this can occur only if the amounts of the surplus labour are different or if the values of the different kinds of labour are different.

The organic composition can be taken to mean the following: Different ratios in which it is necessary to expend constant capital in the different spheres of production in order to absorb the same amount of labour. The *combination of the same amount of labour* with the object of labour requires either that both more raw material and more *machinery* are used in one case than in the other, or that more if only one of these is used.

Where the ratios between fixed and circulating capital are very different, those between *constant and variable* capital can be the same, consequently the *surplus value* can be the same although the *values* produced annually must be different. Let us assume that in the coal industry—where no raw materials are used (apart from *matières instrumentales*), the fixed capital constitutes half the total capital and variable capital the other half. Let us assume that in tailoring the fixed capital=0 (as in the previous case we disregard *matières instrumentales*), that the raw materials=$1/2$ and the variable capital=$1/2$. Given the same degree of exploitation of labour, both will realise the same amount of *surplus value*, since both employ the same amount of labour in proportion to capital, i.e. per 100. But let us assume that fixed capital in the coal industry turns over once every 10 years while there is no difference in the rate of turnover of circulating capital in both cases. At the end of the year (we will assume that the variable capital turns over once a year in both cases) the tailor’s capital will have produced values amounting to 150 if the *surplus value*=50. The coal producer, on the other hand, will have produced values amounting to 105 at the end of the first year (consisting of 5 for fixed capital, 50 for variable and 50 for surplus labour). As in the case of the tailor (the total value of his product+the fixed capital=150, that is, the
product = 105 + 45 for the remaining fixed capital). The production of different magnitudes of value therefore does not preclude the production of the same amount of surplus value.

In the 2nd year, the fixed capital of the coal producer would = 45, variable capital = 50 and surplus value = 50, that is, the capital advanced would = 95 and the profit would = 50. The rate of profit would have risen, because the value of the fixed [XVIII-1116] capital would have declined by \( \frac{1}{10} \) as a result of wear and tear during the first year. Thus there can be no doubt that in the case of all capitals employing a great deal of fixed capital—provided the scale of production remains unchanged—the rate of profit must rise in proportion as the value of the machinery, the fixed capital, declines annually, because wear and tear has already been taken into account. If the coal producer sells his coal at the same price throughout the 10 years, then his rate of profit must be higher in the 2nd year than it was in the 1st and so forth. Or one would have to assume that the maintenance work, etc., stands in direct proportion to the depreciation, so that the total sum advanced annually under the heading of fixed capital remains the same. This extra profit may be equalised also as a result of the fact that—apart from wear and tear—the value of fixed capital falls in the course of time, because it has to compete with new, more recently invented, better machinery. On the other hand, this falling rate of profit, which results naturally from wear and tear, makes it possible for the declining value of the fixed capital to compete with newer, better machinery, the full value of which has still to be taken into account. Finally, the coal producer sold his coal more cheaply [at the end of the second year] on the basis of the following calculation: 50 on 100 means 50% profit, 50% on 95 comes to \( 47\frac{1}{2} \); if therefore he sold the same quantity of coal [not for 105 but] for \( 47\frac{1}{2} \)—then he would have sold it more cheaply than the man whose machinery, for example, began to operate only in the current year. Large installations of fixed capital presuppose possession of large amounts of capital. And since these big owners of capital dominate the market, it appears that only for this reason their enterprises yield surplus profit (rent). In the case of agriculture, this rent derives from working relatively fertile land, but here we are dealing with a case where relatively cheaper machinery is utilised.///

//A large number of instances which are adduced in connection with the relation of fixed to circulating capital, refer to the

\[ \text{a Thus in the original. Presumably, it should be "rising".—Ed.} \]
difference between variable and constant capital. First of all, the proportion of constant to variable capital can be the same although the proportion of fixed to circulating capital is different. Secondly, in the case of constant and variable capital it is a question of the primary division of capital between living and *objectified* labour, not of the modification of this relationship by the circulation process or the influence of this latter on reproduction.

It is clear *d'abord* that the difference between fixed and circulating capital can affect surplus value (apart from the differences in the mass of living labour employed, i.e. differences which are related to the ratio of variable to constant capital) only in so far as it affects the *turnover* of the total capital. It is therefore necessary to investigate how the *turnover* affects surplus value. Two factors are obviously closely connected with it: 1) *surplus value* cannot be accumulated, reconverted into capital, so rapidly (so often); 2) the *capital advanced* must increase both to continue to employ the same number of workers, etc., and because the advances [of money] which the capitalist makes to himself to cover his own consumption costs must extend over a longer period. These factors are important in connection with *profit*. Here however it is, to begin with, only necessary to examine how they affect *surplus value*. One must moreover always clearly distinguish between these two factors.//

Everything which increases the *advances* without proportionally increasing the surplus value, reduces the rate of profit *even if the surplus value remains the same*; the opposite is the case with everything which reduces them. In so far, therefore, as a large amount of fixed capital in proportion to circulating capital—or different turnover periods of capital—affects the size of the advances, it affects the rate of profit *even if not at all affecting the surplus value*.//

The rate of profit is not simply the *surplus value* calculated on the capital advanced, but the *mass of surplus value realised within a given period*, that is, in a definite period of circulation. In so far as the difference between fixed and circulating capital affects the *mass of surplus value* which a particular capital yields *within a given period*, it affects the rate of profit. Two aspects must be taken into consideration: [firstly,] the difference in the size of the *advances* (relative to the surplus value realised) and secondly, the difference in the *length of time* for which these advances have to be made before they are returned with a surplus.//

[XVIII-1117] //The reproduction time, or rather, the number of
reproductions taking place in a definite period of time, is substantially affected by 2 circumstances:

1) The product remains longer in the sphere of production proper. It is possible firstly that, in order to be produced, one product requires a longer period of time than another; it may require a larger part of a year, a whole year or even more than a year. (The latter is the case for example with buildings, in stock-breeding and the production of certain luxuries.) In this case, the product continually absorbs labour—often a great deal of labour is absorbed (for instance by luxury articles and buildings) in relation to the constant capital—the amount depending on the composition of the productive capital, its division into constant and variable capital. Thus in the measure as the time required for the production of the commodity increases and the labour process continues uniformly, a continuous absorption of labour and of surplus labour takes place. This happens for example with cattle or buildings if the latter require say more than a year's work. The product can enter the sphere of circulation, that is, it can be sold, be thrown on the market, only when the work is completed. The surplus labour expended in the first year is embodied with the rest of the labour in the unfinished product of the first year. It is neither greater nor smaller than in other branches of production where the ratio between constant and variable capital is the same. But the value of the product cannot be realised, that is, in the sense that it cannot be converted into money, and neither can the surplus value. The latter cannot therefore be accumulated as capital nor used for consumption. The capital advanced, and also the surplus value, serve, so to speak, as foundations for further production. They are a precondition for it and enter, to some extent, as semi-finished products, or, d'une manière ou d'une autre,* as raw material into the production process of the 2nd year.

Let us assume that the capital is £500, labour=100 and surplus value=50, so that the capital advanced in production=550+500 which is advanced in the 2nd year. The surplus value again=50. The value of the product is therefore=£1,100, of which 100 is surplus value. In this case, the surplus value is the same as if the capital had been reproduced in the first year and £500 had been invested again in the 2nd year. In each year the variable capital employed is 100 and the surplus value 50. But the rate of profit is different. In the first year it is 50, or 10%. But in the second year the capital advanced amounts to

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*a In one way or another.—Ed.
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550 + 500 = 1,050, and $\frac{1}{10}$ of this = 105. If one assumes the same rate of profit, then the value of the product comes to: 550 in the 1st year; 550 + 500 + 55 + 50 = 1,155 in the 2nd year. At the end of the 2nd year, the value of the product = 1,155. Otherwise it would have been only 1,100. In this case, the profit is greater than the surplus value produced, for this only amounts to 100. If one includes the consumption costs which the capitalist has to advance over 2 years, then the capital laid out is even greater in proportion to the surplus value. On the other hand, it is true that the entire surplus value gained in the first year has been converted into capital in the 2nd. Furthermore, the capital laid out in wages is greater, because the 100 is not reproduced at the end of the first year, so that in the 2nd year 200 must be advanced for the same labour for which 100 would have been sufficient if it had been reproduced in the 1st year.

Secondly. After the labour process has been completed, the product must continue to remain in the production sphere in order to undergo natural processes which require either no labour or relatively quite insignificant amounts of it, like wine in the cellar. Only when this period has elapsed can the capital be reproduced. It is obvious that in this case, quite irrespective of what the ratio of variable to constant capital may have been, the effect is the same as if more constant and less variable capital had been laid out. The surplus labour, as well as the total amount of labour employed during a definite period of time, is smaller. If the rate of profit is the same, this is due to equalisation, not to the amount of surplus value produced in this sphere. More capital must be advanced beforehand to maintain the reproduction process—the continuity of production. And for this very reason the surplus value declines in proportion to the capital advanced.

Thirdly. Interruptions in the labour process while the product is in the production process, as in agriculture or in processes such as tanning, etc., where chemical processes involve intervals before the product can proceed from one stage to the next, higher one. If in such cases the interval is reduced by chemical discoveries, the productivity of labour rises, the surplus value [is increased] and objectified labour has to be advanced for a shorter period of time. In all these cases, the surplus value is smaller and the advanced capital larger.

2) The same thing happens if the rate of turnover of the circulating capital is lower than the average because of distant markets. In this case, too, the advanced capital is greater, the surplus value smaller and its proportion to the advanced capital is
also smaller. // In the latter case [the capital] is retained longer in the circulation sphere, in the former case, in the production sphere. //

[XVIII-1118] // Let us assume that the capital advanced in some branch or other of the transport industry = 1,000, fixed capital = 500, which will be worn out in 5 years. The variable capital, which = 500, turns over 4 times during the year. The annual value of the product will thus be 100 + 500 + 100, if the [annual] rate of surplus value = 20%, a total of 700. On the other hand, let us assume that in a branch of tailoring the constant capital, which consists only of circulating capital, = 500 (the fixed capital = 0) and the variable capital = 500. Surplus value = 100. [The capital] turns over 4 times a year. Then the (annual) value of the product will be 4 (500 + 500) + 100 = 4,100. The surplus value is the same in both cases. In the last-mentioned case, the entire capital turns over 4 times a year or once a quarter. Of the other capital 600 turn over in the course of a year, therefore \( \frac{600}{4} = 150 \) in a quarter of a year. That is, 50 in a month, 100 in 2 months, and 400 in 8 months. The whole capital requires 1 year and 8 months or 20 months, in order to turn over. In a year, only \( \frac{6}{10} \) of it turns over.

Now it will be said that in order to make a profit of 10%, less is added per quarter on a value of 1,000 in the case of the first capital than in that of the other. But here it is not a question of addition. One makes more surplus value on the capital used up but not on the capital employed. The difference here arises from the surplus value, not from the addition of profit. The difference here lies in the value, not in the surplus value. In both cases the variable capital amounting to 500 turns over 4 times in a year. Both capitals yield a surplus value of 100 in a year, the [annual] rate of surplus value = 20%. But £25 in a quarter, therefore a higher percentage? 25 on 500 each quarter = 5% a quarter, that is, 20% per annum.

The first [capitalist] turns over \( \frac{1}{2} \) his capital 4 times a year and only \( \frac{1}{5} \) of the remaining \( \frac{1}{2} \) once during the year. A half of four times is twice. Thus he turns his capital over \( 2 \frac{1}{10} \) times during the year. The entire capital of the second capitalist turns over 4 times a year. But this makes absolutely no difference to the SURPLUS VALUE. If the second capitalist continues the reproduction process uninterruptedly, then he must constantly convert 500 into raw materials, etc., and must always use 500 for labour, while the other capitalist likewise uses 500 for labour and has invested the
remaining 500 once and for all (that is, for 5 years) in such a form that he does not need to reconvert it again. This applies however when the ratio of variable to constant capital is the same [in both capitals] despite the difference between fixed and circulating capital. If in both cases, \( \frac{1}{2} \) consists of constant and \( \frac{1}{2} \) of variable capital, then it is only possible for \( \frac{1}{2} \) [in one case] to consist of fixed capital if the circulating constant capital = 0, and [in the other case], \( \frac{1}{2} \) can consist of circulating constant capital only if the fixed capital = 0. Although the circulating constant capital can = 0, as in the extractive and transport industries where, however, the matières instrumentales rather than the raw materials constitute the circulating constant capital, the fixed capital can never = 0 (except in banking, etc.). This is however immaterial so long as the ratio of constant capital to variable capital is the same in both cases, even though in one case there may be more fixed and less circulating constant capital than in the other, or vice versa. The only difference here is the time of reproduction required by one half of the capital and by the total capital. One capitalist must invest a capital of £500 for 5 years before it is returned to him, the other, for a quarter of a year or a whole year. The ability to dispose of the capital is different. The amount advanced is the same but the time for which it is advanced is different. This difference does not concern us here. When one considers the total capital advanced, surplus value and profit are the same—£100 in the first year on the 1,000 advanced. In the second year, it is rather the fixed capital that has a higher rate of profit, since the variable capital has remained the same, whereas the value of the fixed capital has declined. The capitalist only advances 400 fixed and 500 variable capital in the 2nd year and receives a profit of 100 as he did before. But 100 on 900 = 11\(\frac{1}{9}\)%, while the other capitalist, if he continues to reproduce his capital, advances 1,000 as he did previously and makes a profit of 100 = 10%.

The position is different, of course, if, along with the fixed capital, the constant capital as a whole increases as compared with the variable, or if altogether more capital must be advanced in order to set the same amount of labour in motion. In the case discussed above, the question is not how often the total capital is returned or how large the advance is, but how often that portion is returned which is sufficient to set the same amount of productive labour in motion as that used in the other instance, in order to renew the process of production. However, if in the case cited above, the fixed capital were [not 500 but] 1,000 and the circulating capital only 500 [as previously], then matters would be
different. This, however, would not be due to the fact that it is fixed capital. For if the circulating part of the constant capital in the second case were to amount to 1,000 [instead of 500] (because of the dearness of [raw] materials, for example), then the result would be the same. Since in the first examples [of the two cases] the larger the fixed capital, the greater the relative size of the capital advanced as a whole to the variable capital, these two factors are often confused. Moreover, the whole business of the turnover was in fact originally derived from mercantile capital, where it is determined by different laws. In the case of mercantile capital, as I have demonstrated,\(^\text{174}\) the rate of profit is indeed determined by the average number of turnovers, regardless of the composition of this type of capital which, incidentally, consists mainly of circulating capital. For in the case of mercantile capital, profit is determined by the general rate of profit.//

[XVIII-1119] // The point is this. If the fixed capital = \(x\), and it turns over only once every 15 years, then \(\frac{1}{15}\) of it is turned over in a single year, but likewise only \(\frac{1}{15}\) needs to be replaced each year. It would make no difference at all if it were replaced 15 times in a year. Its mass would still be the same as before. The product would only become dearer as a result. But it is more difficult to dispose of it and the risk of depreciation is greater than if the same amount of capital were advanced in the form of circulating capital. But this does not affect the surplus in any way, although it does enter into the capitalists' calculation of the rate of profit since this risk is included in the calculation of the depreciation. As far as the other part of capital is concerned, let us assume that the circulating part of constant capital—matières brutes and matières instrumentales—amounts to 25,000 a year and wages to 5,000. If it were returned only once during the year 30,000 would have to be advanced during the whole year, and if the surplus value were at the rate of 100% it would amount to 5,000, and profit at the end of the year would be 5,000 on 30,000, = \(16\frac{2}{3}\)% \((\frac{1}{6})\). If, on the other hand, the capital turns over five times during the year, then a capital advance of only 5,000 for constant circulating capital and 1,000 for wages will be sufficient. Surplus value will be 1,000, and for \(\frac{5}{6}\) of a year 5,000. But this surplus value is made on a capital of £6,000, because more than this amount is never advanced. Profit would therefore be 5,000 on 6,000, or \(\frac{5}{6}\), five times as much [as previously], that is, \(83\frac{1}{3}\)%.

(Disregarding fixed capital.) There is thus a very considerable difference in the rate of profit because, in fact, labour worth 5,000 is bought with a capital of 1,000 and raw materials, etc., worth
25,000 with a capital of 5,000. If the amounts of capital were equal in these cases of different rates of turnover, then only 6,000 need have been advanced in the first case, that is, only 500 a month, \(\frac{5}{6}\) of which would have consisted of constant capital and \(\frac{1}{6}\) of variable capital. This \(\frac{1}{6}\) would \(= 83\frac{1}{3}\), on which surplus value at 100\% would be \(83\frac{1}{3}\), and this would amount in a year to 
\[(83 + \frac{1}{3}) \times 12 = 1000\] 
But 1,000 on 6,000 = 16\%.

To return to Cherbuliez.

Sismondian:

"In so far as the economic progress of society is characterised by an absolute growth of productive capital and by a change in the proportions between the different elements of this capital, it offers the workers some advantages: 1) The greater productivity of labour, resulting especially from the use of machinery, brings about such a rapid growth of productive capital that despite the change that takes place in the proportion of the approvisionnement to the other elements of capital, this element nevertheless increases absolutely, which makes it possible not only to employ the same number of workers as before, but also an additional number, so that for the workers the result of progress apart from some interruptions means an increase in productive capital and in the demand for labour. 2) The greater productivity of capital tends to diminish the value of the whole mass of products considerably, thus placing them within reach of the workers, thereby increasing the range of enjoyments they are able to obtain" (I.c., [p. 65]).

On the other hand:

"1) However impermanent, however partial the temporary diminution of the approvisionnement which constitutes the price of labour may be, it produces harmful effects nevertheless. 2) The factors tending to promote the economic advance of society are for the most part accidental, independent of the will of the producing capitalist. The effects of these causes are therefore not permanent, etc." ([p.] 66).

"3) It is not so much the absolute as the relative amount consumed by the worker which makes his lot happy or unhappy. What does it matter to the worker if he is able to obtain a few more products which formerly were inaccessible to him if the number of products inaccessible to him has grown in even greater proportion, if the distance which separates him from the capitalist has only increased, if his social position has deteriorated and become more disadvantageous? Apart from the consumption strictly necessary for the maintenance of our strength, the value of our enjoyments is essentially relative" ([p.] 67).

"People frequently forget that the wage labourer is a thinking man, endowed with the same capacities, impelled by the same motives as the working capitalist" ([p.] 67).

[XVIII-1120] "Whatever advantages a rapid growth in social wealth may bring to the wage workers, it does not cure the causes of their poverty ... they continue to be deprived of all rights to capital and are consequently obliged to sell their labour and to renounce all claims to the products of that labour" ([p.] 68). "This is the principal error of the law of appropriation ... the evil lies in this absolute lack of any bond between the wage worker and the capital which is set in motion by his industry" ([pp.] 68-69).

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\(\text{a Marx quotes partly in German and partly in French.— }\)Ed.
This last phrase about "bond" is written in the typical Sismondian manner and is quite silly to boot.

*About the normal man [who is] equated with capitalist, etc., see ibid., pp. 74-76.*

About the *concentration of capitals* and the elimination of the smaller capitalists (l.c., pp. 85-88).

"If in present circumstances real profit derives from the thrift of the capitalists, it could derive just as well from that of the wage earners" ([pp.] 88-89).

*Cherbuliez*

1) shares [James] Mill's view that all taxes should be imposed [only] on rent\(^{175}\) ([p.] 128) but since it is impossible

"to impose a tax which is levied only on rent and affects nothing but rent" ([pp. 128-29]),\(^{a}\)

since it is difficult to separate profit from rent and impossible when the landowner is himself the cultivator, Cherbuliez proceeds to

2) the real conclusion of the Ricardian theory:

"Why do people not take a step further and *abolish private ownership of land*" ([p.] 129).\(^{a}\) "The landowners are idlers who are maintained at the public expense without any kind of benefit to industry or to the general welfare of society". "What makes land productive is the capital employed in agriculture; the landowner contributes nothing to it; he only exists to pocket rent, which does not constitute a part of the profit on his capital, neither is it the product of labour nor that of the productive power of the soil, but the effect of the price of the agricultural products, which is increased by the competition of the consumers", etc. ([p.] 129).\(^{a}\)

"Since the elimination of the private ownership of land would in no way change the causes responsible for rent, rent would continue to exist, but the state would receive it, for all the land would belong to it and it would lease out arable sections of the land to private persons owning sufficient capital to exploit them" ([p.] 130).\(^{a}\) Rent would replace all state revenues. "Finally industry, liberated, released from all fetters, would take an unprecedented leap forward, etc." ([p.] 130).\(^{a}\)

But how does this Ricardian conclusion agree with the pious Sismondian wish to place "bonds" on capital and capitalist production? How does it agree with the lamentation:

"Capital will ultimately rule the world if an upheaval does not halt the course which the development of our society is taking under the domination of the law of appropriation" ([p.] 152).\(^{a}\) "Capital will eliminate the old social distinctions everywhere in order to replace them by this simple classification of men into rich and poor, the rich, who enjoy themselves and rule, and the poor, who work and obey" ([p.] 153).\(^{b}\) "The general appropriation of productive wealth and of the products has always reduced the numerous class of proletarians to a position of subjugation and political impotence, but this appropriation was once combined with a system of restrictive laws which, by *impeding the development of industry and the accumulation of*

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\(^{a}\) Marx quotes in French.— *Ed.*

\(^{b}\) Marx quotes partly in German and partly in French.— *Ed.*
Theories of Surplus Value

capital, [XVIII-1121] placed limits on the growth of the class of the disinherited, restricted their civil rights within narrow bounds and thus in different ways rendered this class harmless. Today, capital has broken part of these fetters; it is preparing to break all of them” ([pp.] 155-56).a “The demoralisation of the proletarians is the second result of the distribution of wealth” 176 ([p.] 156).

o) RICHARD JONES

1) REVEREND RICHARD JONES, AN ESSAY ON THE DISTRIBUTION OF WEALTH, AND ON THE SOURCES OF TAXATION, LONDON, 1831, PART I, RENT

Even this first work on rent is distinguished by what has been lacking in all English economists since Sir James Steuart, namely, a sense of the historical differences in modes of production. (Such a correct distinction of historical forms generally speaking is not contradicted by the very important archaeological, philological and historical blunders attributed to Jones. See, for example, The Edinburgh Review, Vol. LIV, Article IV.) He found that the modern economists after Ricardo define rent as surplus profit, a definition which presupposes that the farmer is a capitalist (or a farming capitalist who exploits the land), who expects average profit on the capital which he invests in this particular sphere, and that agriculture itself has been subordinated to the capitalist mode of production. In short, landed property is conceived only in its modern bourgeois form, that is, in the modified form which it has been given by capital, the dominant relation of production in society. Jones by no means shares the illusion that capital has been in existence since the beginning of the world.

His views on the origin of rent in general are summarised in the following passages:

“The power of the earth to yield, even to the rudest labours of mankind, more than is necessary for the subsistence of the cultivator himself, enables him to pay a tribute: hence the origin of rent” ([p.] 4).

“Rent has usually originated in the *appropriation of [the] soil, at a time when the bulk of the people must cultivate it on such terms as they can obtain, or starve, and when their scanty capital of implements, seeds, etc., being utterly insufficient to secure their maintenance in any other occupation than that of agriculture, is chained with them to the land by an overpowering necessity*” [p. 11].

Jones traces rent throughout all its changes, from its crudest form, performance of labour services, to modern farmer’s rent. He finds that everywhere a specific form of rent, i.e. of landed property, corresponds to a definite form of labour and of the

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a Marx quotes partly in German and partly in French.— Ed.
conditions of labour. Thus, labour rents or serf rents, the change from labour rents to produce rents, metayer rents, ryot\textsuperscript{178} rents, etc., are examined in turn, a development the details of which do not concern us here. In all previous forms, it is the landed proprietor, not the capitalist, who directly appropriates the surplus labour of other people. Rent (as the Physiocrats conceive it by reminiscence) appears historically (and still on the largest scale among the Asiatic peoples) as the general form of surplus labour, of labour performed without payment in return. The appropriation of this surplus labour is here not mediated by exchange, as is the case in capitalist society, but its basis is the forcible domination of one section of society over the other. (There is, accordingly, direct slavery, serfdom or political dependence.)

Since we are only considering landed property here in so far as an understanding of it contributes to an understanding of capital, we shall leave Jones' analysis and proceed directly to his result—which distinguishes him from, and shows his superiority over, all his predecessors.

But first a few incidental remarks.

In discussing forced labour and the forms of serfdom (or slavery) which correspond to it more or less, [XVIII-1122] Jones unconsciously emphasises the two forms to which all surplus value (surplus labour) can be reduced. It is characteristic that, in general, real forced labour displays in the most brutal form, most clearly, the essential features of wage labour.

"Under these conditions" (where there is serf labour) "rent can only be increased either by the more skilful and effective utilisation of the labour of the tenantry" //relative surplus labour//, "this however is hampered by the inability of the proprietors as a body to advance the science of agriculture, or by an increase in the quantity of the labour exacted, and in this case, while the lands of the proprietors will be better tilled, those of the serfs, from which labour has been withdrawn, all the worse" (l.c., CH. II, [p. 61]).

What distinguishes this book on rent by Jones from his Syllabus to be mentioned in 2—is this: In the first work he proceeds from the various forms of landed property as a given fact; in the second, from the various forms of labour to which they correspond.

Jones also shows how different stages in the development of the productive power of social labour correspond to these different production relations.

Serf labour (just as slave labour) has this in common with wage labour, quo\textsuperscript{a} rent, that the latter is paid in labour, not in products, still less in money.

\textsuperscript{a} In respect of.—\textit{Ed.}
As far as "METAYER RENT" is concerned, *"the advance of stock by the proprietor and the abandonment of the management of cultivation to the actual labourers shows the continued absence of an intermediate class of capitalists" (l.c., [p.] 74).

"Ryot rents are produce rents paid by a labourer, raising his own wages from the soil, to the sovereign as its proprietor" (Ch. IV, [p. 109]).* (In Asia especially.) "RYOT RENTS are often mixed up with LABOUR RENTS AND METAYER RENTS" ([p.] 136 sqq.). [Under this system] the sovereign is the chief LANDLORD. *"The prosperity or rather the existence of [the] towns in Asia proceeds entirely from the local expenditure of [the] government"* (l.c. [p. 138]).

**"Cottier" rents ... all rents contracted to be paid in money, by peasant tenants, extracting their own maintenance from the soil"* ([p.] 143). (Ireland) "Over the greater part of the globe, no MONEY RENTS are paid" [l.c.].

"All these FORMS" (SERF, RYOT, METAYER, COTTIER, etc., in short, PEASANTS' RENTS) "PREVENT THE FULL DEVELOPMENT OF THE PRODUCTIVE POWERS OF THE EARTH. The difference in the productiveness of the industry depends first, on the QUANTITY OF CONTRIVANCE USED IN APPLYING MANUAL LABOUR, and SECONDLY, on the extent to which the MERE PHYSICAL EXERTIONS ARE ASSISTED BY THE ACCUMULATED RESULTS OF PAST LABOUR, in other words, on the different *quantities of skill, knowledge and capital brought to the task of production. Small number of the agricultural* classes. It is obvious that the relative numbers of persons who can be maintained without agricultural labour, must be measured wholly by the productive powers of the cultivators..." (Ch. VI [pp. 157-60]). "In England, the tenants who on the disuse of the labour of the serf tenantry took charge of the cultivation of the domains of the proprietors, were found on the land; they were yeomen"* ([p.] 166).

We now come finally to the point which is of decisive interest to us here—FARMERS' RENTS. It is here that Jones' superiority is most striking, for he shows that what Ricardo and others regard as the eternal form of landed property, is its bourgeois form, which, after all, only develops 1) when landed property has ceased to be the dominant relation in production and, consequently, in society; 2) when agriculture itself is carried on in a capitalist way, which presupposes the development of large-scale industry (AT LEAST OF MANUFACTURE) in the towns. Jones shows that rent in the Ricardian sense only exists in a [XVIII-1123] society the basis of which is the capitalist mode of production. As a consequence of the transformation of rent into surplus PROFIT, the direct influence of landed property on wages ceases, which, in other words, merely means that the landed proprietor ceases to be the direct APPROPRIATOR OF SURPLUS LABOUR, this role being now assumed by the capitalist. The relative size of the rent affects only the division of SURPLUS VALUE between CAPITALIST and PROPRIETOR, NOT THE EXACTION OF THAT SURPLUS LABOUR ITSELF. This conclusion in fact emerges from Jones' analysis, though it is not explicitly stated.

Jones marks a substantial advance on Ricardo, in his historical explanation as well as in the economic details. We shall follow his theory step by step. BLUNDERS, of course, occur.

* Thus in the manuscript. Should be "non-agricultural".—Ed.
In the following passages, Jones correctly explains the historical and economic conditions under which rent = surplus profit, that is, the expression of modern landed property.

"Farmers' rents can only exist when the most important relations of the different classes of society have ceased to originate in the ownership and occupation of the soil" ([p.] 185).

The capitalist mode of production begins with manufacture and only later subjugates agriculture.

"It is the artisans and the handicraftsmen who first range themselves under the management of capitalists" ([p.] 187).

"One of the immediate consequences of this system is the power of moving at pleasure the labour and capital employed in agriculture, to other occupations".

"And only with this power can there be any question of equalisation of agricultural and industrial profits."

"While the tenant was himself a labouring peasant, forced, in the absence of other funds for his maintenance, to extract it himself from the soil, he was chained to that soil by necessity; the little stock he might possess, since it was not sufficient to procure him a maintenance unless used for the single purpose of cultivation, was virtually chained to the soil with its master. With the capitalist-master this dependence on the soil is broken; and unless as much can be gained by employing the working class on the land, as from their exertions in various other employments, which in such a state of society abound, the business of cultivation will be abandoned. Rent, in such a case, necessarily consists merely of surplus profits" ([p.] 188). "Rent ceases to have any influence on wages. When the engagement of the labourer is with a capitalist, this dependence on the landlord is dissolved" ([p.] 188-89).

As we shall see later, Jones does not really explain how surplus profit arises, or rather, he explains it only in Ricardian fashion, i.e. by the difference in the degrees of natural fertility of different soils.

"When rents consist of surplus profits, there are 3 causes from which the rent of a particular spot of ground may increase:

1) An increase of the produce from the accumulation of larger quantities of capital in its cultivation;
2) the more efficient application of capital already employed;
3) the capital and produce remaining the same, the diminution of the share of the producing classes in that produce and a corresponding increase of the share of the landlord.

These causes may combine in different proportions" ([p.] 189).

We shall see what is involved by these different causes. First of all they all presuppose that rent exists as surplus profit; and then there is not the slightest doubt that cause 1) to which Ricardo alludes only once and then only incidentally, is correct. When the capital employed in agriculture increases, the amount of rent increases as well, even though the price of corn, etc., does not rise
and no other change whatever takes place. It is clear that, in this case, the price of land rises, although corn prices do not and no change whatever takes place in them.

Jones declares rent on the worst soil to be monopoly price. He therefore restricts the real source of rent either to monopoly price (in the same way as Buchanan, Sismondi, Hopkins, and others) if it is absolute rent (not arising from differences in the fertility of the different kinds of soil) or to differential rent (in the Ricardian sense).

Ad vocem a absolute rent, let us take a gold mine. We assume that the capital employed = £100, the average profit £10, rent £10, and that half the capital consists of constant capital (in this case, machinery and matière instrumentale) and half of variable capital. The £50 of constant capital means nothing more than that it contains the same amount of labour time as [XVIII-1124] is embodied in £50 worth of gold. That part of the product which = £50 therefore replaces this constant capital. If the rest of the product = £100 and if 50 workers are set to work with the £50 of variable capital then [the labour of] 50 workers (assuming a working day of 12 hours) must be expressed in £100 worth of gold, of which £50 goes to pay wages and £50 represents unpaid labour. The value of the products of all capitals of the same composition will then be 120; the product will then consist of 50c and 100, [the 100] corresponding to 50 working days, that is, 50v plus 50c. A capital of 100, utilising more constant capital and a smaller number of workers, would produce a product of less value. However, all ordinary industrial capitals, although the value of their products would, in these circumstances, amount to 120, would only sell them at their production price of 110. But in the case of the gold mine, this is impossible quite apart from the ownership of land, because in this case the value is expressed in the product in kind. A rent of £10 would therefore of necessity arise.//

Corn can sell at a monopoly price, that is, at a price which more than pays the costs and profits of those who grow it under the least favourable circumstances; or at such a price as will only repay the common profits. In the first case abstracting from all difference of fertility in the soils cultivated, [the] increased produce obtained by increased capital (prices remaining the same) may increase the rents, in proportion to the increased capital laid out.* For example 10% be the ordinary rate of profit. If the corn produced by £100 can be sold for 115, the rent would be £5. If * in the progress of improvement the capital employed on the same land were doubled, and the produce doubled, the £200 would yield 230 and *£10 would be rent, and the rent will be doubled*" ([p.] 191).

a As regards.—Ed.
This applies to absolute rent as well as to differential rent.

"In small communities corn may be constantly at a monopoly price... This is possible in larger countries too, provided the increase of population keeps steadily ahead of the increase of tillage. However monopoly price of corn is unusual in countries of considerable extent and great variety of soil. When prices rise steeply more lands are cultivated or more capital is laid out on the old lands, till the price hardly yields the ordinary profit on the outlay any longer. Then tillage will stop, and in such countries corn is usually sold at a price not more than sufficient to replace the capital employed under the least favourable circumstances and the ordinary rate of profit on it,* and the rent paid on the better soils is then measured by the excess of their produce over that of the poorest soil cultivated by similar capitals** ([pp.] 191-92). "All that is necessary to effect a rise of rent over the surface of a country possessing soils of unequal goodness, is this: that the better soils should yield to the additional capital employed upon them in the progress of cultivation, something more than the soils confessedly inferior to them; for then while [the] means can be found of employing fresh capital on any soil between the extremes A and Z, at the ordinary rate of profit, rents will rise on all the soils superior to that particular soil*** ([p.] 195). "Let A have been cultivated with [£]100 yielding annually 110, £10 being the ordinary profits, and B with 100 yielding £115 and C with 100 yielding £120 and so on to Z, the rent of B would be 5, and that of C 10. Let each of these qualities of soil be cultivated with [a capital of] £200. A will produce 220, B 230, C 240, etc., the rent of B, therefore, will have become 10, that of C 20, etc." ([p.] 195).

"The *general accumulation of the capital employed in cultivation, while it enhances the produce of all gradations of soils, somewhat in proportion to their original goodness, must of itself raise rents* without *reference to any progressive diminution in the return to the labour and capital employed, and, indeed, quite independently of any other cause whatever*" ([p.] 195).

It is one of Jones' merits that he is the first who clearly brings out the fact that *once rent [is] supposed, its growth will on the whole //always supposing no revolutions in the mode of production// result from the augmentation of agricultural capital, of capital employed on land. "This may be the case not only if prices remain the same but even when they *fall* below their former* level".

[XVIII-1125] Rejecting the *gradual diminution* of productivity [in agriculture], Jones remarks:

* "The average corn produce of England at one time did not exceed 12 bushels per acre; it is now about double" ([p.] 199). "Each successive portion of capital and labour concentrated on the land may be more economically and efficiently applied than the last" * ([pp.] 199-200).

"Rent will double, triple and quadruple, and so on, if the capital invested in the old land is doubled, tripled, quadrupled *without a diminished return, and without altering the relative fertility of the soils cultivated*" ([p.] 204).

This is therefore the first point on which Jones is in advance of Ricardo. *Once rent [is] supposed, it may increase by the mere increase of the amount of capital employed on the land, irrespective of *any change either in the relative fertility of the soils, or the returns of the
successive doses of capital employed, or any alteration whatever in the price of agricultural produce.*

Jones' next point is this:

*“It is not essential to the rise, that the proportion between the fertility of the soils should be exactly stationary”* ([p.] 205).

(Here Jones overlooks the fact that, conversely, an increasing dis-proportion, even when the whole agricultural capital is more productively employed, must and will increase the amount of the differential rent. A diminution, on the contrary, in the differences of the fertility of the various soils must diminish the differential rent, i.e. rent flowing from those differences. [By] taking away the cause you take away the effect. Still rent (apart from absolute rent) may increase, but* in that case *only in consequence of an increase of the agricultural capital employed.*)

“Ricardo had overlooked the necessarily unequal effects of additional capital on soils of unequal fertility” (l.c.).

(This means nothing more than *that the employment of additional capital adds to the differences of relative fertility, and, in that way, to differential rent.*)

“If numbers, bearing a certain proportion to each other, are multiplied by the same number, the proportion will be the same as that of the original numbers, yet the differences between the amounts of the several products will increase at each step of the process. If 10, 15, 20, be multiplied by 2 or 4, and become 20, 30, 40, or 40, 60, 80, their relative proportions will not be disturbed: 80 and 60 bear the same proportion to 40, as 20 and 15 do to 10, but the difference between the amounts of their products will have increased at each operation, and from being 5 and 10, become 10 and 20, and then 20 and 40” ([pp.] 206-07).

This law works out simply as follows:

1) 10,⁵  15,¹⁰  20.  The difference  5 [and 10].  Sum of the differences 15.

2) 20,¹⁰  30,²⁰  40.  ”  ”  10 [and 20].  ”  ”  30.

3) 40,²⁰  60,⁴⁰  80.  ”  ”  20 [and 40].  ”  ”  60.

4) 80,⁴⁰  120,⁸⁰  160.  [”  ”  40 and 80.  ”  ”  120.]

The difference between the terms is doubled in 2 and quadrupled in 3. The sum of the differences is likewise doubled in 2 and quadrupled in 3.

This therefore is the 2nd law. The first law (applied by Jones only to differential rent) is that the amount of rent increases with the increase of the amount of capital employed. If rent is 5 for 100, then it is 10 for 200.

[XVIII-1126] The second law. *All other circumstances remaining the same, the proportional difference between the capitals
employed on different soils remaining the same, the *amount of that difference*, and hence the amount of the aggregate rent or the sum of those differences, increases with the absolute quantity of that difference resulting from the increase of the capitals employed.* Hence the second law is: The amount of differential rent increases in proportion as the differences of the products increase when the relative fertility remains the same, but capital employed on the different soils is increased uniformly.

Further: "If £100 be employed on classes A, B and C, with a produce of 110, 115, and 120, and subsequently 200, with returns of 220, 228 and 235, *the relative differences of the products will have diminished, and the soils will have approximated in fertility, still the difference* of the *amounts of their products will be increased from 5 and 10 to 8 and 15, and rents will have risen accordingly.* Improvements, therefore, which tend to approximate the degrees of fertility of the cultivated soils, may very well raise rents,* and that without the cooperation of any other cause" ([p.] 208). "The *turnip and sheep husbandry and the fresh capital employed to carry it on, produced a greater alteration in the fertility of the poor soils than in that of the better; still it increased the absolute produce of each, and,* therefore, raised rents, while it diminished the differences in the fertility of the soils cultivated" (l.c.). "With regard to Ricardo's view that improvements may cause rents to fall, [it is only necessary] *to remember the slowly progressive manner in which agricultural improvements are practically discovered, completed and spread*" ([p.] 211).

//This last passage is only of practical interest and does not affect the problem as such, but refers only to the fact that these improvements do not proceed so rapidly as to considerably augment supply in regard to demand and thus to reduce market prices.//

Originally we have:

a) 10, 15, 20. The capital employed in each class=100. The product=110, 115, 120. The difference=5+10=15. On account of improvements made, twice as much capital is employed, [£]200 instead of 100 in each class a), b) and c); but this capital has a different effect in the different classes and the products yielded=220 (that is, double that of a), 228 and 235. Thus:

a) 10, 15, 20
b) 20, 28, 35. The capital employed in each class=200. The product=220, 228 and 235. The difference=8+15=23. But the rate of difference has been reduced. 5:10 (i.e. [the ratio of the differences] b—a [to a] in 1)=1/2 and 10:10=1, whereas 8:20=only 8/20=4/10=²/₅ and 15:20=15/20=³/₄. The rate of difference has declined but its amount has increased. This does not, however, constitute a new law, but only shows that the increase of capital employed leads to an increase in rent as in the first law, although the increase in a, b, c is not proportional to their original differences of
FERTILITY. If prices were to fall as a consequence of this increased fertility (which is however [relatively] diminished fertility for b and c, for otherwise their product would have to be 230 and 240 respectively), it would by no means be necessary for the rent to rise or even to remain stationary.

[XVIII-1127] As a consequence, a sequel, of the 2nd law, a further application of it can be considered:

The third law:

If *"improvements in the efficiency of the capital employed in cultivation increase the surplus profits realised on particular spots of land, they increase rent"* [p. 244].

The following passages by Jones (together with the earlier ones) refer to this:

"Thus the first source of a rise of farmers' rents are *the progressive accumulation and the unequal effects of capital on all gradations of soil*" ([p.] 234).

//This, however, can only refer to improvements which relate directly to the fertility of the soil as, for instance, manures, rotation of crops, etc.//

*"Improvements in the efficiency of the capital employed in cultivation, raise rents by increasing the surplus profits realised on particular spots of land. They invariably produce this increase of surplus profit, unless they augment the mass of raw produce so rapidly as to outstrip the progress of demand. Such improvements in the efficiency of the capital employed, do usually occur in the progress of agricultural skill, and of the accumulation of greater masses of auxiliary capital"* (constant capital). *"A rise of rents from this cause, is generally followed by the spread of tillage to inferior soils, without any decrease in the returns to agricultural capital on the worst spots reclaimed"* ([p.] 244).

//Jones very correctly declares that a fall in profits does not prove [the decreasing efficiency of] agricultural industry (alias the fall in the price of agricultural produce). But he himself explains most inadequately how such a fall can come about. [According to him] either the amount produced or its division between labourers and capitalists may change. Jones has as yet no idea of the real law of declining rate of profit.

*"A fall of profits is no proof of the decreasing efficiency of agricultural industry" ([p.] 257). "Profits depend partly on the amount of the produce of labour, partly on the division of that produce between the labourers and capitalists;* and their amount, therefore, might vary from a change in either of these particulars" ([p.] 260).

This is the reason for the incorrect law which he elaborates:

*"When, abstracting from the effects of taxation, an apparent diminution takes place in the revenue of the producing classes considered jointly"* //what revenue means is not explained here, [whether] value in use or value in exchange, amount of profit or rate [of profit]//, "when there is a fall in the rate of
PROFITS, NOT COMPENSATED BY A RISE OF WAGES, and vice versa," //that is precisely what Ricardo's law says, and it is wrong// "THERE HAS BEEN, it may be argued, SOME DECREASE IN THE PRODUCTIVE POWER OF LABOUR AND CAPITAL" (p. 273).

Jones correctly grasps that a relative increase [in the value] of industrial produce as compared to [that of] agricultural produce* may take place in the progress of society, although, in point of fact, agriculture is progressing absolutely.*

* "In the progress of nations, an increase of manufacturing power and skill usually occurs, greater than that which can be expected in the agriculture of an increasing people. This is an unquestionable truth. A rise in the relative value of raw produce may, therefore, be expected in the advance of nations, without any positive decrease in the efficiency of agriculture"* (p. 265).

But this does not explain the positive rise in the money prices of raw produce, unless a fall in the value of gold takes place which *in manufacture is balanced and overbalanced by the still greater fall in [the value of] the commodities produced, while it is not so balanced in agriculture. This may happen, even [XVIII-1128] if no general fall in the value of gold (money) takes place, but when a particular nation, for instance, buys more money* with a DAYS WORK than the competing nations do.

Jones explains his reasons for not believing that in England the Ricardian law operates, the abstract possibility of which he does admit however.

"If rents should ever rise from the cause stated by Mr. Ricardo,b *'the employment of an additional quantity of labour with a proportionally less return', and a consequent transfer to the landlords of a part of the produce obtained on the better soils, then the average proportion of the gross produce taken by the landlords as rent, will necessarily increase.* Secondly,c the *industry of a larger proportion of the population must be devoted to agriculture*" ([pp.] 280-81).

(This last statement is not quite correct. *It is possible that [a] greater portion of secondary labour is employed—more commodities procured by industry and commerce enter the agricultural process, without the gross produce being augmented proportionally, and without more immediate labour being employed. There may be even less employed.*)

"The statistical history of England presents to us 3 facts: *A spread of tillage* accompanied *by a rise in the general rental of the country. A diminution of the proportion of people employed in agriculture. A decrease in the landlord's proportion of the produce*" ([p.] 282).

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a Thus in the manuscript. The passage should presumably read: "a relative increase [in the value] of agricultural produce as compared to [that of] industrial produce."—Ed.
b See D. Ricardo, On the Principles of Political Economy, and Taxation, p. 60.—Ed.
c Jones has "Firstly".—Ed.
(This last development, just as the decline in the rate of profit, is due to the increase in that part of the product which replaces constant capital. At the same time, rent can increase in both amount and value.)

"Adam Smith says: *'In the progress of improvement, rent, though it increases in [proportion to the] extent, diminishes in proportion to the produce of the land'*" ([p. 284].)

Jones calls constant capital "auxiliary capital".

"It appears from various returns made at different times to the Board of Agriculture, that the whole capital agriculturally employed in England, is to that applied to the support of labourers, as 5 to 1; that is, there are 4 times as much auxiliary capital used, as there is of capital applied to the maintenance of the labour used directly in tillage. In France, this ratio = 2:1" ([p. 223].)

*"When a given quantity of additional capital is applied in the shape of the results of past labour, to assist the labourers actually employed, a less annual return will suffice to make the employment of such capital profitable,* and, therefore, *permanently practicable, than if the same quantity of fresh capital were expended in the support of additional labourers"* ([p. 224].) "Let us suppose £100 employed upon the soil in the maintenance of 3 men, producing their own wages, and 10% profit on them, or £110. Let the capital employed be doubled. And first let the fresh capital support 3 additional labourers. The increased produce must equal £110 = the wages of 3 additional men + £10 profit. Next let the same additional £100 be employed in the shape of implements, manures, or any results of past labour, while the number of actual labourers remains the same. Let this auxiliary capital last on the average 5 years: the annual return to repay the capitalist must be 10% profit, and £20 the annual wear and tear of his capital: or £30 will be the annual return, necessary to make the continuous employment of the second £100 profitable, instead of £110, the amount necessary when direct labour was employed by it. It will be obvious, therefore, that the accumulation of auxiliary capital in cultivation, will be practicable when the employment of the same amount of capital in the support of additional labour has ceased to be so, and that the accumulation of such capital may go on for an indefinite period"* ([pp. 224-25].) "Thus the *increase of auxiliary capital both increases the command of man over the powers of [the] soil, relatively to the amount of XVIII-1129 labour directly or indirectly employed upon it; and diminishes the annual return necessary to make the progressive employment of given quantities of fresh capital profitable*" ([p. 227].) "If we suppose any capital, £100 for instance, employed upon the soil, wholly in paying the wages of labour, and yielding 10% profit, the revenue of the farmer will = 1/10 that of the labourers. If the capital be trebled, etc., then the revenue of the farmer will continue to bear the same proportion to that of the labourers. But if the number of labourers remaining the same, the amount of capital is doubled, profits become £20, or 1/5 of the revenue. If the capital be quadrupled, profits become £40, or 2/5 of the revenue of the labourers; if the capital be increased to £500, profits would become £50, or half the revenue of the labourers. And the wealth, the influence, and probably to some extent, the numbers of the capitalists in the community, would be proportionally increased... A great
increase of capital usually makes the employment of some additional direct labour necessary. This circumstance, however, will not prevent the steady progress of the relative [increase] of the auxiliary capital" ([pp.] 231-32).

The first important point in this passage is that, with the increase in capital, the auxiliary capital increases in comparison to the variable capital, in other words, that the latter declines relatively in comparison with the constant capital.

The fact that the annual returns decline in proportion to the capital advanced if there is an increase in that part of the auxiliary capital which consists of fixed capital, that is, if its turnover period extends over several years—its value only entering into the product annually in the form of depreciation—is not a phenomenon peculiar to agriculture, but a general one. Although, in industry, the raw material worked up during the year increases even more rapidly than the size of the fixed capital. Compare, for example, the amount of raw cotton which a mule jenny consumes weekly or annually with that used up by a spinning wheel. But suppose, for example, that in (large-scale) tailoring the same amount of raw material in terms of value is worked up (although not the same physical amount, the raw material being dearer than that used in spinning), then the annual return in tailoring will be considerably larger than in spinning, because a large part of the (fixed) capital laid out in the latter only enters into the product as annual depreciation.

The value of the annual return in agriculture (where what one can regard as the raw material, the seed, does not increase in the same proportion as the other elements of constant capital, especially fixed capital) is naturally smaller if the capital increases as a result of an increase in the constant capital only and not in the variable. For the variable capital must be entirely replaced in the product, the other [constant capital] only as an annuity in so far as it is consumed annually. If it is assumed that the price of grain is given, when a qr=£2, 220 qrs are required to replace a variable capital of 100 at a profit of 10%, whereas only 60 qrs (=£30) are required to replace a wear and tear amounting to £20 and a profit of £10. A smaller absolute return yields the same profit (as is the case in industry in similar circumstances). Jones' reasoning, however, contains several fallacies.

D'abord, it cannot be asserted (on the assumptions made) that the productive powers of the soil have increased. They have increased in comparison with the labour employed directly, but not compared with

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a Thus in the manuscript. Presumably, it should be "10s."—Ed.
The general capital employed. All that can be said is that less gross 
produce is necessary in order to yield the same net produce, i.e. the 
same profit as before.

[XVIII-1130] Further, the increase in the farmer's revenue in 
comparison to that of the labourers is important in this special 
sphere in so far as here the part of the total product which goes to 
profit increases and goes on increasing relatively to that part which goes to 
the labourers. As a result, the wealth and influence of the farming 
capitalist as compared to his labourers undoubtedly grow and expand. 
But Jones seems to make the following calculation: [£] 10 on 100 
is \( \frac{1}{10} \). £20 on £120 (i.e. 100 expended in labour and 20 
depreciation) = \( \frac{1}{6} \) and the £20 is \( \frac{1}{5} \) of the sum paid out to the 
workers, etc. But nothing is more fallacious than that, generally 
speaking, the rate of profit can increase while the amount of capital 
laid out on labour declines. Exactly the opposite takes place. 
Proportionally less surplus value is produced and the rate of profit 
therefore falls. As regards the farmer specifically (and also each 
particular enterprise taken in isolation) the rate of profit may 
remain the same whether he employs 3 or 6 workers with a capital 
of 200.

The fact that rent = surplus profit, i.e. the excess over and above 
the average profit, presupposes not only that agriculture is formally 
subordinated to capitalist production, but also that equalisation of 
rates of profit takes place in the various spheres of production, 
specifically between agriculture and industry. Otherwise rent may be 
equal to a surplus over wages (which is also profit). It may even 
represent a part of profit or be a deduction from wages.

2) Richard Jones, an introductory lecture on political economy, 
delivered at king's college, london, 27th february, 1833. 
To which is added a syllabus of a course of lectures
ON THE WAGES OF LABOUR, LONDON, 1833

* "Property in the soil almost universally rests, at one time of a people's career, 
either in the general government, or in persons deriving their interest from it" 
([p.] 14).

"By economical structure of nations, I mean those relations between the 
different classes which are established in the first instance by the institution of 
property in the soil, and by the distribution of its surplus produce; afterwards 
modified and changed (to a greater or less extent) by the introduction of capitalists as 
agents in producing and exchanging wealth, and in feeding and employing the 
labouring population" * ([pp.] 21-22).

//The reason Mr. Senior—whose outline appeared at approximately the same time as Ramsay's Essay on the Distribution of Wealth, 
in which latter work the division of profit into "profit of enterprise"
and into "NET PROFITS OF CAPITAL OR INTEREST" (Ch. IV) is dealt with at length—is supposed to have discovered this division, which was already known in 1821 and 1822, can be explained only by the fact that Senior—a mere apologist of the existing order and consequently a vulgar economist—is very congenial to Mr. Roscher.182//

By "LABOUR fund" Jones understands

* "the aggregate amount of the revenues consumed by the labourers, whatever be the source of those revenues"* ([Syllabus, p.] 44).

The main point (the term labour fund probably comes from Malthus?183) in Jones' work is that the whole economic structure of society revolves around the form of labour, in other words, the form in which the worker appropriates his means of subsistence, or that part of his product upon which he lives. This labour fund has various forms and capital is merely one of them, it is a form which arises rather late in the historical development. It is only in Jones' work that the important differentiation—between labour that is paid out of capital and labour paid directly out of revenue—made by Adam Smith receives the full elaboration of which it is capable and becomes a major key for understanding the various economic structures of society. And with it disappears the absurd notion that, because in capital the worker's revenue first takes the form of something appropriated, alias saved, by the capitalist, this signifies more than a formal difference.

"Even among the West European nations we still find the effects of the *social conformation which results from the peculiar mode of distributing the produce of their land and labour, established [XVIII-1131] in the early period of the existence of agricultural nations* //namely a class of agricultural labourers, secondly landlords, thirdly menials, retainers and artisans who participate in the consumption of the revenue of the landlords either directly or indirectly/*/ ([An Introductory Lecture, p.] 16). "Capital, that is, ACCUMULATED WEALTH EMPLOYED WITH A VIEW TO PROFIT is the great agent, the motive power which causes the changes that take place in this economic conformation". ... "Among all nations, you will find the distinct division of wealth here pointed out, acting *a most important part in modifying the ties which connect the different classes of the community, and in determining their productive power...* In Asia and in part of Europe (it was formerly the case throughout Europe) the non-agricultural classes are almost wholly maintained from the incomes of the other classes, principally from the incomes of the *landholders. If you want the labour of an artisan, you provide him with materials; he comes to your house, you feed and pay him his wages. After a time, the capitalist steps in, he provides the materials, he advances the wages of the workman, he becomes his employer, and is the owner of the article produced, which he exchanges for your money ... an intermediate class* appears between the landowners and a portion of the non-agriculturists, upon which *intermediate class those non-agriculturists are dependent for employment and subsistence. The ties which formerly bound the community together are worn out and fall to pieces; other bonds, other principles of cohesion, connect its
different classes: *new economical relations* spring into being, etc. *Here in England not only the *great body of non-agriculturists almost wholly depend on the pay of capitalists, but the labouring cultivators of the soil are their servants too*" ([p.] 16 sqq.).

The *Syllabus of a Course of Lectures on the Wages of Labor* differs from the book *On Rent* in this: The book examines the different forms of landed property to which different *social forms of labour* correspond. In the *Syllabus*, these *different forms of labour* are the point of departure and both the different forms of landed property and *capital* are regarded as their *offspring*. The determinate social form of the worker's labour corresponds to the form which the conditions of labour—that is, in particular, the land, nature, since this relationship embraces all others—assume in respect of the worker. But the former is in fact merely the objective expression of the latter.

We shall see, therefore, that the different forms of the *labour fund* correspond to the different ways in which the worker confronts his own conditions of production. The manner in which he appropriates his product (or part of it) depends on his relations to his conditions of production.

"The *labour fund*," says Jones, "may be divided into 3 classes: 1) *revenues* which are produced by the *labourers* who consume them, and never belong to any other persons" //in this case, quite irrespective of the *particular* form, the worker must in fact be the owner of his instruments of production//; 2) "*revenues belonging to classes distinct from the labourers, and expended by those classes in the direct maintenance of labour*"; 3) "*capital* in its proper sense. These *distinct branches of the labour fund* may all be observed in our own country; but when we look abroad, we see those parts of that fund, which are the most limited here, constituting elsewhere the main sources of subsistence to the population and determining the character and position of the majority of the people, etc." ([pp.] 45-46).

*Ad a).* "The *wages of labouring cultivators, or occupying peasants*. These *labouring cultivators or peasants* are *hereditary occupiers*, *propietors*, *tenants*. The *tenants* are *serfs, metayers, cottiers*. The last peculiar to Ireland. Something resembling *rent* or profit is often mixed up with the *revenues of peasant cultivators of all classes*, but *when their subsistence is essentially dependent on the reward of their manual labour*, they may be regarded as wage *labourers*.

"Thus, among the *labouring peasants* there are:

"a) *hereditary occupiers, who are labouring* [XVIII-1132] *cultivators*. *Ancient Greece. Modern Asia, more especially India*.

"b) *propietors*. *France, Germany, America, Australia*, Ancient Palestine.


The characteristic feature [of these groups] is that the worker reproduces the *labour fund* for himself. *It is not transformed into capital*. Just as the worker directly produces the *labour fund*, so he appropriates it directly, although his *surplus labour* may be
appropriated either wholly or in part by him himself or may be appropriated entirely by other classes, depending on the particular form which his relation to his conditions of production assumes. It is entirely due to economic prejudice that Jones describes this category as wage labourers. Nothing which characterises wage labourers exists amongst them. It is a pretty bourgeois economic fancy that, because that part of the product which the worker appropriates to himself under capitalism appears as wages, the part of his product which the worker himself consumes must be wages.

Ad b. "In England [the labourers are] limited to *menial servants, soldiers, sailors,* and *a few artisans working on their own account, and paid out of the incomes of their employers. Over a considerable portion of the earth this branch of the General Labour Fund maintains nearly the whole of the non-agricultural labourers. Former prevalence of this Fund in England. Warwick the king-maker. The English gentry. Present prevalence in the East. Mechanics, menials. Large bodies of troops so maintained. Consequences of the concentration of this Fund throughout Asia in the hands of the sovereign. Sudden rise of cities. Sudden desertion. Samarcand; Candahar and others.*" ([pp.] 48-49).

Jones overlooks two main forms: The Asiatic communal system with its unity of agriculture and industry. And secondly, the urban craft guild system of the Middle Ages, [which] also existed partially in the Ancient World.

Ad c. "Capital should never be confounded with the General Labour Fund of the World, of which a large proportion consists of revenues. All branches of a nation's revenues ... contribute to the accumulations by which capital is formed. They contribute in different proportions in different countries and different stages of society. When wages and rents contribute the most" * ([p.] 49 sqq.).

Because surplus labour is converted into capital (instead of being exchanged directly as revenue for labour), capital seems to appear as something saved out of revenue. Jones considers it mainly from this point of view. And in the progress of society the great mass of capital does, in fact, consist of revenue reconverted in this way. But in the capitalist production the original labour fund itself likewise appears as something saved by the capitalist. The reproduced labour fund does not remain in the possession of the worker as in case a), but appears as the property of the capitalist and confronts the worker as the property of someone else. And this point is not elaborated by Jones.

What Jones has to say about the rate of profits and its influence on accumulation in the Course of Lectures is rather inadequate:

*"All other things being equal, the power of a nation to save from its profits varies with the rate of profits: is great when they are high, less when low; but as the rate of profits declines, all other things do not remain equal. The quantities of capital employed relatively to the numbers of [the] population may increase."*
What Jones does not understand is how, as a result of the *"may" increase, the rate of profit sinks because "the quantities of capital employed relatively to the numbers of [the] population have increased".* But he approaches close to the correct view.//

*"Inducements and facilities to accumulate may increase... A low rate of profit is ordinarily accompanied by a rapid rate of accumulation, relatively to the numbers of [the] people as in England;* and a *high rate of profit by a slower rate of accumulation, [XVIII-1133] relatively to the numbers of [the] people,* as in Poland, Russia, India, etc." ([p.] 50 sqq.).

Where the rate of profit is high (apart from cases where, as in North America, there is capitalist production on the one hand and, on the other hand, the value of all agricultural produce is low) it is generally due to the fact that capital consists principally of variable capital, that is, direct labour predominates. Assume a capital of 100, of which \( \frac{1}{5} \) is variable capital. And assume further that the surplus labour amounts to \( \frac{1}{5} \) of a working day. In this case, profit=10%. Assume that \( \frac{4}{5} \) [of the capital] consists of variable capital and that surplus labour=\( \frac{1}{6} \) of the working day. In this case, profit would=16%.

"Error of the doctrine, that whenever, in the progress of nations, the *rate of profits* declines, the means of providing subsistence for an increasing population must be becoming less. Foundations of this error: 1) A mistaken notion, that accumulation from profits must be slow where the rate of profits is low, and rapid where it is high. 2) A mistaken belief, that profits are the only source of accumulation. 3) A mistaken belief that all the labourers of the earth subsist on accumulations and savings from revenue, and never on revenue itself" (l.c.).

"Alterations which take place in the economical structure of nations when capital assumes the task of advancing the wages of labour... The amount of capital devoted to the maintenance of labour may vary, independently of any changes in the whole amount of capital." *//This proposition is important.// *"...Great fluctuations in the amount of employment, and great suffering, may sometimes be observed to become more frequent as capital itself becomes more plentiful... Periods of gradual transition of the labourers from dependence on one fund to dependence on another... Transfer of the labouring cultivators to the pay of capitalists... Transfer of non-agricultural classes to the employ of capitalists"* (l.c.).

What Jones calls "transfer" here, is what I call "primitive accumulation". This is merely a formal difference. It is also in contradiction to the absurd notion of "savings".

*"Slavery. Slaves may be divided into pastoral—praedial—domestic—slaves of a mixed character, between praedial and domestic.* We find slaves as cultivating peasants, as *menials or artisans, maintained from the incomes of the rich, as labourers maintained from capital"* ([p.] 59).

But so long as slavery is predominant, the capital-relation can only be sporadic and subordinate, never dominant.
* "The productiveness of the industry of nations really depends on 2 circumstances: First, on the fertility or barrenness of the original sources" /land and water// "of the wealth they produce. Secondly, on the efficiency of the labour they apply in dealing with those sources, or fashioning the commodities obtained from them" ([p.] 4).

"The efficiency of human labour will depend: 1) on the continuity with which it is exerted; 2) on the knowledge and skill with which it is applied, to effect the purpose of the producer; 3) on the mechanical power by which it is aided" ([p.] 6).

"The power exerted by human labourers in producing wealth ... may be increased: 1) by enlisting in their service, motive forces greater than their own..., 2) by employing any amount or kind of motive [XVIII-I134] forces at their command with an increased mechanical advantage.* For example, an ENGINE OF 40 HORSEPOWER on a railway has a different effect to one on a TURNPIKE ROAD" ([p.] 8). *"The best form of a plough will do as much work, and as well, with two horses, as the worst with four" ([p.] 9).

"The steam engine is not a mere tool, it gives additional motive force, not merely the means of using forces the labourer already possesses, with a greater mechanical advantage* [([p.] 10, note).

This is, therefore, according to Jones, the difference between a tool and machinery. The former provides the worker with means for employing the power he possesses to a greater mechanical advantage, the latter provides an increase of motive force. (?)

* "Capital ... consists of wealth saved from revenue, and used with a view to profit" ([p.] 16). "The possible sources of capital ... are obviously all the revenues of all the individuals composing a community, from which revenues it is possible that any saving can be made. The particular classes of income which yield the most abundantly to the progress of national capital, change at different stages of their progress, and are therefore found entirely different in nations occupying different positions in that progress" [([l.]c.)]. "PROFITS are therefore far from being the only sources from which capital is formed or increased. It is even an unimportant source of accumulation, compared with wages and * rents, in the earlier stages of society" ([p.] 20). "When a considerable advance in the powers of national industry has actually taken place, profits rise into comparative importance as a source of accumulation" [([p.] 21).

According to this, capital is a part of the wealth which constitutes revenue, the part which is expended not as revenue but for the purpose of producing profit. Profit is already a form of surplus value which specifically presupposes capital. If the capitalist mode of production, i.e. capital, is postulated, then the explanation is correct; in other words, if one postulates what has to be explained. But here Jones means all revenue spent, not as revenue, but with the aim of enrichment, that is, productively.

Two aspects are, however, important in this context: First: To a certain extent accumulation of wealth takes place in all stages of economic development, that is, partly an expansion of the scale of
production and partly, the accumulation of treasure, etc. As long as wages and rent predominate—that is, according to what was said earlier, as long as the greater part of the surplus labour and surplus produce which does not accrue to the worker himself, goes to the landowner (the State in Asia) and, on the other hand, the worker reproduces his labour fund himself, i.e. he not only produces his own wages himself, but pays them to himself, usually, moreover (almost always in that state of society), he is also able to appropriate at least a part of his surplus labour and his surplus produce—in this state of society, wages and rent are the main sources of accumulation as well. (In these circumstances profit is restricted to merchants, etc.) Only when the capitalist production has become predominant, when it does not merely exist sporadically, but has subordinated to itself the mode of production of society; when in fact the capitalist directly appropriates the whole surplus labour and surplus produce in the first instance, although he has to pay away portions of it to the landowner, etc.—only then does profit become the principal source of capital, of accumulation, of wealth saved from revenue, and used with a view to profit. This at the same time presupposes (as is implicit in the domination of the capitalist mode of production) that "a considerable advance in the powers of national industry has actually taken place".

Jones thus answers those asses who imagine that no accumulation can take place without the profit yielded by capital or who justify profit by saying that the capitalist makes a sacrifice in order to save from his revenue for productive purposes by pointing out that in this particular (capitalist) mode of production the function "of accumulating" devolves principally on the capitalist whereas, in previous modes of production, it was the labourer himself and, in part, the landlord who played the chief roles in this process and profit played hardly any part in it. Naturally the function [of accumulating] always devolves 1) on those who pocket the surplus value and, 2) among those who pocket the surplus value, in particular on the person who also acts as agent in the production process itself. By saying, [XVIII-1135] therefore, that profit is justified by the fact that the capitalist "saves" his capital out of profit and that he fulfils the function of accumulating, one merely says that the capitalist mode of production is justified because it exists—this, however, applies equally to the modes of production which preceded it and those which will succeed it. If one says that otherwise accumulation would be impossible, then one forgets that this particular method of accumulation through the agency of the capitalist has come into existence at a certain
historical stage and is moving towards the historical date when it will cease to exist.

Secondly, once so much accumulated wealth has been concentrated in the hands of capitalists per fas et nefas\(^a\) that they can dominate production, then the greater part of existing capital — after a certain lapse of time — can be considered as merely originating from profit (revenue), that is, from capitalised surplus value.

A point which Jones does not sufficiently emphasise, and which he really only implies tacitly, is this: If the labouring producer pays himself his own wages and if his product does not at first assume the "shape" of other people's revenue from which "savings" are made and then paid back by them to the labourer, it is necessary that the labourer be in possession of his conditions of production (as property owner, or tenant, or hereditary occupier, etc.). In order that his wages and consequently the labour fund can confront him as alien capital, these conditions of production must have been lost to him and have assumed the shape of alien property. Only after his conditions of production together with his labour fund have been wrested from him and when, as capital, they are rendered independent in relation to him, does the further process begin, which is not concerned with the mere reproduction of these original conditions of production, but with their further development so that both the conditions of production and the labour fund confront the labourer as something "saved" from other people's revenue in order to be converted into capital. By losing possession of his conditions of production, and hence, of his labour fund, the labourer also loses the function of accumulating, and every addition he makes to wealth appears in the shape of other people's revenue which must first be "saved" by those people. That is to say, not spent as revenue,[if it is] to perform the functions of capital and labour fund for the labourer.

Since Jones himself describes a state of affairs in which things have not yet reached this stage and where unity prevails, he certainly should have described this "separation" as the real generation process of capital. Once this separation exists, this process does indeed take place and it is continued and extended, since the surplus labour of the worker always confronts him as the revenue of others, through the "saving" of which alone wealth can be accumulated and the scale of production extended.

The reconversion of revenue into capital. If capital //i.e. the separation of the conditions of production from the labourer // is

\(^a\) By fair means or foul.— Ed.
the source of profit //i.e. of the fact that surplus labour appears as
the revenue of capital and not of labour// then profit becomes the
source of capital, of new capital formation, i.e. of the fact that the
additional conditions of production confront the worker as capital,
as a means for maintaining him as a worker and of appropriating
his surplus labour anew. The original unity between the worker and
the conditions of labour //abstracting from slavery, where the
labourer himself belongs to the objective conditions of labour// has
two main forms: the Asiatic communal system (primitive communism)
and small-scale agriculture based on the family (and linked
with domestic industry) in one or the other form. Both are embryonic
forms and both are equally unfitted to develop labour as social
labour and the productive power of social labour. Hence the
necessity for the separation, for the rupture, for the antithesis of
labour and property (by which property in the conditions of
production is to be understood). The most extreme form of this
rupture, and the one in which the productive forces of social labour
are also most powerfully developed, is capital. The original unity can
be re-established only on the material foundation which capital
creates and by means of the revolutions which, in the process of
this creation, the working class and the whole society undergo.

Another point which Jones does not sufficiently emphasise is
this:

Revenue which is exchanged as such against labour—if it is not
the revenue of a self-sustaining labourer who employs a secondary
workman—is the revenue of the landholder, itself derived from the
rent which the self-sustaining labourer pays him, and which the
landlord does not entirely consume in natura, either by himself or
together with his menials and retainers, but a part of which he uses
to buy the products or services of secondary workmen and so on.
This always presupposes the first relationship.

[XVIII-1136] //In the same way as part of the profit is classified
as interest, even if the industrial capitalist employs only his own capital,
because this form [of revenue] has a separate mode of existence,
so, given the capitalist mode of production, even if a labourer owns his
means of production, even without employing any other labourer, it is
considered as capital and the part of his own labour realised by him
au delà the common wage appears to be profit yielded by his
capital. He himself is then divided up into different economic
categories. As his own workman, he gets his wages, and as capitalist, he gets
his profits. This observation belongs to the chapter “Revenue and Its
Sources”. 187 //

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a Over and above.—Ed.
* "There is a difference between the influence, on the productive powers of nations, of that wealth which has been saved, and is dispensed as wages with a view to profit; and of that wealth which is advanced out of revenue for the support of labour. With a view to this distinction, I use the word capital to denote that portion of wealth exclusively which has been saved from revenue, and is used with a view to profit" ([pp.] 36-37). "We might ... comprise under the term capital, all the wealth devoted to the maintenance of labour, whether is has gone through any previous process of saving or not, ...we must, then, in tracing the position of the labouring classes, and of their paymasters in different nations and under different circumstances, distinguish between capital which has been saved, and capital which has undergone no process of accumulation; between, in short, capital which is revenue, and capital which is not revenue" ([p.] 36). "In every nation of the Old World, except England and Holland, the wages of the agriculturists are not advanced out of the funds which have been saved and accumulated from revenues, but are produced by the labourers themselves, and never exist in any other shape than that of a stock for their own immediate consumption" *

What distinguishes Jones from the other economists (except perhaps Sismondi) is that he emphasises that the essential feature of capital is its socially determined form, and that he reduces the whole difference between the capitalist and other modes of production to this distinct form. It is that labour is directly converted into capital and that, on the other hand, this capital buys labour not for the sake of its use value, but in order to valorise itself, to create surplus value (a larger amount of exchange value) and to use it "WITH A VIEW TO PROFIT".

This shows, however, at the same time that the "SAVING OF REVENUE" in order to convert it into capital and "accumulation" are distinguished from other methods only through the form in which "WEALTH IS DEVOTED TO THE MAINTENANCE OF LABOUR". The agricultural labourers in England and Holland who receive wages which are "ADVANCED" by capital PRODUCE "THEIR WAGES THEMSELVES" just like the French PEASANT OR THE SELF-SUSTAINING RUSSIAN SERF. If the production process is considered in its continuity, then the capitalist advances the labourer as "wages" today only a part of the product which the labourer "produced" yesterday. Thus the difference [between the capitalist and other modes of production] does not lie in the fact that, in one case, the labourer does produce his own wages and in the other [case] does not produce them. The difference lies in the fact that [in one case] his product appears as wages; that in this case, the worker's product (the part of the product produced by the worker which makes up the LABOUR FUND) 1) appears as the revenue of others; 2) that then, however, it is not expended as revenue, and not spent on labour by means of which revenue is directly consumed, but, 3) that it confronts the worker as capital which returns to him this portion of the product, in exchange not merely
for an equivalent but for more labour than is objectified in the product. Thus his product appears 1) as revenue of others, 2) as something which is "saved" from revenue in order to be employed in the purchase of labour with a view to profit, i.e. as capital.

And this process in which his own product confronts him as capital, is described in the following way: the labour fund has gone "through a previous process of saving", "has undergone a process of accumulation", and prior to being converted into the labourer's means of subsistence, it "exists in another shape" (here it is expressly stated that merely a change of form takes place) "than that of a stock for the labourer's immediate consumption". The whole difference lies in the transformation which the labour fund produced by the worker undergoes before it comes back to him in the form of wages. In the case of self-sustaining peasants or independent artisans, it therefore never assumes the form of "wages".

[XVIII-1137] "Saving" and "accumulation"—as far as the labour fund is concerned—are mere names here for the transformations which the worker's product undergoes. The self-sustaining labourer consumes his product just like the wage labourer, or rather, the latter does so just like the former. But in the case of the wage earner, his product appears to be something saved or accumulated from [the revenue of] others, the capitalist's revenue. In fact, however, it is this process that makes it possible for the capitalist "to save" or "accumulate" the labourer's surplus labour for his own purposes, and this is the reason why Jones places such great emphasis on the fact that, in non-capitalist modes of production, accumulation does not arise from profits, but from wages, in other words, from the income of the self-sustaining cultivator or the artisan who exchanges his labour directly for revenue (otherwise how could the middle classes have arisen out of the latter?) and from the landlord's rent. But for the labour fund to undergo these transformations, the conditions of production must confront the labourer as capital, which is not the case in other forms. The expansion of wealth does not appear to be due to the labourer in the latter case, but to the saving of profit, the reconversion of surplus value into capital, in the same way as the labour fund itself (before its expansion as a result of new accumulation) confronts the labourer as capital.

"Saving", taken literally, only makes sense with regard to the capitalist who capitalises his revenue, in contrast to the capitalist who consumes his revenue, i.e. spends it as revenue, but makes no sense whatever when applied to relations between capitalist and labourer.

Two cardinal facts about capitalist production: [First,] concentra-
tion of the means of production in a few hands so that they no longer appear as the immediate property of the individual labourer, but as factors of social production, even though in the first instance they appear as the property of the non-working capitalists, who are their trustees in bourgeois society and enjoy all the fruits of this trusteeship. Second: Organisation of labour itself as social labour brought about by cooperation, division of labour and the linking of labour with the results of social domination over natural forces. In both these ways, capitalist production eliminates private property and private labour, even though as yet in antagonistic forms.

The main difference between productive and unproductive labour noted by Adam Smith, is that the former is exchanged directly for capital and the latter for revenue—and the full meaning of this difference emerges first in Jones. His work shows that the first kind of labour is characteristic of the capitalist mode of production, and the second—where it is predominant—belongs to earlier modes of production, and, where it merely plays a subordinate role, is restricted (or ought to be restricted) to spheres which are not directly concerned with the production of wealth.

*“Capital is the instrument through which all the causes which augment the efficiency of human labour, and the productive power of nations, are brought into play... Capital is the stored-up results of past labour used to produce some effect in some part of the task of producing wealth”* [p. 35].

(In Note, ib., page 35, he says:

*“It will be convenient, and it is reasonable, to consider the act of production as incomplete till the commodity produced has been placed in the hands of the person who is to consume it; all done previously has that point in view. The grocer’s horse and cart which brings up our tea from Hertford to the College, is as essential to our possession of it for the purpose of consumption as the labour of the Chinese who picked and dried the leaves.”

“But... this capital... does not perform in every community all the tasks it is capable of performing. It takes them up gradually and successively in all cases; and it is a remarkable and an all-important fact, that the one special function, the performance of which is essential to the serious advance of the power of capital in all its other functions, is exactly that which, in the case of the greater portion of the labourers of mankind, capital has never yet fulfilled at all” ([pp.] 35-36). “I allude to the advance of the wages of labour” ([p.] 36). “The wages of labour are advanced by capitalists in the case of less than one-fourth of the labourers of the earth.” “This fact... of vital importance in accounting for the comparative progress of nations” (I.c.).

[XVIII-1138] “Capital, or accumulated stock, after performing various other functions in the production of wealth, only takes up late that of advancing to the labourer his wages”* ([p.] 79).

In the last sentence on page 79, capital is indeed described as a “relation”, not merely as “accumulated stock” but as a quite definite
relation of production. The “stock” cannot “take up the function of advancing wages”. Jones, moreover, emphasises that it is the basic form of capital—the form which gives the whole process of social production its distinctive character, dominates it, leads to a quite new development of the productive powers of social labour, and revolutionises all social and political relationships—that confronts wage labour, and pays wages. He emphasises that before capital performs this function, which is of decisive importance, it fulfils other functions and appears in other, subordinate and historically earlier forms, but that its power in all its functions only develops fully when it steps forth as industrial capital. On the other hand, in Lecture III “On the gradual manner in which capital or capitalists” //there’s the rub in this or; accumulated stock becomes capital only because of this personification// “undertake successive functions in the production of wealth”, a Jones does not indicate what the previous functions are. They can indeed only be those of capital engaged in commerce or banking. But although Jones comes so close to the correct concept and even expresses it in a certain fashion, nevertheless, being an economist, he is so enmeshed in bourgeois fetishism that not even the devil could be certain that he does not mean that “accumulated stock” as such can perform different functions.

The sentence:

*“Capital, or accumulated stock, after performing various other functions in the production of wealth, only takes up late that of advancing to the labourer his wages”*

is the most complete expression of the contradiction; on the one hand, it expresses a correct historical conception of capital, but, on the other hand, a shadow is cast over it by the narrow-minded notion of the economist that “stock” as such is “capital”. Hence “the accumulated stock” becomes a person who “takes up the function of advancing wages” to men. Jones is still rooted in economic prejudice when he solves [the problem], a solution becomes necessary as soon as the capitalist mode of production is regarded as a determinate historical category and no longer as an eternal natural relation of production.

One can see what a great leap forward there was from Ramsay to Jones. Ramsay regards precisely that function of capital which makes it capital—the advancing of wages—as accidental, due only to the poverty of the people, and irrelevant to the production

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process as such. In this narrow circumscribed manner, Ramsay 
denies the necessity for the capitalist mode of production. Jones,
on the other hand, //strange that they were both priests of the 
Established Church.\textsuperscript{188} The ministers of the English Church seem to 
think more than their continental [brethren]|// demonstrates that it 
is precisely this function that makes capital capital and gives rise to 
the most characteristic features of the capitalist mode of production. 
He shows how this form occurs only at a certain level of 
development of the productive powers and that it then creates an 
entirely new material basis. Consequently, however, his com-
prehension of the fact that this form "can be superseded" and of 
the merely transitory historical necessity for this form, is quite 
different from that of Ramsay and more profound. He by no 
means regards capitalist relations as eternal.

* "A state of things may hereafter exist, and parts of the world may be approaching 
to it, under which the labourers and the owners of accumulated stock may be 
identical; but in the progress of nations ... this has never yet been the case, and to 
trace and understand that progress, we must observe the labourers gradually 
transferred from the hands of a body of customers, who pay them out of their 
revenues, to those of a body of employers, who pay them by advances of capital out 
of the returns to which the owners aim at realising a distinct revenue. This may not 
be as desirable a state of things as that in which labourers and capitalists are identified, but 
we must still accept it as constituting a stage in the march of industry, which has hitherto 
marked the progress of advancing nations. At that stage the people of Asia have 
not yet arrived"* ([p.] 73).

[XVIII-1139] Here Jones states quite explicitly that capital and 
the capitalist mode of production are to be "accepted" merely as a 
transitional phase in the development of social production, a phase 
which, if one considers the development of the productive powers 
of social labour, constitutes a gigantic advance on all preceding 
forms, but which is by no means the end result; on the contrary, 
the necessity of its destruction is contained in the antagonism 
between "owners of accumulated wealth" and the "actual labourers".

Jones was a professor of political economy at Haileybury and 
the successor to Malthus. One can see here how the real science of 
political economy ends by regarding the bourgeois production 
relations as merely historical ones, leading to higher relations in 
which the antagonism on which they are based is resolved. By 
analysing them political economy breaks down the apparently 
mutually independent forms in which wealth appears. This 
analysis (even in Ricardo) goes so far that 1) The independent, 
material form of wealth disappears and wealth is shown to be simply 
the activity of men. Everything which is not the result of human 
activity, of labour, is nature and, as such, is not social wealth. The
phantom of the world of goods fades away and it is seen to be simply a continually disappearing and continually reproduced objectivisation of human labour. All solid material wealth is only transitory materialisation of social labour, crystallisation of the production process whose measure is time, the measure of a movement itself. 2) The manifold forms in which the various component parts of wealth are distributed amongst different sections of society lose their apparent independence. Interest is merely a part of profit, rent is merely surplus profit. Both are consequently merged in profit, which itself can be resolved in surplus value, that is, to unpaid labour. The value of the commodity itself, however, can only be reduced to labour time. The Ricardian school reaches the point where it rejects one of the forms of appropriation of this surplus value—landed property (rent)—as useless, in so far as it is pocketed by private individuals. It rejects the idea that the landowner is an agent of capitalist production. The antithesis is thus reduced to that between capitalist and wage labourer. This relationship, however, is regarded by the Ricardian political economists as given, as a natural law, on which the production process itself is based. The later economists go one step further and, like Jones, admit only the historical justification for this relationship. But from the moment that the bourgeois mode of production and the conditions of production and distribution which correspond to it are recognised as historical, the delusion of regarding them as natural laws of production vanishes and the prospect opens up of a new society, [a new] economic formation of society, to which the bourgeois mode of production is only the transition.

//The third section4 “Capital and Profit” to be divided in the following way: 1) Conversion of surplus value into profit. Rate of profit as distinguished from rate of surplus value. 2) Conversion of profit into average profit. Formation of the general rate of profit. Transformation of values into prices of production. 3) Adam Smith’s and Ricardo’s theories on profit and prices of production. 4) Rent. (Illustration of the difference between value and price of production.) 5) History of the so-called Ricardian law of rent. 6) Law of the fall of the rate of profit. Adam Smith, Ricardo, Carey. 7) Theories of profit. Query: whether Sismondi and Malthus should also be included in the Theories of Surplus Value. 8) Division of profit into industrial profit and interest. Mercantile capital. Money capital. 9) Revenue and its sources. The question of the relation between the processes of production and distribution also to be included here. 10) Reflux movements of money in the
process of capitalist production as a whole. 11) Vulgar economy. 12) Conclusion. “Capital and wage labour”://

We still [have] to consider a number of things in Jones’ work: 1) In what way, in particular, the capitalist mode of production—the advancing of wages by capital—alters the forms and the productive powers. 2) His observations regarding accumulation and the rate of profit.

But, first of all, another point has to be emphasised.

[XVIII-1140] *“The capitalist has been but an agent to give the labourers the benefit of the expenditure of the revenues of the surrounding customers, in a new form and under new circumstances”* ([p.] 79).

This refers to the non-agricultural labourers, whose earnings previously came direct from the revenue of the landholders, etc. Whereas previously they exchanged their labour (or the product of their labour) directly for that revenue, the capitalist exchanges the product of their labour—collected and concentrated in his hands—for that revenue, in other words, revenue is transformed into, exchanged for capital, in that it constitutes the returns on capital. Instead of being direct returns for labour, it constitutes direct returns for the capital that employs the labourers.

//The first section “Production Process of Capital” to be divided in the following way: 1) Introduction. Commodity. Money. 2) Transformation of money into capital. 3) Absolute surplus value. (a) Labour process and valorisation process. (b) Constant capital and variable capital. (c) Absolute surplus value. (d) Struggle for the normal working day. (e) Simultaneous working days (number of simultaneously employed labourers). Amount of surplus value and rate of surplus value (magnitude and height?). 4) Relative surplus value. (a) Simple cooperation. (b) Division of labour. (c) Machinery, etc. 5) Combination of absolute and relative surplus value. Relation (proportion) between wage labour and surplus value. Formal and real subsumption of labour under capital. Productivity of capital. Productive and unproductive labour. 6) Reconversion of surplus value into capital. Primitive accumulation. Wakefield’s theory of colonisation. 7) Result of the production process. Either sub 6) or sub 7) the change in the form of the law of appropriation can be shown. 8) Theories of surplus value. 9) Theories of productive and unproductive labour.//

// Interest: The Economist remarks on interest:

“If a fixed sum of precious metal falls [in value], this is no reason why a smaller quality of money should be taken for its use, for if the principal is of less value for the borrower, the interest is to the same extent less difficult for him to pay. In California, 3% per month, 36% per annum, because of the unsettled
STATE. In Hindustan, with the Indian princes borrowing for unproductive expenses, the lenders, to counterbalance on the average the losses of capital, [charge] very high interest, 30%, having no relation to profit which might be gained in industrial operations" (The Economist, [No. 491,] January 22, 1853 [p. 89]).

But the interest charged by usurers who advance seeds, etc., or lend the loom, etc., to the ryots bears just as little “relation to profit” gained by the latter. I.e. it bears no relation to the profit made by these Hindoo cultivators and weavers. Just as little does the interest English workers pay at the pawnshop (100% a year on the average; see Tuckett) have any relation to the rate of their wages and still less to “profits realised by them”. The interest these usurers receive rather includes not only the entire profit (the whole surplus value), but constitutes in part a deduction from the wages, these being depressed even under the Indian level, which is low in itself, partly because of the Hindoos’ limited needs and partly because of the fertility of the soil, whence low price of rice, etc. Incidentally, this reproduces itself in England, for instance, where “home industry” exists merely as a form not yet really (but only formally) subsumed under the capitalist mode of production, etc. This against the jackass Carey, who e.g. compares the interest paid by an Indian ryot with that paid on first class bills in England, to demonstrate how much higher wages are in England than in India. But now back to The Economist, which adds the following to the above:

“The lender here charges an *interest so high as to be sufficient to replace the principal in a short time, or at least as, on the average of all his lending transactions, might serve to counterbalance his losses in particular instances, by the apparently exorbitant gains acquired in others*” (l.c.).

Concerning the rate of interest, it says:

* “The rate of interest depends: 1) upon the rate of profit; 2) upon the proportion in which the entire profit is divided between lender and borrower” * (The Economist, l.c.).

The Economist, like all English economists, of course [considers that] profit = the whole surplus value minus rent; interest is merely part of it.

* “Abundance or scarcity of the precious metals, the high or low scale of general prices prevailing, determines only whether a greater or less amount of money will be required in effecting the exchanges between borrowers and lenders, as well as every other species of exchange...” The only difference is *that a greater sum of money would be needed to represent and transfer the capital lent... the relation between the sum paid for the use of capital and the capital expresses the rate of interest as measured in money*” * ([pp.] 89-90).

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a See this volume, p. 349.— Ed.
b See H. Ch. Carey, Essay on the Rate of Wages..., Philadelphia, 1835, p. 112 sqq.190.— Ed.
[XVIII-1141] Regarding the pawnshop business:

* "It is by frequent fluctuations in a month, and by pawning one article to relieve another, where a small sum is obtained, that the premium for money becomes so excessive. 240 licensed pawnbrokers in London and about 1,450 in the country. The capital employed is estimated at about 1 million.* It is turned round at least thrice in the course of a year and yields each time 33 1/3% on an average; so that the inferior orders of England yearly pay 1 million for the *temporary loan of a million, exclusive of what they lose by goods being forfeited" * (J. D. Tuckett, A History of the Past and Present State of the Labouring Population etc., Vol. I, London, 1846, p. 114).191//

COURT OF EXCHEQUER. Homer versus Taunton. DECEMBER 21, 1859 (Reynolds's [Newspaper], DECEMBER 25, 1859 [No. 489, pp. 11, 1]). (STOCKING WEavers.\textsuperscript{a})

"This was an action for libel by Homer (HOSier and grocer) (his wife runs a shop at that place) at Earl Shilton, near Hinckley-Leicestershire, versus Taunton, EDITOR of the Midland Express, * for two libels imputing to the plaintiff oppression and tyranny over the working people in his employ, and also [charging him] with being a truckmaster.*"

(Instead of paying his WORKpeople in wages, that fellow made them take out their earnings in his wife's shop.)

"He employed between 200 and 300 WORKpeople. After all the deductions the average earnings are between 3s. 6d. and 4s. a week. A FRAME costs £2, and the master charges the workman £2 10 a year for the use of the frame. (1s. per week; of the 52 weeks, 50 are working weeks.)"

//Hence in a year he makes 50s. on 40s., or 125%. This shows Mr. Carey the size of interest (rent) where profit really appears in industrial countries like England in the exceptional form in which he generally conceives of it, namely as interest or rent which the capitalist receives from the worker for the rent of the machine. This also disposes of the twaddle about the LABOUR OF SUPERINTENDENCE. Some of these KNITTERS formerly owned FRAMES, but the emergence of improved ones made theirs valueless.

* "The workman, now, be it remarked, is not allowed to buy one for himself. Prior to certain alterations in the construction of the stocking frame, a skilled and industrious man could earn from 8-10s. a week"* [ibid., p. 1].

As regards the benefits deriving from improvements in machinery for the worker himself, the rapid series of improvements in the JENNY MULE in the 18th century made it impossible for the INDEPENDENT (notably AGRICULTURAL) WEAvers to replace their machines, rendered valueless, by new ones, and landed them in the hands of the capitalists. (Apart from the fact that the machines, once developed and capable of being moved by MECHANICAL POWER, led on to the FACTORY SYSTEM.)

\textsuperscript{a} Marx adds the German term here.—Ed.
("The improvements," says Babbage in his book, 1832, Ch. XXIX [p. 281], "which took place not long ago in frames for making patent-net were so great, that a machine, in good repair, which had cost £1,200, sold a few years after for £60. During the great speculations in that trade, the improvements succeeded each other so rapidly, that machines which had never been finished were abandoned in the hands of their makers, who were left stranded through happier discoveries serving the same purpose.")

*A man, with a wife and 4 children, was enabled to earn from 6s. to 6s. 6d. a week; but after the usual deduction for frame rent, room rent, scouring, etc., had been taken, no more than 2s. remained to support himself and family. Another very able hand, having been 20 years in the trade, could earn as much as 12s. a week; but then, he would have to work 15 hours every day. One man, examined in the course of this trial, declared that all the clothes he had on, with the exception of his coat, were borrowed." "The money thus made," * says *Reynolds's Newspaper,

*"is the distillation of the sweat and the strength of the starving [XVIII-1142] and squalid myriads, to whom life is a dismal penance of incessant and unrequited toil."*

The journalist who had denounced this taskmaster was fined £5 for libel.

Where capitalist production is capitalist merely in form, the capitalist is merely a rack-renting "middleman". This holds equally for industry carried on in this way and for Irish or Indian agriculture. Take the following item from *The Times* of March 13, 1862, headed "starving needlewomen":

*A deputation waited on Sir G. Lewis, at the War Office, on the 11th March. An association, originally established by Miss Barlee, and now powerfully supported, proposes to undertake the contracts for military clothing on the same terms now given by Government to contractors, and yet to pay the starving needlewomen an advance of 30% on their present wages. This result is simply obtained by getting rid of the 'middleman' and applying his profits to the benefit of the human material out of which they have hitherto been made. With every advantage the society can give, an ordinary needlewoman cannot earn more than 1s. for 10 hours' incessant labour at soldiers' shirts (viz. 2 shirts a day), and at cloth work not more than 1s. 6d. a day, for 12 hours' work. At contract work her wages now vary from 5d. to 8d. per 10 hours' work."*

//For a seven-day week this makes 35 to 56d., i.e. from 2s. 11d. to 4s. 8d. a week.//

//"Admittedly there is something cruel about this robbing of the worker; but it constitutes the very basis, the surest source of profit, and commercial probity has not the least occasion to blush on account of it. The most honourable fellow may engage in it on his terrain: the master's wrestling the utmost from the worker is within the rules of war, they are two contending powers" [Leduc,] Sir Richard Arkwright, l.c., [Paris, 1841, p.] 144).*

When the master exploits ses ouvriers; for instance, by overworking

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b Marx quotes in French. — Ed.
c His workers. — Ed.
them in an extraordinary style, this is clear profit, whatever the
average rate of profit. All profits of expropriation\textsuperscript{17} are uncertain.
Under given average circumstances of commerce, cheating the worker
always remains "the very basis, the surest source of profit".\textsuperscript{2}

//The capitalist's real profit is largely profit upon expropriation, and
there is a particularly wide scope for the "individual work" of the
capitalist in this, the mercantile field, where it is not a matter of
creating surplus value but of distributing the aggregate profit of the
whole class of capitalists among its individual members. This does not
concern us here.\textsuperscript{192} Certain kinds of profit, e.g. that based on
speculation, occur solely in this field. Therefore, examining them
here would be totally irrelevant. It is evidence of vulgar economy's
brute stupidity that it lumps these—notably in order to represent
profit as "wages"—with profit so far as it originates in the creation of
surplus value. See, e.g., the worthy Roscher.\textsuperscript{193} It is therefore quite
natural that such jackasses, in discussing the distribution of the
aggregate profit of the whole capitalist class, should throw together
the calculation items and compensation titles of capitals in
different spheres of production with the causes behind the
exploitation of the workers by the capitalists, with the factors
behind the origin of profit as such, so to speak.//

[XVIII-1143] //Different ratios of constant to variable capital:

* "Price of cotton cloth in the island of Java. The cotton, in the seed, is sold by
the picul (about 133 lbs). Not above $1/4$ or $1/5$ of this weight ... is cotton; and the
natives, by means of rude rollers, separate, at the expense of one day's labour,
about $1\frac{1}{4}$ lb. of cotton from the seed. In this stage it is worth between 4 or 5 times
its original cost; and the prices of the same substance, in its different stages of
manufacture, are for one picul:

"Cotton in the seed: 2 to 3 dollars;
"Clean cotton ...................... 10-11;
"Cotton thread ...................... 24;
"Cotton thread died blue ........ 35.

"Good ordinary cotton cloth ..... 50. Thus ... the expense of spinning in Java
is 117% on the value of the raw material ... the expense of spinning cotton into a
fine thread is, in England, about 33%" * (Ch. Babbage, On the Economy of Machinery

"In 1792, manual labour was performed mainly by men, without premature
recourse to children; the total number of workers or operatives of all kinds could
be estimated, in 1792, at a quarter of the population, which was around 15 million.
The available mechanical power, at the time, was probably three times that of manual
labour in value. Consequently, the manual labour was equal to that of
3,750,000 men, and the mechanical labour to that of three times this number, or
roughly the labour of 11,250,000 men, the total product having the value of the
labour of 15,000,000 men. As a result, the population and the total accumulated

\textsuperscript{a} Marx quotes in French.—Ed.
productive power were evenly balanced. But the introduction of the improved steam
engine, weaving looms, etc., multiplied Great Britain's productive power incalcula-
ably. Manual labour has increased by enlisting the daily labour, carried on almost
continuously, of women and children at the manufactories, and as a result it can now be
assessed as that of one-third of the population, which had grown to 18 million by
1817, an increase of 3 million over 25 years. But since the introduction of the
improved machines of Arkwright and Watt there has been a real rise in the powers
productive of wealth equal to the labour of 200 million active, strong and
well-trained workers, that is to say 10 times the population of the British Isles, or
thirty times the amount of manual labour replaced today by this increase in the means
of producing wealth. The following changes occurred between 1792 and 1817: the
population rose from 15,000,000 to 18,000,000; manual labour rose from \( \frac{1}{4} \) to \( \frac{1}{3} \),
which in relation to 18,000,000 people means 6 million.

"The newly created [productive] power=the labour of ... 200 million people.

"In 1792, mechanical labour=3 times the amount of manual labour ... 11,250,000. Grand total of productive power in 1817 ... 217,250,000 people, or, as a
ratio to the population of 1817, 12.6 to 1. It follows from this table that over a
period of 25 years Britain achieved a level of industrial development and
productive power enabling it to increase its wealth at an annual rate 12 times that
of the past, and that it can therefore sacrifice this surplus, whether in war
expenditure or in foreign trade unprofitable to it, or employ it to improve the
condition of its population" ([H. G. Macnab,] Examen impartial des nouvelles vues de
M. Robert Owen etc., Paris. 1821, [pp.] 128-30).\(^a\)

[XVIII-1144] //Economy through reducing breaks in labour time in
the production sphere.

"Bleaching ... the natural operation shortened by the application of
chlorine, in combination with lime" (Babbage, I.e., [pp.] 31-32).//

Economy in expense and additional capital.

"It will be necessary occasionally to adjust or repair the machine; this is done
with greater ease by a workman accustomed to machine-making than by one who
merely directs its motion. Now, since the good performance of machines and their
duration depend to a very great extent upon the care given to immediately
correcting every irregular vibration, the tiniest imperfection in their parts as soon
as they appear, it is evident that the expenditure arising from the reparation and
the wear and tear of machinery is considerably reduced by installing the
appropriate workman right on the spot. But in the case of a single tulle loom, this
would be too expensive a plan. The conclusion immediately following is that only
an establishment using a number of such looms may have recourse to it, so that the
whole time of one workman can be occupied in keeping them in order and making
whatever repairs happen to be necessary. If this principle of economy is applied
consistently, one is bound of necessity to double and treble the number of
machines, in order to employ the whole time of 2 or 3 skilful workmen" (Babbage,
CH. XXII, [pp.] 280-81).\(^b\)

Now back to Richard Jones.

After describing capital as a specific relation of production, the
essence of which is that accumulated wealth takes over the function

\(^a\) Marx quotes in French.— Ed.
\(^b\) Marx quotes partly in German and partly in French.— Ed.
OF ADVANCING WAGES, and the LABOUR FUND itself appears as "WEALTH SAVED FROM REVENUE AND EMPLOYED WITH A VIEW TO PROFIT", Jones outlines the changes in the development of the productive powers characteristic of this mode of production. How the (ECONOMICAL) RELATIONS and consequently the social, moral and political STATE OF NATIONS CHANGES with the CHANGE in the MATERIAL POWERS OF PRODUCTION, is very well explained.

*"As communities change their powers of production, they necessarily change their habits too" ([p.] 48). "During their progress in advance, all the different classes of the community find that they are connected with other classes by new relations, are assuming new positions, and are surrounded by new moral and social dangers, and new conditions of social and political excellence"* (l.c.).

He describes the influence of the capitalist form of production on the development of the productive powers in the following way. But before coming to this, a few passages connected with those already quoted.

*“Great political, social, moral, and intellectual changes accompany changes in the economical organisation of communities, and in the agencies and the means, affluent or scanty, by which the tasks of industry are carried on. These changes necessarily exercise a commanding influence over the different political and social elements to be found in the populations where they take place; that influence extends to the intellectual character, to the habits, manners, morals, and happiness of nations” ([p.] 45). “England is the only great country which has taken ... the first step in advance towards perfection as a producing machine; the only country in which the population, agricultural as well as non-agricultural, is ranged under the direction of capitalists, and where the effects of their means and of the peculiar functions they alone can perform, are extensively felt, not only in the enormous growth of her wealth, but also in all the economical relations and positions of her population. Now, England, I say it with regret, but without the very slightest hesitation, is not to be taken as a safe specimen of [XVIII-1145] the career of a people so developing their productive forces” ([pp.] 48-49).

"The general labour fund consists: 1) of wages which the labourers themselves produce. 2) Of the revenues of other classes expended in the maintenance of labour. 3) Of capital, or a portion of wealth saved from revenue and employed in advancing wages with a view to profit. Those maintained on the first division of the labour fund we will call unhired labourers. Those on the second, paid dependants. Those on the third, hired workmen"* (wage labourers). *“The receipt of wages from any of these 3 divisions of the labour fund determines the relations of the labourer with the other classes of society, and so determines sometimes directly, sometimes more or less indirectly, the degree of continuity, skill, and power with which the tasks of industry are carried on” ([pp.] 51-52). “The first division, self-produced wages, maintains more than half, probably more than 2/3, of the labouring population of the earth. These labourers consist everywhere of peasants who occupy the soil and labour on it... The second division of the labour fund, revenue expended in maintaining labour, supports by far the greater part of the productive non-agricultural labourers of the East. It is of some importance on the continent of Europe; while in England, again, it comprises only a few jobbing mechanics, the relics of a larger body. The third division of the labour fund, capital, is seen in England employing the great majority of her labourers, while it maintains
but a small body of individuals in Asia and in continental Europe maintains only the non-agricultural labourers; not amounting, probably, on the whole, to a quarter of the productive population" ([p. 52]. "I have not ... made any distinction as to slave-labour... The civil rights of labourers do not affect their economical position. Slaves, as well as freemen, may be observed subsisting on each part of the general fund"* ([p. 53]).

Although the "civil rights" of the labourers do not affect "their economical position", their economical position however does affect their civil rights. Wage labour on a national scale—and consequently, the capitalist mode of production as well—is only possible where the workers are personally free. It is based on the personal freedom of the workers.

Jones quite correctly reduces Smith's productive and unproductive labour to its essence—capitalist and non-capitalist labour—by correctly applying [the distinction made by] Smith between labourers paid by capital and those paid out of revenue. Jones himself, however, apparently understands by productive and unproductive labour, labour which enters into the production of material [wealth] and that which does not. This follows from the passage quoted, where he speaks of the productive labourers who depend on revenue expended to maintain them [p. 52]. Further:

* "The portion of the community which is unproductive of material wealth may be useful, or it may be useless"* ([p. 42]. Further: * "It is reasonable, to consider the act of production as incomplete till the commodity produced has been placed in the hands of the person who is to consume it" (p. 35, note).*

The distinction made between the labourers who live on capital and those who live on revenue is concerned with the form of labour. It expresses the whole difference between capitalist and non-capitalist modes of production. On the other hand, the terms productive and unproductive labourers in the narrow sense [are concerned with] labour which enters into the production of commodities (production here embraces all operations which the commodity has to undergo from the first producer to the consumer) no matter what kind of labour is applied, whether it is manual labour or not [including] scientific labour, and labour which does not enter into, and whose aim and purpose is not, the production of commodities. This difference must be kept in mind and the fact that all other sorts of activity influence material production and vice versa in no way affects the necessity for making this distinction.

[XVIII-1146] We now come to the development of the productive powers by the capitalist mode of production.

*"It may be as well to point out here how this fact" //of the wages being advanced by capital// "affects their powers of production, or the continuity, the knowledge, and the power, with which labour is exerted... The capitalist who pays a
workman may assist the continuity of his labour. First, by making such continuity possible; secondly, by superintending and enforcing it. Many large bodies of workmen throughout the world ply the street for customers, and depend for wages on the casual wants of persons who happen at the moment to require their services, or to want the articles they can supply. The early missionaries found this the case in China... "The artisans run about the towns from morning to night to seek custom. The greater part of Chinese workmen work in private houses. Are clothes wanted, for example? The tailor comes to you in the morning and goes home at night. It is the same with all other artisans. They are continually running about the streets in search of work, even the smiths, who carry about their hammer and their furnace for ordinary jobs. The barbers, too ... walk about the streets with an armchair on their shoulders, and a basin and boiler for hot water in their hands." This continues to be the case very generally throughout the East, and partially in the Western World. Now these workmen cannot for any length of time work continuously. They must ply like a hackney coachman, and when no customer happens to present himself they must be idle. If in the progress of time a change takes place in their economical position, if they become the workmen of a capitalist who advances their wages beforehand, two things take place. First, they can now labour continuously; and, secondly, an agent is provided, whose office and whose interest it will be, to see that they do labour continuously ... the capitalist has reserves ... to wait for a customer...

Here, then, is an increased continuity in the labour of all this class of persons. They labour daily from morning to night, and are not interrupted by waiting for or seeking the customer, who is ultimately to consume the article they work on. But the continuity of their labour, thus made possible, is secured and improved by the superintendence of the capitalist. He has advanced their wages; he is to receive the products of their labour. It is his interest and his privilege to see that they do not labour interruptedly or dilatorily. The continuity of labour thus secured, the effect even of this change on the productive power of labour is very great... The power is doubled. Two workmen steadily employed from morning to night, and from year's end to year's end, will probably produce more than 4 desultory workmen, who consume much of their time in running after customers, and in recommencing suspended labour"*

([p.] 37 sqq.)

**Firstly.** The transition from labourers who perform casual services—making coats, trousers, etc., in the landowner's house—to workers employed by capital, is already very well described by Turgot.** Second.** Although continuity certainly distinguishes capitalist labour from the form described by Jones, it does not distinguish [capitalist labour] from slave production carried on on a large scale. Third. It is incorrect to describe the increased amount of labour brought about by its long duration and continuity as an increase in productive power or the power of labour. This [occurs] only in so far as the continuity augments the personal skill of the labourers. By [increased] power, we understand the greater productivity of a given quantity of labour employed, not any change in the quantity employed. The latter belongs rather to the formal subordi-

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nation of labour to capital and it only evolves fully with the
development of fixed capital. (We shall deal with this soon.)

Jones correctly emphasises the fact that the capitalist regards
labour as his property, no part of which must be wasted. With
regard to labour which is maintained directly by revenue, this is a
matter of the use value of labour only. [XVIII-1147] Furthermore,
Jones correctly emphasises that the sedentary labour of the
non-agricultural labourers lasting from morning to night is by no
means something which arises spontaneously, but is itself a product
of economic development. In contrast to the Asiatic form and to
the Western form [of labour] (prevailing in former times, partly
even today) in the countryside, the urban labour of the Middle
 Ages already constitutes a great advance and serves as a
preparatory school for the capitalist mode of production, as
regards the continuity and steadiness of labour.

//About this continuity of labour:

* "The capitalist, too, keeps, as it were, an echo-office for labour; he insures
against the uncertainty of finding a vent for labour, which uncertainty would, but
for him, prevent the labour, in many cases, from being undertaken. The trouble of
looking for a purchaser, and of going to a market, is reduced, by his means, to a
comparatively small compass"* (An Inquiry into Those Principles, Respecting the Nature

In the same work:

* "Where the capital is in a great degree fixed, or where it is sunk on land ... the
trader is obliged to continue to employ, much more nearly (than if there had been
less fixed capital), the same amount of circulating capital as he did before, in order
not to cease to derive any profit from the part that is fixed"* (l.c., [p.] 73).//

//* "Of the state of manners to which the dependence of the workmen on the
revenues of their customers has given birth in China, you would, perhaps, get the
most striking picture in the Chinese Exhibition, so long kept open by its American
proprietor in London. It is thronged with figures of artisans with their small packs
of tools, plying for customers, and idle when none appear—painting vividly to the
eye the necessary absence, in their case, of that continuity of labour which is one of
the three great elements of its productiveness, and indicating sufficiently, to any
well-informed observer, the absence also of fixed capital and machinery, hardly less
important elements of the fruitfulness of industry"* (Jones, l.c., [Text-book of
Lectures on the Political Economy of Nations, p.] 73). * "In India, where the
admixture of Europeans has not changed the scene, a like spectacle may be seen in
the towns. The artisans in rural districts are, however, provided for there in a
peculiar manner... Such handicraftsmen and other non-agriculturists as were
actually necessary in a village were maintained by an assignment of a portion of the
joint revenues of the villagers, and throughout the country bands of hereditary
workmen existed on this fund, whose industry supplied the simple wants and tastes
which the cultivators did not provide [for] by their own hands. The position and
rights of these rural artisans soon became, like all rights in the East, hereditary.
The band found its customers in the other villagers. The villagers were stationary
and abiding, and so were their handicraftsmen... The artisans of the towns were
and are in a very different position. They received their wages from what was
substantially the same fund—the surplus revenue from land—but modified in its mode of distribution and its distributors, so as to destroy their sedentary permanence, and produce frequent, and usually disastrous migrations ... such artisans are not confined to any location by dependence on masses of fixed capital"* (as in Europe, for example, where cotton and other manufactories are fixed in districts where there is waterpower, or abundant steam-producing fuel, and considerable masses of wealth have been converted into buildings and machinery, etc.). *"...The case [is] different when the sole [XVIII-1148] dependence of the labourers is on the direct receipt of part of the revenues of the persons who consume the commodities the artisans produce. They are not confined to the neighbourhood of any fixed capital. If their customers change their location for long—nay, sometimes for very short—periods, the non-agricultural labourers must follow them, or starve" (Jones, l.c., [pp.] 73-74). "The greater part of* this fund for the handicraftsmen in Asia is *distributed by the State and its officers. The capitala was, necessarily, the principal centre of distribution" ([p.] 75). "From Samarkand, southwards to Beejapoor and Seringapatam, we can trace the ruins of vanishing capitals, of which the population left them suddenly"* (and not as in other countries [as a result of a gradual] decline) *"as soon as new centres of distribution of [the] royal revenues, i.e. of the whole of the surplus produceb of the soil, were established"* (l.c., [p.] 76).

See Dr. Bernier,c who compares the Indian towns to army camps. This is due to the form of landed property which exists in Asia.//

We now proceed from the continuity to the division of labour, [the development of] knowledge, use of machinery, etc.

*"But the effect of the change of paymasters on the continuity of labour is by no means yet exhausted. The different tasks of industry may now be further divided... If he" (the capitalist) "employ more than one man, he can divide the task between them; he can keep each individual steadily at work at the portion of the common task, which he performs the best... If the capitalist be rich, and keep a sufficient number of workmen, then the task may be subdivided as far as it is capable of subdivision. The continuity of labour is then complete... Capital, by assuming the function of advancing the wages of labour, has now, by successive steps, perfected its continuity. It, at the same time, increases the knowledge and skill by which such labour is applied to produce any given effect. The class of capitalists are from the first partially, and then become ultimately completely, discharged from the necessity of manual labour. Their interest is that the productive powers of the labourers they employ should be the greatest possible. On promoting that power their attention is fixed, and almost exclusively fixed. More thought is brought to bear on the best means of effecting all the purposes of human industry; knowledge extends, multiplies its fields of action, and assists industry in almost every branch... But further still as to mechanical power. Capital employed not to pay, but to assist labour, we will call auxiliary capital."

//He therefore means by this term the part of constant capital which is not made up of raw material.//

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a Marx adds the German term in brackets.—Ed.
b Jones has "surplus revenues".—Ed.

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*"The national mass of auxiliary capital may, certain conditions being fulfilled, increase indefinitely: the number of labourers remaining the same. At every step of such increase, [there is an increase] in the third element of the efficiency of human labour, namely, its mechanical power... Auxiliary capital thus increases its mass relatively to the population... What conditions, then, must be fulfilled that the mass of auxiliary capital employed to assist them" //the capitalist's workmen// "may increase? There must concur 3 things:

1) the means of saving the additional capital;
2) the will to save it;
3) some invention by which it may be [made] possible, through the use of such capital, that the productive powers of labour may be increased, and increased to an extent which will make it, in addition to the wealth it before produced, reproduce the additional auxiliary capital used, as fast as it is destroyed, and also some profit on it... When the full amount of auxiliary capital, that in the actual state of knowledge can be used profitably, has already been supplied, ... an increased range of knowledge can alone point out the means of employing more. Further, such employment is only practicable if the means discovered increase the power of labour sufficiently to reproduce the additional capital in the time it wastes away. If this be not the case, the capitalist must lose his wealth... But the increased efficiency of the labourers must, besides this, produce some profit, or he would have no motive for employing his capital in production at all... All the while, that by employing fresh masses of auxiliary capital, these two objects can be effected, there is no definite and final limit to the progressive employment of such fresh masses of capital. They may go on increasing co-extensively with the increase of knowledge. But knowledge is never stationary; and, as it extends itself from hour to hour in all directions, from hour to hour some new implement, some new machine, some new motive force may present itself, which will enable the community profitably to add something to the mass of auxiliary capital by which it assists its industry, and so increase the difference between the productiveness of its labour and that of poorer and less skilful nations" (I.e. [pp. 38-41]).

[XVIII-1149] First, with regard to the statement that the inventions, or applications or contrivances must be of such a kind, *"that the productive powers of labour are increased to such an extent as to make it, in addition to the wealth it before produced, reproduce the additional auxiliary capital used, as fast as it is destroyed"*, or *"reproduce the additional capital in the time it wastes away".* This means nothing more than that the wear and tear is replaced *au fur et à mesure* (que)⁹ it takes place, or, that the additional capital is replaced in the average time during which it is consumed. A portion of the value of the product, or, what amounts to the same thing, a portion of the product, must replace the consumed auxiliary capital, and, at such a rate that if, in a given period of time, it is wholly consumed, it may be reproduced wholly, or a new capital of the same kind may take the place of the capital gone by. But what is the condition for this? The productivity of labour must rise to such an extent through the application of the additional auxiliary

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⁹ As soon as.—Ed.
CAPITAL that a part of the product can be deducted to replace this component part either in natura or by exchange.

The reproduction of the auxiliary capital takes place if the productivity is so great, in other words, if the increased amount of output produced during the working day of the same length is such that a unit of a particular commodity is cheaper than a unit produced by the former method, although the aggregate price of the total output covers (for example) the annual depreciation of the machinery, that is, the amount of depreciation calculated per unit of the commodity is insignificant. If the part which replaces the depreciation, and secondly the part which replaces the value of raw material, are deducted from the total product, then there remains a part which pays for the wages and a part which covers the profit and even yields more surplus value [although the price per unit remains the same as] it was previously... An increase in the product could take place without fulfilling this condition. If, for example, the number of pounds of twist were to increase tenfold (instead of a hundredfold, etc.) and if the value of the wear and tear of the machinery which has to be added to the price were to drop from \( \frac{1}{6} \) to \( \frac{1}{10} \), then the twist spun by machinery would be dearer than that produced by spindle. If an additional £100 of capital in the form of guano were used in agriculture and if this guano had to be replaced in a year, and if the value of a qr (produced by the old method) = £2, then 50 additional qrs would have to be produced merely to replace the depreciation. And without this the additional capital could not be used (profit is here disregarded).

Jones' remark that the additional capital must be "reproduced" (of course from the sale of the product or in natura) "in the time it wastes away" simply means that the commodity must replace the wear and tear embodied in it. In order to begin reproduction anew, all the value elements contained in the commodity must be replaced by the time when its reproduction is to begin again. In agriculture, this reproduction time is given as a result of natural conditions, and the period of time in which the wear and tear must be replaced is given, ni plus ni moins as the time in which all the other value elements of grain, for example, have to be replaced. In order that the reproduction process can begin, i.e. that the renewal of the real process of production can take place, the commodity must pass through the process of circulation, that is, the commodity must be sold (in so far as it is not replaced in

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* In exactly the same way.— Ed.
nature, like the seeds) and the money for which it is sold converted into elements of production again. In the case of grain and other agricultural products, there are certain specific periods for this reproduction dictated by the seasons, that is, extreme limits, definite limits are set to the duration of the process of circulation.

Second: Such definite limits to the circulation process arise in general from the nature of commodities as use values. All commodities deteriorate sooner or later, although the ultima Thule\textsuperscript{a} of their existence varies. If they are not consumed by people (either in the production process or individually), then they are consumed by elemental natural forces. They decay, and finally they disintegrate. If their use value is destroyed, then their exchange value goes down the drain and that puts an end to their reproduction. The final limits of their circulation time are therefore determined by the natural termini\textsuperscript{b} of reproduction proper to them as use values.

Third: In order that the production process of the commodities may be continuous, that is, so that one [XVIII-1150] part of capital may be continuously in the production process and the other continuously in the process of circulation, very varied divisions of capital must take place, in accordance with the natural limits of the periods of reproduction, or the limits [of existence] of the different use values, or the different spheres of operation of capital.

Fourth: This applies to all the value elements of the commodity simultaneously. But, in the case of commodities in the production of which a great deal of fixed capital is employed, there is, in addition to the limits which their own use values impose on the circulation process, another determining factor, namely, the use value of fixed capital. It wastes away in a certain time and, therefore, must be reproduced in a given period. Let us assume, for example, that a ship lasts 10 years, or a spinning machine 12. The freight carried during the 10 years, or the twist sold during the 12 years, must be sufficient for a new ship to replace the old one after 10 years and for a new spinning machine to replace the old one after 12. If the fixed capital is used up in \(\frac{1}{2}\) year, then the product must be returned from circulation in this period.

Besides the natural mortality periods for commodities as use values—periods which vary greatly amongst different use values—and besides the requirements of the continuity of the production

\textsuperscript{a} A remote goal or end (literally: the farthest Thule, a land considered by the ancients to be the northernmost part of the habitable world).—Ed.

\textsuperscript{b} Periods.—Ed.
process, which set even more varied final limits to the circulation time, according to whether the commodities must remain in the production sphere or can remain in the circulation sphere for a longer or shorter period of time, a third factor is thus added, namely, the different mortality periods, and therefore different requirements of reproduction, of the auxiliary capital used in the production of commodities.

Jones declares that the second condition [for the use of auxiliary capital] is the "profit" which the auxiliary capital must "produce", and this is the conditio sine qua non for all capitalist production, regardless of the particular form in which the capital is employed. Nowhere does Jones explain how he conceives the genesis of this profit. But since he merely derives it from "labour", and the profit yielded by the auxiliary capital simply from the increased efficiency of the labour of the workmen, it must consist of absolute or relative surplus labour. It arises in general from the fact that after deducting the part of the product which either in natura or by exchange replaces the constituent parts of capital which consist either of raw materials or of instruments of labour, the capitalist, firstly, pays wages from the remainder of the product, and secondly, appropriates a part of it as surplus produce, which he either sells or consumes in natura. (This latter is not a significant factor in capitalist production and occurs only in a few exceptional cases, when the capitalist directly produces necessary means of subsistence.) This surplus produce however, just as the other parts of the product, consists of the workers' realised labour, but labour which is not paid for; this product of labour is appropriated by the capitalist without any equivalent.

What is new in Jones' presentation is that the increase in the auxiliary capital over and above a certain level is contingent on an increase of knowledge. Jones declares that the necessary conditions are: 1) the means to save the additional capital; 2) the will to save it; 3) some invention by means of which the productive power of labour is increased sufficiently to reproduce the additional capital and to produce a profit on it. What is necessary above all is that there should be a surplus produce either in kind or converted into money. In the production of cotton, for example, the planters in America (like those in India at the present time) were able to plant large areas, but did not have the means for converting the raw cotton into cotton by means of cleaning at the right time. Part of the cotton rotted in the fields. This kind of thing was ended by the invention of the cotton gin. Part of the product is now converted into cotton gin. But the cotton gin does not merely replace its own
cost; it also increases the surplus produce. New markets have the same effect, for instance, furthering the conversion of skins into money (likewise improved transport). Each new machine which consumes coal is a means for converting surplus [produce] existing in the shape of coal into capital. The conversion of a part of the surplus [produce] into auxiliary capital can take place in two ways: [firstly,] increase in the auxiliary capital already in existence, its reproduction on a larger scale; [secondly,] discovery of new use values or of a new use for well-known use values, and new inventions of machinery or of motive power leading to the creation of new kinds of auxiliary capital. In this context, extension of knowledge is obviously one of the conditions for increasing the auxiliary capital or, what amounts to the same thing, for the conversion of surplus produce or surplus money (foreign trade is important in this connection) into surplus of auxiliary capital. For example, the telegraph opens up a whole new field for the investment of auxiliary capital, so do the railways, etc., and so does the whole gutta-percha and Indian rubber production.

[XVIII-1151] This point about the extension of knowledge is important.

Consequently, accumulation does not have to set new labour in motion, it may simply direct the labour previously employed into new channels. For example, the same mechanical atelier which previously made [hand] looms now makes power-loom and some of the weavers are taken over by [mills using] the changed methods of production while the others are thrown on to the street.

When a machine replaces labour, it always demands less new labour (for its own production) than it replaces. Perhaps the old labour is simply given a new direction. In any case, labour is freed, which after a greater or lesser amount of trials and tribulations may be used in other ways. The human material for a new sphere of production is thus provided. As far as the direct freeing of capital is concerned, it is not the capital which buys the machine which becomes free, because it is invested in it. And even assuming that the machine is cheaper than the amount of wages it replaces, more raw material, etc., will be required. If the workers now dismissed previously cost £500 and the new machine costs 500 too, then the capitalist previously had an outlay of 500 every year, whereas the machine may perhaps last 10 years, so that in fact he now has an outlay of only 50 a year. But what at any rate becomes free (after deducting the [expenditure for] the larger number of workers employed in the manufacture of the machine and in auxiliary
MATTERS connected with it, such as coal [production], etc.) is the capital which constituted the income of the [dismissed] workers or that [employed in the production of commodities] which these workers bought with their wages. This continues to exist as it did previously. If workers are simply replaced as MOTIVE POWER without the machinery itself being substantially altered, for example, if wind or water [now operate the machinery] where this was done previously [by workers], two lots of capital are freed, the capital previously spent on paying the workers and the capital for which their money income was exchanged. This is an example used by Ricardo.a

But one part of the product previously converted into wages is now always reproduced as AUXILIARY CAPITAL.

A large part of the labour previously used directly in the production of means of subsistence is now used in the production of AUXILIARY CAPITAL. This too is in contradiction to Adam Smith’s view, according to which the accumulation of capital = the employment of more productive labour.b Apart from the examples considered above, the result may be merely a change in the APPLICATION OF LABOUR and a WITHDRAWAL of labour from the direct production of means of subsistence and its transfer to the production of means of production, railways, bridges, machinery, canals and so on.

// How important the existing amount of means of production and the existing scale of production are for accumulation [is described in the following]:

“The astonishing expedition with which a great cotton factory, comprehending spinning and weaving, can be erected in Lancashire, arises from the vast collection of patterns of every variety, from those of gigantic steam engines, waterwheels, iron girders and joists, down to the smallest member of a throttle or loom in possession of the engineers, mill-wrights, and machine makers. In the course of last year Mr. Fairbarn equipped waterwheels equivalent to 700 horses power and steam engines to 400 horses power from his engineer factory alone, independent of his mill-wright and steam-boiler establishment. Hence, whenever capital comes forward to take advantage of improved demand for goods, the means of fructifying it are provided with such rapidity, that it may realise its own amount in profit, ere an analogous factory could be set a-going in France, Belgium or Germany” (A. Ure, Philosophie des manufactures etc., Vol. I, Paris, 1836, [pp.] 61-62).c

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c Marx quotes in French. Here the original English is reproduced (see A. Ure, The Philosophy of Manufactures..., London, 1835, p. 39).—Ed.
[XVIII-1152] With development, machinery becomes cheaper, partly relatively—in comparison with its force—and partly absolutely; at the same time, however, a massive concentration of machinery takes place in the workshop so that its value increases in proportion to the living labour employed, although the value of its individual components declines.

The driving force—the machine which produces the motive power—becomes cheaper as the machinery which transmits the power and the machine which the power operates, are improved, as friction is reduced, etc.

"The facilities resulting from the employment of self-acting tools have not only improved the accuracy and accelerated the construction of the machinery of a mill, but have also lowered its cost and increased its mobility in a remarkable degree. At present a throttle frame, made in the past manner, may be had complete at the rate of 9s. 6d. per spindle, and a Mule Jenny at about 8s. per spindle including the patent licence for the latter. The spindles in cotton factories move with so little friction that 1 horse power drives 500 on the fine hand mule, 300 on the Mule Jenny, and 180 on the throttle; which power includes all the subsidiary preparation machines as carding, roving, etc., a power of 3 horses is adequate to drive 30 large looms with their dressing machines" (l.c., [pp.] 62-63 [Engl. ed., p. 40]).

* "Over by far the greater part of the globe, the great majority of the labouring classes do not even receive their wages from capitalists; they either produce them themselves, or receive them from the revenue of their customers. The great primary step has not been taken which secures the continuity of their labour; they are aided by such knowledge only, and such an amount of mechanical power as may be found in the possession of persons labouring with their own hands for their subsistence. The skill and science of more advanced countries, the giant motive forces, the accumulated tools and machines which those forces may set in motion, are absent from the tasks of the industry which is carried on by such agents alone"* ([R. Jones, Text-book of Lectures on the Political Economy of Nations...], p. 43).

// In England herself: * "Take agriculture... A knowledge of good farming is spread thinly, and with wide intervals, over the country. A very small part of the agricultural population is aided by all the capital which ... might be available in this branch of the national industry... The working in these" // great manufactories// "is the occupation of only a small portion of our non-agricultural labourers. In country workshops, in the case of all handicraftsmen and mechanics who carry on their separate task with little combination, there the division of labour is incomplete, and its continuity consequently imperfect... Abandon the great towns, observe the broad surface of the country, and you will see what a large portion of the national industry is lagging at a long distance from perfection, in either continuity, skill, or power"* (l.c., [p.] 44). //

Capitalist production leads to separation of science from labour and at the same time to the application of science to material production.

With regard to rent, Jones remarks correctly:

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a Marx quotes in French.—Ed.
Rent, in the modern sense of the term, which depends entirely on profit, presupposes:

* "the power of moving capital and labour from one occupation to another ... the mobility of capital and labour, and in countries where agricultural capital and labour have no such mobility ... we cannot expect to observe any of the results which we see to arise here from that mobility exclusively" * (l.c., p. 59).

This "MOBILITY OF CAPITAL AND LABOUR" is, in general, the real prerequisite for the formation of a general rate of profit. It presupposes indifference to the specific form of labour. In reality friction takes place (at the expense of the working class) between the one-sided character which the division of labour and machinery impose on labour capacity on the one hand, while on the other hand, it confronts capital //which is thereby differentiated from its undeveloped form in craft-guild industry // merely as the living potentiality of any type of labour in general, which is given this or that direction according to the profit that can be made in this or that sphere of production, so that different masses of labour are transferable from one sphere to another.

In Asia, etc., * "the body of the population consists of labouring peasants; systems of cultivation [XVIII-1153] imperfectly developed, afford long intervals of leisure. As the peasant produces his own food, he also produces most of the other primary necessities which he consumes ... his dress, his implements, his furniture, even his buildings; for there is in this class little division of occupations. The fashions and habits of such a people do not change; they are handed down from parents to children; there is nothing to alter or disturb them" * ([p.] 97).

On the other hand, the capitalist production, whose characteristic features are MOBILITY OF CAPITAL AND LABOUR and continual REVOLUTIONS in the modes of production, and therefore in the relations of production and commerce and the way of life, leads to great MOBILITY IN THE HABITS, MODES OF THINKING, etc., OF THE PEOPLE.

Compare the following with the above-quoted passage about the "INTERVALS OF LEISURE" and the "IMPERFECTLY DEVELOPED SYSTEMS OF CULTIVATION".

* "Where a steam engine is employed on a farm, it forms part of a system which employs most labourers in agriculture, and [is] in all cases [associated] with a reduction [in the number] of horses" ("On the Forces used in Agriculture". [A] Paper read by Mr. John C. Morton at the Society of Arts [on December 7,] 1860.)* And

* "The difference of time required to complete the products of agriculture, and of other species of labour, is the main cause of the great dependence of the agriculturists. They cannot bring their commodity to market in less time than a year. For that whole period they are obliged to borrow from the shoemaker, the tailor, the smith, the wheelwright, and the various other labourers, whose products they want and which are completed in a few days or weeks. Owing to this natural circumstance, and owing to the more rapid increase of the wealth produced by other labour than that of agriculture, the monopolisers of all the land, although
they have also monopolised legislation, are unable to save themselves and their servants, the farmers, from becoming the most dependent class of men in the community" (Hodgskin, Popular Political Economy, p. 147,* note).200

The capitalist differs from capital in that he must live, and therefore must consume part of the surplus value as revenue, daily and hourly. Thus, the longer the period of production before the capitalist can bring his commodity to market, or the longer the period of time before he gets returns from the sale of his commodities, the longer he must live either on credit during the intervening time—a matter we are not discussing here—or he must hoard a stock of money as large as he spends as revenue. He must advance his own revenue for a longer period. His capital must be larger. He is obliged to leave a part of it always unused, as a consumption fund. //In small-scale farming, therefore, domestic industry is combined with agriculture; supplies for the year, etc. //</p>

We now come to Jones' teaching on accumulation. His original contribution so far has been that it is by no means necessary for accumulation to arise from profit; and secondly, that the accumulation of auxiliary capital depends upon the advance of knowledge. He limits the latter to the discovery of new mechanical appliances, motive forces, etc. But it is true in general. For example, if corn is used as raw material in the preparation of spirits, then a new source of accumulation is opened up, because the surplus produce may be converted into new forms, satisfy new wants, and enter as a productive element into a new sphere of production. The same applies if starch, etc., is prepared from corn. The sphere of exchange of these particular commodities and of all commodities is thereby expanded. The same takes place when coal is used for lighting, etc.

Foreign trade, too, is of course a great agent in the process of accumulation, because it tends to increase the variety of use values and the volume of commodities.

What Jones says first of all is concerned with the connection between accumulation and the rate of profit. (He is by no means very clear about the origin of the latter.)

* "The power of a nation to accumulate capital from profits does not vary with the rate of profit ... on the contrary, the power to accumulate capital from profits ordinarily varies inversely as the rate of profit, that is, it is great where the rate of profit is low, and small where the rate of profit is high"* (Jones, Text-book of Lectures..., p. 21). Adam Smith says: [XVIII-1154] *"Though that part of the revenue of the inhabitants which is derived from the profits of stock is always much greater in rich, than in poor, countries, it is because the stock is much greater; in proportion to the stock, the profits are generally much less" (Wealth of Nations, Vol. II, Ch. 3 [p. 406]).
“In England and Holland, the rate of profit is lower than in any other part of Europe” ([p.] 21). “During the period in which her... wealth and capital have been increasing the most rapidly, the rate of profit has been gradually declining” ([pp.] 21-22). “The relative masses of the profits produced... depend not alone on the rate of profit... but on the rate of profit taken in combination with the relative quantities of capital employed” ([p.] 22). “The increasing quantity of capital of the richer nation... is also usually accompanied by a decrease in the rate of profits, or a decrease in the proportion, which the annual revenue derived from the capital employed, bears to its gross amount” (l.c.). “If it be said that all other things being equal, the rate of profit will determine the power of accumulating from profit, the answer is, that the case, if practically possible, is too rare to deserve consideration. We know, from observation, that a declining rate of profit is the usual accompaniment of increasing differences in the mass of capital employed by different nations, and that, therefore, while the rate of profit in the richer nations declines, all other things are not equal. If it be asserted that the decline of profits may be great enough to make it impossible to accumulate from profits at all, the answer is, that it would be foolish to argue on the assumption of such a decline, because long before the rate of profits had reached such a point, capital would go abroad to realise greater profits elsewhere, and that the power of exporting will always establish some limit below which profits will never fall in any one country, while there are others in which the [rate of] profit is greater”* ([pp.] 22-23).

“Apart from the PRIMARY SOURCES OF ACCUMULATION, [there are] DERIVATIVE ones, such as, for example, the OWNERS OF [the] NATIONAL DEBT, officials, etc.” ([p.] 23).

All this is bel et bon." It is quite correct that the amounts ACCUMULATED by no means depend solely on the rate of profit, but on the rate of profit multiplied by the capital employed, that is, just as much on the size of the capital advanced. If the capital employed= C, and the rate of profit = r, then accumulation = Cr, and it is clear that this product can increase if C grows more quickly than r declines. And this is indeed a fact DERIVED FROM OBSERVATION. But this does not explain the cause, the raison d'être, of this fact. Jones himself came very near to it when he made the observation that the AUXILIARY CAPITAL continuously increases RELATIVELY TO THE WORKING POPULATION BY WHICH IT IS PUT INTO MOTION.

In so far as the decline in profit is due to the cause mentioned by Ricardo—the RISE OF RENT—the ratio of the total SURPLUS VALUE to the capital employed remains unchanged. But one part of it—RENT—increases, at the expense of the other part, i.e. of PROFIT; this leaves the proportion of the total SURPLUS VALUE, of which PROFIT, INTEREST AND RENT are only categories, [to the total capital] unchanged. Thus, in fact, Ricardo denies the phenomenon itself.

On the other hand, the mere decline in the rate of interest proves nothing in itself, just as its rise proves nothing, although it does indeed always indicate the MINIMUM RATE below which profit

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a Well and good.—Ed.
cannot fall. For profit must always be higher than the average [rate of] interest.

[XVIII-1155] Apart from the terror which the law of the declining rate of profit inspires in the economists, its most important corollary is the presupposition of a constantly increasing concentration of capitals, that is, a constantly increasing decapitalisation of the smaller capitalists. This, on the whole, is the result of all laws of capitalist production. And if we strip this fact of the contradictory character which, on the basis of capitalist production, is typical of it, what does this fact, this trend towards centralisation, indicate? Only that production loses its private character and becomes a social process, not formally—in the sense that all production subject to exchange is social because of the absolute dependence of the producers on one another and the necessity for presenting their labour as abstract social labour ([by means of] money)—but in actual fact. For the means of production are employed as communal, social means of production and therefore not [determined] by [the fact that they are] the property of an individual, but by their relation to production, and the labour likewise is performed on a social scale.

A separate section in Jones' work is headed "[On the] Causes Which Determine the Inclination to Accumulate".

*"1) Differences of temperament and disposition in the people.
"2) Differences in the proportions in which the national revenues are divided among the different classes of the population.
"3) Different degrees of security for the safe enjoyment of the capital saved.
"4) Different degrees of facility in investing profitably, as well as safely, successive savings.
"5) Differences in the opportunities offered to the different ranks of the population to better their positions by means of savings"* ([p.] 24).

All these 5 causes, in fact, boil down to this—that accumulation depends on the stage of the capitalist mode of production reached by a particular nation.

D'abord No. 2. Where capitalist production exists in a developed form, profit constitutes the chief source of accumulation, that is, the capitalists have concentrated the greater part of the national revenue in their hands and even a section of the landlords seeks to capitalise [their revenue].

No. 3. Security (in the legal and police sense) increases in proportion to the degree to which the capitalists secure control of the state administration.

No. 4. As capital develops, the spheres of production increase on the one hand, and, on the other hand, the organisation of
credit [develops] in order to collect every farthing in the hands of the money-lenders (bankers).

No. 5). In capitalist production, the improvement of one's position depends solely on money, and everyone can delude himself into believing that he can become a Rothschild.

There remains No. 1). All peoples do not have the same predisposition towards capitalist production. Some primitive peoples, such as the Turks, have neither the temperament nor the disposition to it. But these are exceptions. The development of capitalist production creates an average level of bourgeois society and therefore an average level of temperament and disposition amongst the most varied peoples. [It is] as truly cosmopolitan as Christianity. This is why Christianity is likewise the special religion of capital. In both it is only men who count. One man in the abstract is worth just as much or as little as the next man. In the one case, all depends on whether or not he has faith, in the other, on whether or not he has credit. In addition, however, in the one case, predestination has to be added, and in the other case, the accident of whether or not a man is born with a silver spoon in his mouth.

The source of surplus value and primitive rent:

"When land has been appropriated and cultivated, such land yields, in almost every case, to the labour employed on it, more than is necessary to continue the kind of cultivation already bestowed upon it. Whatever it produces [XVIII-1156] beyond this, we will call its surplus produce. Now this surplus produce is the source of primitive rents, and limits the extent of such revenues, as can be continuously derived from the land by its owners, as distinct from its occupiers"* ([p.] 19).

These primitive rents are the first social form in which surplus value is represented, and this is the obscure conception which forms the foundation of the theory of the Physiocrats.

Both absolute and relative surplus value have this in common that they presuppose a certain level of the productive power of labour. If the entire working day (available labour time) of a man (any man) were only sufficient to feed himself (and at best his family as well), then there would be no surplus labour, surplus value and surplus produce. This prerequisite of a certain level of productive power is based on the natural productiveness of land and water, the natural sources of wealth. It is different in different countries, etc. Needs are simple and crude in early times and the minimum produce required for the maintenance of the producers themselves is consequently small, and so is the surplus produce. On the other hand, the number of people who live off the surplus produce in those circumstances is likewise very small, so that they
receive the sum total of the small amounts of surpluses produced obtained from a relatively large number of producers.

The basis for absolute surplus value—that is, the real precondition for its existence—is the natural fertility of the land, of nature, whereas relative surplus value depends on the development of the social productive forces.

And with this we finish with Jones.

**Dominance of the merchant estate:** In the part of London called Tower Hamlets, one finds very extensive furniture-making. There exists there a division of labour, in the sense that production as a whole is subdivided, falls into a large number of mutually independent branches of business. One shop only makes chairs, another makes tables, another again cupboards, etc. But these shops are run *plus ou moins* on a handicraft basis, by a small master-craftsman with a few journeymen. Still their output is too large for them to work on direct orders from private individuals. Their customers are the owners of furniture warehouses. On Saturday the master visits them and sells his product, and [...] there is haggling over the price as in a pawnshop over the loan to [be] extended for one article of dress or another, etc. These master-craftsmen must sell weekly, if only to be able [to buy] the raw materials for the next week. Under these circumstances they are, properly speaking, merely middlemen between the trader and their own [work]ers. The trader is the capitalist proper, and he pockets the greater part of the surplus value. Along these lines [...] the transition to manufacture from branches which were previously carried on on the handicraft basis or as subsidiary branches [of rural] industry. Thus in Lyons, etc., Nottingham, etc., the trader is called the manufacturer, although those middlemen ... exploit [...] the workers. This is the transition to manufacture or also to large-scale industry, depending on the level of technological development of small independent production. Where it is already based on handicraft-type machines—or machines used within the limits of [handicraft] production—we see a transition to large-scale industry.

[...]

[“E.g. in the west] of the United States most settlers, having paid for their land, reach it with no property in [the world except] an ax, a spade, a hoe, a gun,

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a More or less.—Ed.
b The manuscript is damaged here.—Ed.
a cow, a few household utensils, and one or two [...] (A CHANGE OR TWO OF CLOTHING). The land [is] covered with timber [and] is of no use in its present [XVIII-1157] condition for TILLAGE. They go to a neighbouring merchant. He let them have on credit—against the future CROP—some of [his] capital, in the form of sugar, tea, coffee, flour, corn, potatoes, seed, salt, PROVISIONS, winter clothing, etc. With this borrowed capital *each settler begins his labours, and when the crops are harvested, the merchant is paid in grain and other productions, and the settler finds himself, by the aid of this credit, in possession of a surplus, sufficient in part to support his family for another year, which he could not have possibly possessed had the merchant refused to give him credit...* A large part *of the planters of the cotton growing states* receive *large supplies of clothing and subsistence for their slaves and of every article of their very consumption, upon credit from the neighbouring merchants, in anticipation of the next year's crop...* As regards these COUNTRY MERCHANTS themselves, *who aid the settlers and planters, few or none of them have a capital of their own adequate to carry on business to the extent they do. They are themselves obliged to obtain most of their supplies upon credit from the wholesale merchants of the large interior towns and the Atlantic cities, while those in turn avail themselves more or less of credit with the European manufacturers... It not unfrequently happens that a settler in [the] remotest region of Missouri plants his land and produces his crop by means of credit obtained, it may be, through three or four successive links, from a manufacturer of hardware in Birmingham, or from one of dry goods in Manchester" (Condy Raguet, A Treatise on Currency and Banking, 2nd ed., Philadelphia, 1840, [pp.] 50-52).*

Richard Jones sums up correctly in the following passage:

*"The amount of capital devoted to the maintenance of labour may vary, independently of any changes in the whole amount of capital... Great fluctuations in the amount of employment, and great suffering, may sometimes be observed to become more frequent as capital itself becomes more plentiful" (R. Jones, An Introductory Lecture on Political Economy, London, 1833, p. 52).*

The total capital may remain the same and a CHANGE (decline especially) may take place in the variable capital. A CHANGE in the proportion between the two constituent parts of capital does not necessarily involve CHANGES in the size of the total cap[ital].

An increase in the total capital, on the other hand, may be accompanied not only by a relative, but by an absolute diminution of variable capital and is always connected with violent FLUCTUATIONS in the variable capital and consequently with "FLUCTUATIONS IN THE AMOUNT OF EMPLOYMENT".
[3) RELATIVE SURPLUS VALUE

γ) MACHINERY.

UTILISATION OF THE FORCES OF NATURE AND OF SCIENCE
(*STEAM, ELECTRICITY, MECHANICAL AND CHEMICAL AGENCIES*)
[(CONTINUED)]

[V-211] Costs of machinery, buildings, etc., when not working. In The Times for November 26, 1862 a spinning manufacturer points out that his mill, employing 800 workpeople and consuming, when at full work, about 150 bales of East Indian, or about 130 bales of American cotton, costs him about £6,000 a year (about £120 a week) when not working. There are, first of all, fixed costs, which do not concern us here (but which are very important in practice), namely rent, the most significant fixed cost, whether the machine works or not (rent in the above case=£2,450), further insurance (insurance of mills and machinery against fire in the above case=£477, insurance of cotton in process £123); taxes on this property // rates on the mills and machinery, as paid in 1861 (poor rate included) £310//. Further: salaries of manager, book keeper and salesmen. (In the above case £625.) Then wages of lodgekeeper, watchmen, engineer, and occasional labour to tend the machinery (£250. This occasional labour to tend the machinery belongs to the outgoings to conserve it). Then coal for warming the mill, and occasionally working the steam engine (£150.) Finally "allowance for deterioration of machinery". (£1,200, because the machinery is already very worn out.) With regard to the last point, the Lancashire spinner remarks:

* "It may appear to many that, as the mills and machinery are not working, they cannot be deteriorating... It is not intended to cover the cost of the ordinary wear and tear, which is repaired, as a knife has a new blade, by a staff of mechanics provided for the purpose by every manufacturer when his mill is working. But it is intended to cover that kind of wear which cannot be repaired from time to time, and which, in the case of a knife, would ultimately reduce it to a

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**a** "The Case of the Millowners. To the Editor of The Times", The Times, No. 24413, November 26, 1862.— Ed.
state in which the cutler would say of it, 'it is not worth a new blade'. It is also intended to cover the loss which is constantly arising from the superseding of machines before they are worn out by others of a new and better constitution. From these two causes it is well known that the machinery in a mill gets entirely renewed, at the least, once in every 15 or 20 years; and invention does not stand still in times like these, being always stimulated by difficulties; nor do the weather and the natural principle of decay suspend their operations because the steam engine ceases to revolve." *

The same fellow also says:

*“No doubt a large number (of manufacturers) have ample reserves on which they can fall back, but the bulk of Lancashire manufacturers have no spare capital. The habit of the trade is to spend in extensions of their mills and machinery their profits as fast as they make them, and as a rule they have an insufficiency rather than a redundancy of floating capital" * [p. 12].

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<th>&quot;New Capital&quot;</th>
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<td>1) the machine</td>
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<td>2) annual upkeep</td>
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| 3) raw materials       | 3) raw materials."  

// There is of course provisioning of the workers in the case of new capital as well. He is only speaking here of the provisioning of the workers replaced by the machine. //

"On both sides one must abstract from the number of workers who are necessary to supervise and direct the movements of the machine. The old capital would grow in direct proportion to the number of workers employed. If it is 100 for a particular number, it is 200 for twice that number. The new capital is not subject to the same laws of growth, for the element of the machine that serves the application of the motor does not grow in numbers or in dimensions in proportion to the number of workers whose labour it replaces. Hence whatever the superiority of the new capital over the old for a given number of workers, it lies in the nature of this surplus labour that it is converted into inferiority, in proportion as one increases the number of the workers represented and replaced by the machine. If 2 workers are replaced, it is perhaps more expensive. If 4, 10, 20 workers are replaced, it becomes ever cheaper. This favourable result can only be obtained on condition that one disposes of a previously accumulated capital which is sufficient to set up a machine to replace the required number of workers and to obtain a

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a The words "Fixed capital" are written in the margin opposite the following two sentences.—Ed.
b In the margin opposite this paragraph, Marx wrote "Improvement of machinery paid for with loans".—Ed.
c Marx quotes in French.—Ed.
d Marx wrote this paragraph to the right of the Cherbuliez text.—Ed.
quantity of raw materials proportionate to that number. Here again, as in the case of a new subdivision of labour, the saving is linked to the prior realisation of an additional capital. *Each accumulation of wealth provides the means of accelerating subsequent accumulation* (pp. 28-29).\(^2\)

// Firstly. The situation with accumulation is to be taken into account in the conversion of *surplus value into capital*. It should be mentioned here that just as accumulation is a condition of capitalist production, so capitalist production is a cause of accumulation.

Secondly: The machine replaces a certain quantity of workers, either in real terms, i.e. by taking their place (this is always the case when the trade is not new but was previously carried on without machinery); or potentially, in that so and so many workers would be necessary to replace it. If we speak e.g. of the millions of workers (see Hodgskin\(^26\)) who would be needed to furnish the amount of production now furnished in the cotton industry, we are speaking of the number of the workers who would be needed to replace the machinery. It is different when we say that so and so many weavers were displaced by the *powerloom*. Then we are speaking of the workers the machine has *replaced*. This is a big distinction. Once machinery has been introduced as the basis of a branch of production (with no more competition from manufacture) it only displaces workers to the degree that it is improved. But production expands with a given level of *perfection* of the machinery before it attains a higher level.

If e.g. 10 were employed at handlooms, and 20 are employed at *powerlooms*, and if a *powerloom* replaces 10 handlooms, then the 20 accomplish as much as 200 did previously. But they have not driven out or replaced 200. The first *powerloom* drove out 10. The other 19 *powerlooms* have employed 19. One must not say, therefore, that productive power has replaced 180, because 200 would have been needed without the *powerlooms*. The productive power has merely increased tenfold.

If a new *powerloom* is invented, allowing 10 to do as much as 20, the 20 would be replaced by the 10, or 10 thrown out of work. If the number of these *powerlooms* grew in turn to 20, 20 would be employed. And 40 would have been necessary on the previous scale. And 400 on the original scale. But the 400 men, who never existed, have not been replaced. The first *powerloom* drove out 10 and second 2. Thus the productive power has grown in the proportion 20:1.

\(^2\) Marx quotes partly in German and partly in French (with minor alterations).—*Ed.*
At any rate there has thus been a twentyfold increase in the productive power. If this development had taken place in all branches, the worker would have needed 20 times less time to reproduce his means of subsistence. Thus if it was 11 hours initially, it is now \(\frac{11}{20}\) of an hour, and all the remaining part of his working day, \(\frac{119}{20}\) hours, belongs to the capitalist. But the development is not uniform and all-embracing.

It should further be remarked: the amount of surplus labour is determined not by the workers replaced by the machine but by the workers employed by it. This is precisely what Cherbuliez forgets. The productivity of the machine (and its cheapness) is not only determined by the quantity of workers it replaces, but also by the quantity of workers whose labours it assists. Or the expressions are in [V-213] some respect identical. //

// In so far as machine labour curtails the labour time needed to produce a particular commodity, hence increases the quantity of commodities which are produced in the same labour time, 2 things are possible. The commodity enters into the consumption of the workers. Then, leaving aside what we developed previously, there is an increase in the amount of labour which can be applied to produce commodities that do not enter into the consumption of the workers; in which surplus labour can therefore be represented. This extends the basis, upon which can [be] reared a larger upper class. At the same time the pleasures of this class. But there is also an extension of the basis, upon which can [be] reared a larger working class, of the amount of living material on whose exertions the upper class is reared. If, secondly, the commodity does not enter into the consumption of the workers, there is either a cheapening of pleasures or a setting free of labour for new fields of exertion.//

Distribution of the value of the machinery, buildings, etc., over the quantity of commodities produced.\(^b\)

Constant capital, in so far as its relative magnitude of value—proportionately to the total capital—enters as a determining factor into the rate of profit, is to be left out of account entirely in examining surplus value as such. We have therefore regarded it as \(c\), of indifferent magnitude, both in the section on absolute surplus value and in dealing with cooperation, division of labour, etc.\(^c\) In examining machinery, however, we are compelled to concern ourselves especially with constant capital. Nevertheless,

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\(^a\) See present edition, Vol. 30, p. 235 ff.—Ed.

\(^b\) Ibid., pp. 321-27.—Ed.

\(^c\) Ibid., pp. 172-232, 255-63, 264-306.—Ed.
there is no inconsistency here. Two points should be made about this:

1) Relative surplus value can be created only in so far as the commodities entering into the consumption of the workers (means of subsistence) are cheapened; hence the value of these commodities is reduced, i.e. the quantity of labour time required for their production is reduced. And the labour time contained in the commodity consists of two parts: a) the past labour time contained in the means of labour consumed in the commodities, and in the raw material, s’il y en a\(^a\); b) the living labour last added, in short the labour which is realised with the aid of those means of labour and in that raw material.

All the methods of shortening the labour time necessary for the production of a commodity, hence reducing its value, leave untouched the value of the raw material which enters into production. (There is at most a saving of it given labour on a larger scale.) This part of the past labour which enters into the value of the commodity therefore does not come into consideration at all. What all these methods have in common is that they curtail to a greater or lesser degree the living labour which is applied to past labour.

All that remains to be considered now, therefore, is the part of the past labour which consists of the instruments and conditions of labour (such as buildings, etc.). This part remains unchanged with simple cooperation and division of labour. (It is, inversely, cheapened by concentration and utilisation in common.) But it is different with the employment of machinery. Here a specific relation enters the picture. The curtailment of living labour rests here upon a revolution in this part of constant capital, and one can say, expressing it very roughly, that complex, large-scale, and expensive instruments of production replace simple and cheap ones. If the commodity were therefore just as much made dearer by the machinery (or more so) as it is on the other hand cheapened by the acceleration and curtailment of the living labour added, the value of the commodity would not be reduced. One component [of the value] of the commodity would fall by the very fact that the other increased. There would be no reduction in the total quantity of labour time necessary to the production of the commodity, therefore no production of surplus value. So because this method of creating relative surplus value rests on the revolution of a particular part of the constant capital, and is thereby distinguished

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\(^a\) If there is any.—*Ed.*
from other methods, this point must be examined here specifically. Viewed quite generally, the problem is solved by saying that the total quantity \([V-214]\) of the commodities produced by the machinery is *so large* that in every aliquot commodity there enters a smaller value component (part of the depreciation) of the machinery, buildings and the *matières instrumentales*\(^a\) needed for the functioning of the machinery than if the same commodity were produced in the old manner by human beings and their old craft tools. But the fulfilment of this condition will in turn depend on the following circumstances:

\(a\) the *quantity of commodities* an individual worker can produce in a given labour time, e.g. a working day, by means of the machinery;

\(\beta\) the *number of workers* who, if the above relation is given, *simultaneously* receive assistance from the machinery in their labour; and through whom the value part of the total machinery calculated on each individual is relatively reduced;

\(\gamma\) the difference between the period during which the machinery enters into the labour process and the period during which it enters into the valorisation process. E.g. a machine which lasts for 15 years enters completely into the labour process every year for 15 years. But only \(1/15\) of it enters into the valorisation process every year. The total annual product in commodities therefore never contains more than \(1/15\) of the value component of the machinery.

2) A big distinction is to be made between the question of how far the constant capital affects the *rate of profit*—this is the investigation of the question of the *ratio of the surplus value to the value* of the *capital advanced*, *without any regard to the functions of different parts of that capital*—and on the other hand, the question of how far a particular configuration of constant capital (machinery, etc.) lessens the *price of the individual commodity*, or the labour time *contained* in it (past and present labour). In *content* of course the two questions come down to the same thing. But here the same phenomenon is considered from entirely different points of view. In the one case we investigate how the commodity //and therefore *labour capacity*, in so far as the commodity enters into the consumption of the workers// is cheapened, i.e. the total quantity of labour, past and living, required for its production, is lessened. In the other case we investigate how the ratio of surplus value to total capital advanced (the *rate of profit*) is affected by the

\(^a\) Instrumental materials.—*Ed.*
revolution in the quantity and value relations of the constituent parts of the capital. The latter investigation presupposes surplus value; it presupposes the whole of capitalist production (including the process of circulation). The former investigation presupposes nothing but our general law about the value of commodities and the laws that follow therefrom about the value of labour capacity and ratio of surplus value to the latter.

3) The confusion between these questions: the lessening of the labour time required for the production of an individual commodity (or a number of commodities), and the proportion of surplus labour to necessary on the one hand, and on the other hand the value and quantity relations of the different components of capital, is the source of great fallacies.

*D'abord* the main fallacy. If the essence of capitalist production is grasped, it is absolutely no contradiction to say that the labour time necessary for the production of a commodity is reduced, but that there is on the other hand an increase in the total amount of time the worker must use for the production of this commodity which has become cheaper. In contrast, this constitutes, in fact, an incomprehensible contradiction to the economists who let the machine be invented and introduced, not in order to curtail the labour time the worker needs for the production of a commodity, but in order to curtail the labour time he must provide altogether as equivalent of his wage. And especially so, if on the one hand profit is explained by the fact that machinery shortens the worker's labour time, and on the other hand it is demonstrated (Senior, etc.) that machinery necessitates the prolongation of that labour time.

*Secondly:* As far as the labour time of the worker himself is concerned, his paid labour time is shortened by this, and his unpaid labour time lengthened. It already follows [V-215] from this that the quantity of labour time contained in a commodity and the proportion in which this labour time is divided between capitalist and worker are two entirely different things. If the capitalist sells a commodity more cheaply, it does not follow at all from this that he makes less profit on it, realises less surplus value on it. The situation is usually the reverse. In addition to this, it is not the individual commodity, but the total amount of commodities produced in a certain period, that is to be considered as the product of the capital.

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a First.—*Ed.*

Prolongation of absolute labour time in the Factory System.a

The developed organisation of labour which corresponds to the machine system on the capitalist basis is the Factory System, which predominates even in modern large-scale agriculture, more or less modified by the peculiarities of that sphere of production.

The main proposition that applies here is that the surplus value the capitalist makes derives not from the labour replaced by the machine, but from the labour which is employed on the basis of machinery.

Now the yield in surplus value is determined by two momentsb: the rate at which the individual worker is exploited, or the share of surplus labour in the working day of an individual worker, and, secondly, the number of workers simultaneously employed, the number exploited by a given capital. The introduction of machinery lessens the latter moment, while it raises the former. It raises the surplus labour time of the individual worker, but it lessens the number of workers simultaneously exploited by a particular capital. The same method, therefore, which has a tendency to raise the rate of surplus value, has at the same time the antagonistic tendency to weaken the other moment, which acts equally to determine the amount of surplus value.

If each of 20 workers works for 12 hours, 2 hours of which is surplus value, the amount of surplus value = 2 × 20 = 40 hours of labour (= 3 working days of 12 hours each plus 4 hours). If each of 10 workers works 12 hours, 4 hours of which is surplus labour, the amount of surplus value = 40 hours as above. But 6 workers, each of whom works 6 hours of surplus labour, will only provide 36 hours of surplus value. And if the same capital set in motion 20 workers in the first case and 6 workers in the second, the amount of surplus value would have declined, even though its rate had increased.

This antagonistic tendency of exploitation based on machinery impels the extension of absolute labour time. If e.g. in the second case the workers were to work 14 hours instead of 12, and 8 hours were surplus labour, the amount of surplus value would = 6 × 8 = 48.

This reason, which impels the absolute prolongation of labour time—the increase of absolute surplus labour, the prolongation of the working day—is something the capitalists and their spokesmen are totally unconscious of. The phenomenon shows itself once

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b Cf. present edition, Vol. 30, pp. 185, 253 et al.—Ed.
machine manufacturing has been sufficiently extended and developed through competition for the social value, the market value, of the commodities produced with machinery to be brought down to their individual value, so that the capitalist can no longer pocket the difference.

This is a driving motive entirely independent of the valorisation of the part of the constant capital which consists of machinery and buildings. The valorisation motive, as being more obvious, is directly present in the consciousness of the capitalists and their spokesmen.

This motive is very simple, and common to all surplus labour, but it operates particularly strongly when the value and the amount of the capital employed in the means of labour is large enough to be predominant.

D'abord, no additional outlay of machinery and building is necessary, whether 12 or 24 hours are worked, whereas, if a correspondingly greater amount of labour is to be absorbed simultaneously, the buildings, machinery [V-216] and to a certain degree the machinery which produces the motive power must be increased in size. The commodity is cheapened thereby too. For it is irrelevant whether the value of the machinery is distributed over more labour spatially, through the number of workers who work alongside each other and are assisted simultaneously by it; or this happens temporally, by the fact that the same number of workers are assisted by the same machinery over 24 instead of 12 hours.

The absolute reproduction time of the buildings remains roughly the same, whether they enter really as conditions into the labour process over 12 or over 24 hours.

The reproduction time of the machinery itself is not curtailed to the same extent as its active service is prolonged. But the reproduction time of its value is curtailed to the same extent.

The profit is thus greater in a given section of circulation and the profit in general is calculated according to the surplus value which is realised in a particular period of circulation, e.g. a year.

The ratio of constant to variable capital is in general reduced by this, because the share of the most important part of the constant capital is reduced.

The examination of this last point therefore belongs to the theory of profit.4

Replacement of the tool of labour by machinery.

It should be noted here that machinery does not only replace living labour, but also the worker and the tools of his craft. The latter may of course be very insignificant, e.g. when sewing
machines replace the usual labour of sewing. This is usually not a replacement; the actual working tool rather re-emerges in the machinery itself, even if on an infinitely larger scale and more or less altered by mechanisation.

_Conglomeration of workers in the factory system._

Later on we shall go further into the peculiarities of cooperation, as it appears in the factory system, as distinct from both simple cooperation and manufacture based on the division of labour.

But here it is to be noted above all that developed machinery—the system of production based on machinery—presupposes the conglomeration of workers at one point, their spatial concentration under the direction of a single capitalist. Concentration of this kind is its condition. See the quotation from Ravenstone.

The machinery which produces the motive power—and similarly the directing machinery which subdivides and transmits the power—is relatively cheapened to the degree that it is applied to a progressively larger system of machinery; there is a similar relative reduction in the cost of buildings, heating, superintendence, etc., in short the objective conditions of labour which are communally needed and consumed by the mass of the workers. There must correspond to the system of simultaneously operating machinery an army of simultaneously employed workers, partly to put into effect the division of labour peculiar to the machine system, partly to implement the system of simple cooperation, the simultaneous exploitation of many people who do the same thing, which is characteristic of the division of labour. Hence although the number of workers set in motion by a particular capital—and the number of workers required for the production of a given amount of commodities—is reduced, the number of workers simultaneously employed and commanded under individual capitalists increases; there is an increase in the concentration of workers acting together in space and time.

Just as the capital functioning in production in this system takes on the shape of a great social mass of wealth, even if it belongs to an individual capitalist, which stands in no relation at all to an individual's capacity—however large—for working and earning, so the same is true of the system of collaborating workers in a great social combination.

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See this volume, pp. 423-25, 483-85, 496-97.—Ed.
[V-217] Condensation of labour.

If we call the variable capital \( v \), the constant \( c \), and the surplus labour contained in the product \( x \), the value of the commodities produced by a particular capital, if we assume that the whole of the constant capital enters into the valorisation process, considered from the point of view of the absolute surplus value, \( c + v + x \).

The methods which raise relative surplus value change absolutely nothing in this formula. Or, the value of the total product is not raised by these methods. \( c \) may grow, because the amount, and therefore the value, of the raw material grows. Ditto, because the value of the machinery grows. But the value of \( c \) remains unaltered. It only reappears in the product. Just as little is \( x \) altered. \( v \) is exchanged in the labour process for \( v + x \), where \( v \) represents the labour time which is expressed in \( v \), and \( x \) represents the excess over and above this. \( v + x \) is the total working day. It is not altered by the methods which create relative surplus value. Or, in other words: however much the quantity of products produced in a working day is increased by these methods, their value is not increased, even though, as a result of the cheapening of the products, hence of the means of reproduction of labour capacity, the division of labour time into paid and unpaid is changed. (The value of the total product of e.g. one working day may be increased: e.g. more cotton may be spun, etc. In short because more constant capital is consumed in the same time.)

There is nevertheless an exception to this. And an exception which only develops with machine labour. This is condensation of labour, or it is so in so far as, owing to the development of the social productive power of labour, the intensity of labour, the filling in of the pores in labour time, is driven onwards to such an exceptional degree, and becomes so much the constant feature of labour in a particular sphere of production, that the more intensive hour of labour=the more extensive hour of labour+\( x \) At a certain point what has been gained in extension must be lost in intensity. But the same result also occurs in reverse. And the replacement here of quantity by degree is not a matter of speculation. Where the factum occurs, there is a very experimental way to prove it: if it is physically impossible for the worker e.g. regularly to perform the same quantity of labour over 12 hours in the course of a week as he now performs over 10 or \( 10^{1/2} \) hours. Here we see the necessary reduction of the normal or total

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\(^a\) See present edition, Vol. 30, p. 335.—Ed.

\(^b\) Hence.—Ed.
working day as a result of the greater condensation of labour, which implies a greater tautness, nervous tension, but at the same time a greater physical exertion. With the increase of the two moments—the rapidity and the extent (the quantity) of the machinery which is to be supervised—a nodal point is necessarily reached, at which the intensity and the extent of labour cannot simultaneously grow any further, the one necessarily excluding the other. And in this case, in spite of the reduction in absolute labour time, the surplus labour may not only remain the same, but grow. And indeed for two reasons. On the one hand, because the productivity of labour grows, i.e. owing to the general law that determines relative surplus value altogether. Secondly, however, because the more intensive hour of labour now counts as such, hence its product e.g. = the value of 1 1/2 extensive hours of labour in the previous mode of production. The more intensive hour of labour—here as the regular, general law of a particular sphere of production, not as something accidental and individual—will now be reckoned as what it is, as a greater quantity of labour, condensed as opposed to more porous labour time. As long as the intensity grows simultaneously with the extension of the absolute labour time, the worker will admittedly be subject to not only simple but double overwork; but the more intensive hour of labour does not count as such. It only counts from the moment at which its heightened intensity appears as the real, tangible and given limit of its extension.

This is the reason why with the introduction of the Ten Hours' Bill there was not only a growth in the productivity of the branches of English industry into which it was introduced, but also a rise rather than [V-218] a fall in the amount of value they produced, and even in wages.¹

It should of course always be remarked that as soon as a concrete economic phenomenon comes into question, general economic laws can never be applied simply and directly. E.g., in the matter just referred to, a mass of circumstances come into consideration which lie far away from our subject; indeed, it would be impossible to explain these circumstances without anticipating developments which involve much more concrete relations than those we are so far able to grasp. E.g., the rise in demand following from the expansion of the world market since the discoveries in California and Australia,² and the combinations

² The discovery of gold in California in 1848 and in Australia in 1850.—Ed.
connected with this. The influence exerted, precisely during the period of occurrence of the phenomenon referred to, by the cheapness and abundance of the supply of the raw material (cotton), etc., in a number of these branches of industry. And finally the measure of the value, e.g. of cotton, is determined not by the English hour of labour, but by the average necessary time of labour on the world market.

But leaving aside all this, the English Factory Reports unanimously demonstrate two facts: 1) that since the introduction of the Ten Hours' Act (later modified to 10 1/2 hours) the small, piece-by-piece improvements in machinery were on a far larger scale and more continuous than in any prior period, and 2) that the speed of the machinery, and the amount of it that the individual worker has to overlook, have very much increased the intensity of labour, the demands on the worker's nerves and muscles.

Furthermore, the same Reports leave no doubt about the other two facts: 1) that without the law on hours, the limitation of the absolute working day, that great revolution in the running of industry would not have occurred, that it was enforced by the outer limit set by legislation to the exploitation of the worker; 2) that the experiment would not have been possible, i.e. not possible so quickly with this favourable result, without the high level of technological development already attained, and the means of assistance given by the level of capitalist production attained in general.

If all branches of industry were subjected to the same restrictions, and with the same success, with an equal rise in the intensity of labour, this intensity would count as a general rule, and not as the distinct property of a specifically determined branch of labour. A new average normal working day would merely have been established. The whole day would have been shortened, but also the necessary labour time and the surplus labour time within that (on an average) in the different branches. (An English working day of 10 1/2 hours is not only more productive, but contains perhaps as great a quantity of labour as the 24 hours worked in the cotton mills of Moscow.)

The capitalist mode of production in general condenses labour time, or increases the amount of labour provided within a definite time, the amount of labour which is actually worked in for instance an hour or 12 hours. This is in fact identical with increasing the continuity of labour for the individual worker (for the individual worker, disregarding the continuity of the production process, i.e. its regular continuance over whole periods of time). Even the
formal subsumption of labour under capital brings this about, as does the whip in the mode of production based on slavery. This intensity is increased still further by cooperation, but particularly by the division of labour and even more by machinery, where the continuing activity of the individual is bound and conditioned by the activity of a whole, of which he only appears as a member, or which works, as in the mechanical workshop, with the utter uniformity and tirelessness of an inanimate force of nature, an iron mechanism. A certain average degree of intensity of labour—of the real quantity of labour which is performed in a given time—and a relatively higher degree //although in the nature of things it differs in different branches of production// than is found in non-capitalist or even in merely formally capitalist production, is here altogether a general presupposition. It is presupposed for all work, if one speaks of time as its measure, and if one speaks of the labour time necessary for the production of a commodity. But this is not what is being referred to here.

Just as little is it the greater (or different) performance of the same labour in the same time, according to the degree to which skill, etc., has been developed through the division of labour and transmitted skill, and efficiency is increased through the aid of machinery. These two aspects relate to the higher productivity of labour, whereby in fact the real quantity of labour remains the same, and (with machinery) might even be diminished to a certain degree.

[V-219] What is being spoken of here is an increase in the exertions of labour which accompanies the development of productive power; so that in the same time not only more is produced, but more work is done, more labour power is expended, and indeed above the average degree—in a degree which is only made feasible permanently, day in day out, by limiting the extension of labour time. In this case not only relative but absolute surplus value is created, as long as this degree of intensity is not universal. But the latter would presuppose, just as much, a general reduction of the working day.

In any case, intensification of labour meets with barriers just as does extension of labour. And these barriers are shown by the fact that at a certain point the intensity of labour can only be raised by reducing its extension. Thus e.g. if 10 hours is the normal average working day, with the corresponding level of intensity of labour—or of condensation of labour time, quantity of labour which is provided at each moment in time—all inventions which made labour more productive on this basis, without increasing the tension of the labour itself, would only raise relative surplus value.
But if a new condensation of labour time were linked to this development of the productive forces, so that the quantity of labour grew in the same time, and not only the productivity of that labour, a point would soon be reached at which the overall working day would have to be shortened again.

It is only capital's shameless and ruthless lack of moderation, impelling it to go beyond the natural limits of labour time into the realms of madness, whereby the labour also silently becomes more intensive and strained with the development of the productive forces, that forcibly compels even the society which rests on capitalist production (in this connection the rebellion of the working class itself is of course the main driving force) to restrict the normal working day within firmly fixed limits. This first occurs as soon as capitalist production has emerged from the crude and boisterous years of its adolescence and created a material basis for itself. Capital's reaction to this forcible restriction of labour time is a greater condensation of labour, which for its part in turn brings about a new curtailment of absolute labour time at a certain point. This tendency to replace extent by degree only emerges at a higher level of development of production. This is in a certain sense a condition for social progress. Free time is created in this way for the worker as well, and the intensity of a particular kind of labour therefore does not remove the possibility of activity in another direction; this can on the contrary function, appear, as a relaxation from it. Hence the extraordinarily beneficial consequences—statistically demonstrated—of this process for the physical, moral, and intellectual amelioration of the working classes in England.204

As we have often repeated, we always proceed, in our whole development, from the assumption that commodities, and therefore also labour capacity, are always paid for at their value, and we consider the changes in surplus labour exclusively on this basis. The real cuts in wages, etc., conditioned by competition are therefore not mentioned here. Thus e.g. the supply of labour is increased by overtime, without any increase in the number of workers, or one group of workers is overworked, while the other group is entirely or partly unemployed. In this way an artificial oversupply of labour is created, with the result that the supply of those rendered unemployed by this overworking forces down wages altogether (also those of the employed).

This is, on the other hand, one of the reasons why wages rose rather than fell in England in the branches of industry covered by the factory laws. Since the demand for commodities rose as a result
of the extension of the world market, and, in particular, in the opinions of the capitalists, the extent of this demand rose still further, the demand for labour also rose; but this demand could not, as under the old conditions, be satisfied by artificially increasing the supply of labour, nor was it possible thereby to paralyse its effects on wages.

[The] supply of workers also fell off very considerably; in part through emigration from England, in part through the Irish exodus and pestilence.²⁰⁵

[XIX-1159]a⁹ One example of the condensation of labour is work that is not practised at factories, e.g. tailoring in London. During certain months of the year there is both the greatest possible extension of the working day, and the work is carried on at a feverish rate.* For the rest of the year the tailors are for the most part unemployed or only partially employed. The necessary labour time—hinc wages—is not determined by the labour time in this period of the paroxysm of labour, but is rather calculated on the average labour time, and the wage thus obtained therefore also covers a great part of the whole year's income. Here the condensation of labour is bound up with the extension of the working day, but the whole working period is restricted e.g. to a few months or weeks. One of the most miserable forms of exploitation of labour. These are periods of feverish labour, alternating with chronic slackness and unemployment.

DIVISION OF LABOUR AND MECHANICAL WORKSHOP.
TOOL AND MACHINERY ²⁰⁶

"By a low level of organisation I mean a low degree of differentiation of the organs for different particular operations; for as long as one and the same organ has to perform diversified work, the reason for its variability may probably be seen in the fact that natural selection preserves or suppresses every little deviation of form less carefully than when the organ has to serve for one special purpose alone. In the same way that knives intended to cut all kinds of things may be of more or less the same shape, whilst a tool intended solely for some particular use must have a different shape for every particular use" (Darwin [On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life, London, 1859, p. 149]).b

* In all seasonal businesses.

a This page of the manuscript is entitled: "Continuation of Notebook V (Machinery, etc.)".—Ed.
b Marx quotes with minor alterations.—Ed.
It is one of the main results of the division of labour that instruments or tools which belong to the same species of purpose, e.g. cutting instruments, boring instruments, compressing instruments, etc., should become differentiated, specialised and simplified. One only needs to observe, e.g., the infinite variety of forms assumed by the knife, once each particular way of using it has been given a form which corresponds to this particular purpose and this purpose alone! It happens that once this kind of labour—rather the different forms of labour which work together to create a particular product, a specific commodity—has been divided up, the ease with which it can be performed depends on particular modifications of the instruments which formerly served different purposes. The direction taken by these alterations is determined by experience and by the specific difficulties put in the way by the unchanged form. This differentiation, specialisation, and simplification of the means of labour therefore originates spontaneously with the division of labour itself, without any need for a prior insight into the laws of mechanics, etc. Darwin, see above, makes the same remark on specialisation and differentiation in the organs of living beings. 

*Differentiation*—difference of forms and crystallisation of these forms. *Specialisation*, that the instrument which now only serves a particular purpose is only effective in the hands of labour which is itself differentiated. Both things imply the simplification of the instruments, which only have to serve now as the means of a simple and uniform operation. 

The differentiation, specialisation and simplification of the instruments of labour given by the division of labour in the system of manufacture based on it—their exclusive adaptation to very simple operations—is one of the technological, material prerequisites for the development of machinery as an element which revolutionises the mode of production and the relations of production.

[XIX-1160] In one sense Babbage is therefore right to say:

"While the division of labour has reduced each particular process to the use of some simple tool, the union of all these tools, actuated by one moving power, constitutes a machine" (Babbage, *Traité sur l'économie des machines etc.*, Paris, 1833 [p. 230]).

What we stress here is not only the reduction of "each particular process to the use of some simple tool", but also something which is involved in this, the *creation of these simple tools* arising out of the division of labour.

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* Here and below Marx quotes from Babbage in French. The original English is reproduced here (see Ch. Babbage, *On the Economy of Machinery and Manufactures*, London, 1832, p. 171).—*Ed.*
One finds the view, both in English textbooks on mechanics and in works on political economy, that a machine is not essentially different from a tool or instrument; that the latter is a simple machine and the machine a complicated tool, or that they are only to be distinguished as simple and complex machinery. In this sense, indeed, even the elementary mechanical forms, such as lever, inclined plane, pulley, screw, wedge, wheel, etc., are called machines.

But it is not in this sense that Babbage calls the machine, in the passage quoted above, a "union of all these tools, actuated by one moving power". He is not speaking here of the mere combination of different elementary mechanical forms, such as those mentioned above. There is hardly even a simple tool which is not a combination of several of these forms. Babbage speaks here rather of the union, the combination, of all the different instruments which e.g. within the manufacture of the same commodity are appropriate to different, separate modes of operation and therefore to different workers; and also of the setting in motion of this combination of instruments by a single motor, whatever this motor might be, whether the human hand and foot, animal power, elemental forces, or an automatic mechanism (mechanical propulsion).

Other people, in contrast, draw the line of demarcation between machine and tool by saying that in the case of the tool the motive power is human, but with the machine the power is provided by a natural force alien to man (a force which does not dwell within the human being as an individual quality) such as animal or mechanical power, etc. According to this view an ordinary plough, e.g., is a machine, while a jenny, a mule (unless driven by selfactors), a sewing machine, etc., and the most complicated mechanical looms, are none of them machines, as long as they are set in motion by human beings themselves.

It must above all be noted that what is involved here is not a precise technological separation, but such a revolution in the means of labour employed as to transform the mode of production and therefore the relations of production; thus it is something characteristic of the capitalist mode of production in particular.

Historically, two stages in the transition to machine labour must be distinguished.

Machinery by no means always arises from manufacture, i.e. the analysis of the labour required for the production of a commodity

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*a* See present edition, Vol. 28, p. 487, and Vol. 29, pp. 82-83.—*Ed.*
into different forms of hand labour divided among different individuals. This is only one point of departure for machinery. It also emerges, secondly, from tools which had production of the handicraft type as their prerequisite, and, during the golden age of manufacture in the towns, were at most developed further, in the sense that a mass of these tools was concentrated in a building, together with the workers who set them in motion, assuming the form of simple cooperation. Here the cheapening of the product arose in particular from three \(^a\) causes: 1) the discipline to which the workers were subjected by capital; 2) the common utilisation of the general-type conditions of labour, such as buildings, tools, etc.; 3) the purchase of raw material on a large scale, etc.

The following should be viewed as the two classic examples of machinery which has emerged through these different routes:

On the one hand, the spinning and weaving machines which emerged from the most ancient tools (even if these had been somewhat improved in the course of time), without any further subdivision of the modes of operation within them, as brought about by some further division of labour. If we speak here of the division of labour, we mean the division of labour on which manufacture is founded, not separation into distinct and independent handicrafts. (Weaving, for example, was very subdivided in the latter way.)

On the other hand, there is the construction of the machines themselves by means of machinery. The [XIX-1161] latter emerged from—and had as its basis, a basis which also underlay the production of machines in spinning, etc.—the most complete implementation known to us of the system of manufacture founded on the division of labour.

The transformation of industry proceeds historically from the first form. It is in the nature of things that only after the manufacture of commodities by machinery had attained a certain extent did the need to produce the machinery itself by machines make itself felt.

With spinning wheels, where the motive force which set the wheel in motion, and through the wheel the spindle, was the foot, the part of the tool which came directly into contact with the material, the wool, the spindle, had a separate existence, was in fact a different tool from the wheel, which the motive force seized on. The picking of the wool and its twisting into threads, hence in fact spinning, was done by hand, and was only then threaded by

\(^a\) Marx has "two".—Ed.
hand onto the spool, once it had passed through this hand operation. From the moment when the tool itself took over this operation previously performed by hand, hence the tool itself spun, the same motive force as set the wheel in motion also setting the tool itself to spin, and the worker thus being reduced to the role of setting the wheel in motion and correcting and supervising the spinning of the tool (e.g. reconnecting broken threads), from this moment the spinning wheel changed into a machine, even if a machine of the handicraft type—a machine within the limits of handicrafts, i.e. a machine which could be worked by an individual person; which initially still permitted the trade to be carried on as a handicraft or a domestic, or a rural-domestic enterprise (the last as a subsidiary occupation of the agricultural population). But from this moment onwards the number of spindles was also larger; the working machine proper was admittedly still set in motion by human power, but partly the way in which this power was directed, partly the immediate effect of this part of the machine, which seizes and transforms the material, no longer stood in any relation to the physical exertion or the dexterity of the worker, to the operations in which his hand still had to act as intermediary, before the tool carried them further. All his hand now did was to assist the instrument by correcting its errors. The instrument had become the spinner and the same motive force which set the wheel in motion imparted to the working part of the machine a movement that "spun". The amount of the product therefore no longer stood in any relation to the physical exertion of the foot as motive force, whereas the hand came to the operation post festum, did not mediate it. Here a mass of spindles were at once set into the movement of spinning. The actual instrument of labour is therefore a union of many previously independent spindles, driven by the same motive force. It is therefore the transformation of the part of the tool which comes directly into contact with the material that served as the point of departure of the industrial revolution, which characterises the capitalist mode of production; this was the road from 6 to 1,800 spindles (paired on one mule). With the spinning wheel there were only a few virtuosi (prodigies) who could spin with both hands. The spinning machine was not really complete until a large number of such machines, a reunion of such machines, received their motion from water and later from steam. The organisation and combination of labour resting on the machinery first becomes complete with the establishment of the mechanical workshop, where an automaton sets the whole process in motion.
But the industrial revolution first affects the part of the machine which does the work. The motive force here is at first still man himself. But operations such as previously needed the virtuoso to play upon the instrument, *are now brought about by the conversion* of the movement directly effected by the simplest mechanical impulse (turning the crank, treading the wheel) of human origin into the refined movements of a working machine.

[XIX-1162] From the moment when direct human participation in production was reduced to the provision of simple *power*, the principle of work by machinery was given. The mechanism was there; the motive force itself could later be replaced by water, steam, etc.

After this first great industrial revolution, the employment of the steam engine as a machine for producing movement was the second revolution.

If one neglects to consider this, looking only at the motive force, one overlooks precisely the thing that marks, *historically*, the turning point.

Man possessed living automata from the beginning, in the shape of animals, and the employment of animal power for the pulling and carrying of burdens, for riding, driving, etc., is older than most handicraft instruments. Hence if one wished to characterise this as the decisive feature, machinery would be further developed among the Scythians than the Greeks; at least, the former employed these living locomotives to a greater extent. Animals were the first to be applied as motive force for the implements of labour, tools which have to bring about a definite mechanical alteration in the material they seize on, in the case of the plough, and much later also water (later still wind) in the case of the mill. The first form already belongs to very early stages of civilisation, which had not yet progressed to manufacture, but had only advanced to handicraft production. Just as little did the water mill bring forth an industrial revolution, rather taking up the same kind of position alongside handicrafts in the Middle Ages as it later occupied beside manufacture, etc. That the use of water power to set a mechanism in motion was, of course, seen as a particular principle, emerges from the fact that the later factories were baptised "mills", and indeed they are still called *mills* in England.

With both kinds of labour it was a matter of one of the simplest mechanical operations, the reduction of material, pulverising, in one case, and disaggregation in the other.

If we look at the machines which replace the earlier tools,
whether those of handicrafts or of manufacture, we find (with the exception of machines whose work itself consists in movement, in changing from one place to another, i.e. transport machines, railways, steamships, etc.) that the part of the machine which actually modifies the material consists for the most part of earlier tools, such as spindles, needles, hammers, saws, planes, shears, scrapers, combs, etc., even if they have received a modified form so that they can function as parts of a mechanism. What mainly distinguishes them is either that what previously appeared as an independent tool now acts merely as one element in a collection of such tools, or that it has taken on much more gigantic dimensions in proportion to the power of the motive force. But the actual task with any mechanism never consists in any more than the conversion of the original movement which is brought about by the motive force into another form, corresponding to the purpose of the labour and imparted to the working machine.

"Weaving machines: Are on the whole identical to an ordinary loom, or rather they consist of many looms, which are set in motion at the same time. They only have in addition particular attachments for pulling the combs and shafts, for throwing the shuttle and striking the plate. The alterations undergone since olden times by the shuttle, with which the weft is thrown through the warp, are not very significant. The form has on the whole remained the same" (Poppe [Geschichte der Technologie..., Vol. I, Göttingen, 1807, pp. 279, 280].

Mills:
"First the crushing of corn grains. D'abord probably by hitting them with stones. Then a container or mortar, in which they were pounded with a pestle. Then it was seen that grinding was better than pounding. The pestle was given a twisting movement in the mortar for that reason. This was best done with a handle, placed at the stem of the pestle, and turned round and round by a human being, almost like our coffee grinders. Thus the hand mill was discovered. At the beginning female slaves were assigned to the grinding, later serfs. Later still the pestle was made much heavier and provided with a pole instead of a handle, to which horses, oxen, or even donkeys were harnessed. These animals continuously pulled the pestle which was pounding the corn round and round, while they themselves went round in a circle, with eyes blindfolded. Thus there were already [XIX-1163] horse mills (molae jumentariae, asinariae), which were of greater effectiveness than the hand mills. The horse mills were then perfected; the pestle took on a more appropriate, initially conical shape, and a more convenient container in which it was turned round. In the course of time the pestle was remodelled into a big, heavy cylindrical stone, which turned round upon another big stone, and in this way ground the corn. The former stone was called the runner, the latter was called the nether millstone. The cylindrical runner had an opening in the centre, through which the grains of corn could fall, so as to pass between the surfaces of the runner and the nether millstone, where they were crushed...

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a This and the following passages from Poppe are contained in Marx's Excerpt Notebook XV (London 1851).— Ed.

b Mills worked by draught animals, donkeys.— Ed.
"The invention of the watermill took place at the time of Mithridates, Julius Caesar, Cicero. (From Asia to Rome.) The first watermills in Rome were built on the Tiber shortly before Augustus. Vitruvius describes one...

"Toothed wheels and gears, which were connected to the shaft of the waterwheel, transmitted the motion of the waterwheel to the millstone which crushed the corn" (Poppe [op. cit., Vol. I, pp. 104-07, 109-10]).

The plough involved absolutely no new principle, and was in no way suited to bringing about an industrial revolution. It fitted completely into the framework of small-scale production. Here the animals functioned as living locomotives, just as they had previously done when pulling and carrying burdens. Like human beings they are capable of voluntary movement, and man had already learned to subordinate their will to the direction of his. The movement was irregular, if only on account of difficulties of the terrain, and man had not only to lead constantly, but to bear a hand himself along with the animal, once the cart became stuck in the mud. The connection between the motive force and working machine did not involve a new principle either. It was just as easy to harness the ox or the horse to the plough as to the cart. With the simple application of animal power the principle of voluntary movement remains predominant; the purely mechanical action is concealed under the cover of voluntary movement, and therefore it does not emerge. But it is already entirely different with e.g. the mill, where the animals are led or whipped round in a circle with their eyes blindfolded. The movement here already appears as unnatural, and reduced to a regular mechanical course, the circle. To the peasant, old and new, the animal by no means appears as a piece of machinery, but, as Mr. von Haller says in his Restauration der Staats-Wissenschaft, a "helpmate". Animals are in general only the earliest human instruments, a point already developed well by Turgot. The steam plough presupposes not only agriculture on a large scale, but the levelling of the ground, just as the locomotive presupposes railway lines.

The mill in contrast can be regarded as the first implement of labour to which the principle of machinery has been applied. This was relatively easier than with spinning, weaving machines, etc., because the actual working part of the machine, i.e. the part which overcomes resistance and seizes the object to be worked on, functioned from the outset independently of the human hand and

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a C. L. von Haller, Restauration der Staats-Wissenschaft..., Vol. 1, Winterthur, 1816, pp. 332, 378 (note).—Ed.

without further intervention of human operations. Whether I pound or grind dried corn in a mortar with a pestle, my hand serves here simply as a motive force. Once it was discovered that grinding was more advantageous than pounding, and hence a turning movement was more advantageous than a movement up and down, it was gradually found that the pestle did not need to be directly grasped with the hand, but that an apparatus for turning could be interposed between it and the hand. With the growing size and weight of the pestle, greater force had to be exerted on it, and the handle grew in size and was progressively converted into a shaft, which was turned in a circle, first by human beings and then by animals. There were admittedly changes in the form of the pestle and of the container in which it worked, and it was a long time before the bottom of the container and the pestle were replaced by two stones, of which one turned cylindrically upon the other; and it was a still longer time before this movement was brought about by the natural fall of water down an incline. With the water mill the mechanical principle, the principle of the employment of a mechanical motive force and its direction by a mechanical contrivance, was realised to a considerable extent, for the water-wheel, which the water seizes hold of, and its crankshaft, which transmits the motion to the millstone through a system of toothed wheels and gears, comprised a whole system of mechanical motion.

[XIX-1164] From this angle, therefore, the whole of the history of mechanics can be studied through the history of the mill.

We find here, firstly, the application one after another of all kinds of motive force, and the coexistence for a long time of human power, animal power, water power, floating mills, windmills, wagon mills (mills on wagons, set in motion by the movement of the wagon, for war, etc.) and finally steam mills.

At the same time we see in the history of the mill the extraordinarily slow progress in development from Roman times (shortly before Augustus), when the first water mills were introduced from Asia, to the end of the 18th century, when the first steam mills are seen, constructed on a large scale in the United States. Here it is only through an extraordinary accumulation of the experience of generations that there occurs an advance, which is even then only applied sporadically, without overturning the old method of working. This lay partly in the character of the corn mills as a subsidiary agricultural occupation, in the very slow extension of the individual machine to form a system of machinery, in which the same motive force set in motion several
sets of millstones; it lay also in the nature of the article. Yankee land was the first place where there was a big trade in flour, the flour trade on a large scale.

In Rome water mills were still extraordinary establishments.

"The water mills have even today not yet driven out all the hand and horse mills" [Poppe, op. cit., Vol. I, p. 110].

The year 536 (Belisarius) saw the appearance of the first floating mills. From Rome the water mill spread to other states [pp. 111, 112].

A further advance in the machinery of the mill was that part of the work which was previously separate from the actual grinding, carried on independently, was now performed by the same motive force and thus mechanically combined with the work of grinding.

"Originally no one thought about separating the flour from the husks or the bran. Then the ground corn was sifted through a hand sieve. The pounded corn had already for a long time been caught in a special bin, later called the bolting house, in the form in which it emerged from between the millstones. Later on, sieves were installed in the bolting house, and given a form which allowed them to be turned with a crank. They made do with that until the beginning of the 16th century, when the bolting mechanism proper was invented in Germany; there a sieve, in the shape of a stretched-out bag, is shaken by the mill itself. The invention of the bolting mechanism gave rise to the development of a special type of fabric, so-called bolting cloth, which was later produced in factories."

//This is an example of the way in which a new division of labour within society is called forth by the introduction of, and improvements in, machinery.//

"Roller milling was invented at the end of the 18th century by Oliver Evans in Philadelphia" [ibid., pp. 114-16, 118-19].

"Windmills. Invented in Germany in the 10th or 11th century. Only in the 12th century were they first seriously made use of. Until then they were rarities. From the 16th century Holland was the land of the windmills. Improved by them and by the Netherlanders. In Holland windsails were previously used more for driving scoops for removing water from low-lying fields" [pp. 130-34].

Improvements:

"Brace bands, so as to be able to bring the mill to a halt suddenly. The post mill, or so-called German windmill, was the only kind of [wind]mill known up to the middle of the 16th century. A violent storm could overturn a mill of this type along with its post. In the middle of the 16th century a Fleming found the way to make it impossible to overturn a mill. He made the whole of the mill immobile except the top, so that only the top needed to be turned round to point the sails into the wind, while the body of the mill was fixed firmly to the ground. Dutch windmills. In Germany and other countries it was only in the 18th century that they started to imitate the construction of the Dutch windmill, because the post mills were much less costly. The Dutch mills were given foundations, not merely of wood, in the shape of a truncated cone; soon the attempt was successfully made to construct them upon a stone base, which often took a turret-like shape. The roof or cap of the mill can be turned on rollers" (it has to be movable, so that it can always be turned towards the wind), [XIX-1165] "either with the assistance of a lever which is moved
by means of a stationary winch, or crowbars are used to turn round a shaft; this has a drive which engages with teeth in the cornice of the roof. Only in the 18th century was this machinery perfected to enable easier and more advantageous movement” [pp. 135-37].

(Holland in the 16th and 17th centuries was the dominant commercial and colonial nation; in addition, import of corn, large-scale trade in grain, cattle breeding within the country rather than tillage, hydraulic projects, the Protestant religion, bourgeois development, republican freedom.)

“Whatever the kind of mill, all its parts were always capable of many improvements; people hardly concerned themselves about these possibilities until the end of the 17th century.

“In the 18th century mills were infinitely improved, partly through better utilisation of the native power, partly through a more advantageous arrangement of the internal parts, e.g. the milling, sifting, and the whole of the gearing mechanism. New kinds of mill and new parts for mills were invented, and new theories were worked out to secure the optimum layout for the mills. As in machine technology as a whole, the theory was often in open contradiction to experience, unpractical, wrong.

“The common hand mill, as it existed centuries ago, and even now often still exists on certain large farms, etc., is usually provided with a crank, on which human power is exerted. Two people can do the turning together. These mills were also not seldom constructed in such a way as to be turned by the pushing and pulling of levers. But here the motive power acted unevenly on the mill. This was improved through the addition of the flywheel, since the latter continues its movement at the same speed even if the motive power becomes weaker for a few moments. (Already recommended in the works of Faulhaber (1616 and 1625) and De Cous (1688).) The flywheel is placed on the crankshaft, and it facilitates its movement and makes it more uniform. The examination of rotary movement in mills was useful from many different aspects. It extended not only to the actual flywheels and pinions, but especially to the millstones, waterwheels, windsails, in general to all the parts which rotated” [pp. 138-40].

“Invention of the field mills, wagon mills or animal mills, which could be brought by wagon from one place to another. Supposed to have been invented by the Italian Pompeo Targone, at the end of the 16th century, for military purposes. He was Marquis Spinola’s engineer. In the 18th century more sophisticated field mills, in which the runners were set in motion by the wheels of the wagon itself, while it was being pulled along.

“When the craft of milling was still in its infancy, only a single runner and consequently only one set of millstones was set in motion by the main axle shaft, which passes through e.g. the waterwheel. Later on the possibility was seen of setting in motion two runners, and thereby also two sets of millstones, by the main axle shaft, which passes through e.g. a single waterwheel.” (17th century?) “All one had to do was provide the main axle with a spur wheel, and let this engage on both sides with the gears of two shafts lying parallel with the main axle. What was needed in addition was to fix a cogwheel at each of these shafts, in such a way that each cogwheel could drive its own runner by means of a vertical drive shaft; then one had two sets of millstones. But now everything depended on the quantity of water, because that intermediate mechanism and connecting gear required a stronger motive power. There was very little attempt to arrange the machinery in
such a way as to lessen friction as much as possible, so as to allow it to be driven by as small a motive power as possible. People depended entirely on the motive power, which was expected to overcome whatever irregularities of motion might occur and to make up for the deficiencies of the machine. No precise investigation was made into the theory of friction until the end of the 17th century. At most one smeared with grease and oil a few of the parts which seemed to come up hard against each other. The wheels, the gudgeon pins, etc., benefited from a correct knowledge of the theory of friction. In the 18th century the theory of friction was reasonably well developed. Furthermore, the teeth of the gears were made epicycloidal... Teeth which are rounded off into this curved line produce an even velocity of rotation, [XIX-1166] they do not jerk or shake, there is much less friction at the point of contact, and consequently the motion is much easier and closer to the ideal” [pp. 145-49, 155].

“In the period when the first water mills were set up, no attention was paid to controlling the water more advantageously, or ensuring that the wheels themselves” (the waterwheels) “should be designed and employed to greater effect. The theory of hydrodynamics, [developed] by Poleni, in De motu aquae (1717), was of assistance in the construction of watermills. D’Alembert, Traité d'équilibre et du mouvement des fluides, 1744. Bossut, Traité élémentaire d'hydrodynamique, 1775, a etc. Similarly Bernoulli, Euler, etc., particularly in arriving at satisfactory results on the flow velocity of water and the obstacles to this. Special instruments, known as flow meters, were invented in the 18th century for the practical determination of the flow velocity of water. The levelling or surveying of water, i.e. the determination of the gradient or inclination of the bed of a river, canal, stream and the like was of no less importance in water mill technology. Full use of this was first made in the 18th century, especially with the assistance of the level or water level. Where rivers were not too broad, use was made of artificial gradients. The water is forced into a narrower space as it approaches the waterwheel, so as to make it flow faster. The contrivance used for that purpose is the millrace. It had long been customary in Germany for the water to be made to flow towards the wheel in a more or less steep gradient. In France the millers almost always employed the water horizontally, and accordingly it had no natural gradients, or no vertical distance between the inclined plane and the horizontal surface. Until the middle of the 18th century there was no special theory of millraces. After this period the discovery was made that the millraces for overshot waterwheels and breast wheels are best built in the shape of a parabola... Newton, Mariotte, Johann and Daniel Bernoulli, d’Alembert, Euler, etc., made considerable advances in the theory of the resistance or thrust of water” [pp. 160-65].

(With the undershot wheel the water acts through its velocity, while with the breast wheel it brings about the turning effect through its thrust and weight, and with the overshot wheel it is for the most part its weight alone which acts. Whether it is more advantageous to set up one or the other of the wheels mentioned depends on the quantity of water and the distance through which it falls.)

“After this a mass of other people endeavoured in the 18th century to derive a general law through which the strength of the thrust could be determined. Hydraulics and hydraulic technology were altogether enriched in the 18th century with many discoveries, which were for the most part very advantageous for the

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a These works are mentioned in Poppe's book, on p. 160 (notes 29-31).— Ed.
Division of Labour and Mechanical Workshop

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craft of milling too. The latter, however, followed very slowly after advances in the theory, especially in Germany. The waterwheels themselves in particular had been investigated more closely since the beginning of the 18th century, with the aim of discovering a theory which would enable them to be constructed to the greatest advantage. Parent, Pitot, Cassini, de La Hire, Martin, Du Bost, William Waring, Philipp Williams, Deparcieux, Lambert, etc. The theory of waterwheels was difficult, hence it was decreed as empty theorising, and the millwrights paid little attention to it. In this respect too, much of the theoretical work still remained reserved to the 19th century” [pp. 165-69, 171].

“The second half of the 18th century saw the invention of the Englishman Barker: water mill without wheel and trundle. This water mill resulted from the so-called reaction machine or Segner’s waterwheel. A cylinder, open at the top, is capable of turning easily about its axis. A large number of precisely horizontal pipes is inserted into the cylinder close to the bottom, and the water present in the cylinder can enter these pipes. They must be closed at their [XIX-1167] extremities, but be provided close to the end with an opening into the side, out of which the water is able to flow in a horizontal direction. If the water now flows out of the side openings, the cylinder will turn about its axis in the opposite direction. The water exerts an even pressure everywhere upon the side walls of the pipes. But at the points where the openings are located, the water finds no resistance and can therefore flow out freely. At the points opposite these openings, the pressure continues to be exerted upon the walls; and since this pressure is not cancelled out by an equal and opposite pressure, it pushes the pipe away in that direction and sets the cylinder into rotation. Barker connected the axis of the cylinder to the millstones and the appropriate apparatus, and a corn mill was created out of this…” [pp. 179-74].

“Mills driven by steam engines. Tried first in England. This was the origin of the so-called Albion mill in London, which had 20 sets of millstones and was set in motion by 2 steam engines. It was destroyed by fire on the 2nd March 1791. In the 18th century this system was still a rarity. In Germany, in the first decade of the 19th century, it did not yet...

“A water mill was built by Thomas Ellikott in Virginia on the Okkaquam River. It performs all the functions of milling almost without human assistance. It has 3 waterwheels and 6 sets of millstones. No one needs to bring the corn up the stairs and throw it into the hopper: the mill itself does this through the mechanism of a moving Archimedean water screw, which screws the corn horizontally forward, and a kind of system of buckets, which brings it up to the top floor, and guides it from there through the hopper into the area between the millstones. Before being poured in it is cleaned by a further machine. After the flour has cooled, the machine brings it automatically to the place where the flour containers stand, and even pours it into them” [pp. 183, 185, 186].

In Germany the nobles at first maintained that the wind was their property; but then the bishops challenged them, claiming it as ecclesiastical property.

“In 1159 the emperor Frederick I made water mills a regalian right. The only exception for a while were small non-navigable rivers. The regalian prerogative was even extended to cover the air. It was already an established practice in the 11th century for ruling princes to oblige their subjects to have their corn milled in the

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a Poppe mentions their works on pp. 167-68 (notes 66-76) of his book.—Ed.
seigneurial mills and in no others, in return for a certain fee. *Privileged mills or compulsory mills*” [pp. 189-90].

“In the first half of the 18th century the Dutch also provide practical instruction in the millwright’s art” [p. 192].

The mill passed through the following stages of development, beginning with the period of the Roman Empire, at the start of which the *water mill* was introduced into Rome from Asia Minor:

Middle Ages. *Hand mills, animal mills and water mills.* (Windmills invented in Germany in the 10th or 11th century. First used seriously from the 12th century onwards. Until the middle of the 16th century the only ones used.) Characteristic that the German nobility claimed the wind as its property, then the priests. Frederick I made water mills a regalian right in 1159, then extended this to cover the air. *Privileged* or *compulsory* seigneurial mills. Moses said: Thou shalt not muzzle the ox when he treadeth out the corn. But the Christian lords of Germany say on the contrary: “Servs should have a big wooden board fastened round their neck, so that they can’t use their hands to put flour into their mouths.”

The sole improvement in the water mill: For a long time, the flour was caught, just as it emerged from between the millstones, in a special container. The *hand sieves*, which were previously used to sift the crushed corn, were now fixed in this container, which was designed in such a way that they could be turned with a crank.

Sixteenth century. Beginning of the 16th century, a sieve stretched out to form a bag, the *bolter properly so called*, shaken by the mill itself.

Windmills were very widespread in Holland in the first half of this century. They were converted from German into Dutch windmills. In the middle of the century the Dutch were already using wind-driven sails to draw water. Movable top. Stone building. *Braking system*, in order to bring the mill to an immediate halt while in motion. Mechanical contrivances to turn the top into the wind, even if still very clumsy. (The *cap* of the mill.) Namely thus: the sails are directed towards the wind by means of the cap. [XIX-1168] The cap is turned round on rollers (pointed) by crowbars, etc. At the end of the 16th century transportable mills for military purposes, *field mills*, *wagon mills* or *animal mills*, which can be brought from one place to another on a wagon pulled by an ox.

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a Deuteronomy 25:4.—*Ed.*
Seventeenth century. With some non-water mills (hand querns) the motion was produced by pushing and pulling with handles. The motive power acts very unevenly here. The flywheel introduced (fixed to the crankshaft) to facilitate the motion and make it more uniform. Some theoretical investigations into flywheels, pinion wheels and rotary motion in general.

Eighteenth century. Two sets of millstones set in motion by one waterwheel. (This had already started in the 17th century.) Namely, a single waterwheel acts on a single axletree, which acts on 2 runners, and thereby 2 sets of millstones are also set in motion, and indeed it acts on 2 runners through side-axles, gearing, and connecting gear (see above). But now greater motive power is required. The theory of friction is developed. Epicycloidal shape for the teeth of wheels, gears, etc.

Investigations into the better utilisation of the motive power itself, the water, its regulation. Necessary to determine the thrust of flowing water; whether a certain amount is sufficient for a particular purpose, whether it needs to be used as a whole or in part. Theoretical writings de motu aquae, its velocity, obstacles it comes up against. Current meters to determine the flow velocity of the water. Hence the first measurements of motive power.

What was further found important (already in the 17th century, and earlier still in practice, in a crude form) was levelling or water surveying (i.e. the determination of the gradient or the inclination of the bed of a river, a stream, a canal, etc.). In the 18th century the level or water level.

Artificial inclines. Millraces. Since the middle of the 18th century. Theory of the millrace. Parabola as form of the millrace for overshot waterwheels and breast wheels. Whether the water acts by velocity or weight. Theory of the resistance or thrust of water. Newton, Mariotte, the Bernoullis, d’Alembert, Euler, etc. (Laws determining the force of thrust.) Investigations into the most advantageous form of waterwheel. Theory of waterwheels difficult. Practice only followed theory slowly here.

Second half of the 18th century. Water mill without wheel and trundle, consisting of a cylinder capable of moving easily about its axis, open above, and a large number of horizontal pipes inserted into it near its bottom, closed at their extremities, but provided with a side-opening close to the end, out of which the water can flow in a horizontal direction. The principle here is the uniform pressure of

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a See this volume, pp. 397-98.—Ed.
b On the motion of water.—Ed.
the water on the pipes. If the water runs out at the side where it
finds no resistance, the pressure on the other side is not cancelled
out into equilibrium, and the pipes therefore turn. The principle
is *au fond* the same as with the steam engine—movement
produced by removing the equilibrium of the motive power.

*Milling with steam engines.* With this at the same time a system of
machinery. 20 sets of millstones at the Albion in London, set in
motion by 2 steam engines. (Burned down in 1791.)

Similarly at the end of the 18th century. *Water mill* as system; not
only by the combination of 6 sets of millstones, but automatically
(through the Archimedean water screw). The corn is carried up
the escalator, it is deposited on the upper floor, it is guided from
there through the hopper to between the millstones, it is cleaned
by machinery connected to them, it is poured out, the cooled flour
is brought automatically to the place where the flour containers
stand and automatically poured into them. This was built by *Thomas
Ellikott* on the Okkaquam River in Virginia. Now the system of the
automatic milling machine had been perfected.

[XIX-1169] What drove the *Dutch* (since 1579 separated from
Spain as the United Provinces) to use *wind power* was the lack of
rivers with any considerable inclination. // A great lack of mines
for the setting up of actual factories. There were neither smithies
nor ironworks there of any size. // // The most prominent of the
trades carried on there were wool, silk, linen manufactures, oil
and saw mills, paper and dyeworks. Almost all these trades had
already reached their highest level towards the end of the 17th
century. Declined from then onwards. // // Tobacco factories. //

*United States of America.* Its trade (export of grain and flour,
etc.) with the West Indies. But particularly during the *Revolution-
ary War* (1793-1807, etc.) their trade increased with England,
France, Spain, Portugal, and numerous other European countries.
Demand for American flour (whereas otherwise they only had to
supply the West Indies with it). 619,681 barrels of flour were
exported from the *United States* in 1791; 1,074,639 in 1793.

// Here, as previously with the Dutch, the first trades to become
prominent were closely connected with trade and seafaring. // // The corn trade was very insignificant in the Middle Ages, took
on a certain importance in the 17th century, grew in the 18th and
19th centuries. One may say that the trade in flour was first
conducted on a world-wide *scale* by the *United States.//

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* At bottom.—* Ed.
Gunpowder, the compass, and the printing press were the 3 great inventions which ushered in bourgeois society. Gunpowder blew up the knightly class, the compass discovered the world market and founded the colonies, and the printing press was the instrument of Protestantism and the regeneration of science in general; the most powerful lever for creating the intellectual prerequisites.

But the water (wind) mill and the clock are two machines inherited from the past. Their development prepares the way for the period of machinery, even during the time of manufacture. Hence “mills” is the word for all instruments of labour set in motion by the forces of nature, including the more complicated tools in which the human hand is the motor. With the mill the elements of machinery are already developed alongside each other in a certain independence and extension; motive power, the prime motor engaged by the motive power, connecting mechanism, wheels, levers, cogs, etc., between the prime motor and the working machine.

The clock is based on the craftsmanship of artisanal production together with the erudition which characterises the dawn of bourgeois society. It gives the idea of the automatic mechanism and of automatic motion applied to production. The history of the clock goes hand in hand with the history of the theory of uniform motion. What, without the clock, would be a period in which the value of the commodity, and therefore the labour time necessary for its production, are the decisive factor?

"Flails already known to the ancients. Threshing sledges and threshing wagons (threshing machines) among the Phoenicians" [Poppe, op. cit., Vol. I, p. 194].

The water mill, first used for milling corn, could naturally be employed on different materials, for all similar purposes, with appropriate modifications to the working instrument. In the period of manufacture, therefore, it was extended to all manufactures in which this motive power, etc., was employed, either as a whole or in part.

Oil machines. Oil mills, stamping mills.

"Oils. The process by which they are obtained from seeds and fruits sometimes involves merely squeezing out, but more often the seeds or fruits are crushed and ground, and then squeezed out once again. The ancients already obtained their oil by squeezing in an oil press or pressing machine [pp. 220-22]. There are many oil mills in Holland" [p. 227].

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a Marx uses both the German and the English term. Cf. this volume, p. 392.— Ed.
The needle factory, which Adam Smith takes as his example, is itself a factory for an instrument of labour.209

Nuremberg. The main centre of inventions for tools, on the basis of handicraft production, from the clock (Nuremberg egg210) to the die stamper used for forming pinheads and setting them on the pins.

The thimble was also a Nuremberg invention [see Poppe, op. cit., Vol. II, pp. 4-7, 13-14, 95].

[XIX-1170] “The saw is ancient; the present-day saw is not very different in shape from the saw of the ancient Greeks. Already in the 4th century there were water-driven mills for sawing wood. There was already a sawmill in Augsburg in 1337. In Norway in 1530 the first sawmill was built under the name of ‘The New Craft’” [ibid., pp. 33-36].

“Already in the 16th century [there were] mills which set in motion many saw blades, cutting one or more trees at once into many planks. Euler, *Sur l'action des scies* [1756]. Nancarrow, *Calculations Relating to Grist and Sawmills* [1794].6 (Improved theory of sawmills.)” [Pp. 41-43, 45-46.]

“Boring mills for the boring of wooden tubes already existed in the 16th century. Veneering mills for precision cutting of stained and rare types of wood were invented in the 16th century by Georg Renner of Augsburg. (The men of Nuremberg and Augsburg were excellent cabinet-makers.)” [Pp. 43-46.]

Paper mills.

“Rag (linen) paper seems to have been invented in Germany in the 14th century. Straight after the invention of rag paper mechanical contrivances were used for the crushing and pounding of the rags. The first paper mills were hand mills, and only after a number of years were water-driven paper mills set up, when large-scale paper-making started. In the 14th century [they were to be found] in Germany (Nuremberg) and Italy. The rag cutting machine first became known in Germany in the first quarter of the 18th century... Up to the end of the 17th century the rags were merely converted into a pulpy mass by the hammering or stamping of the apparatus. Then the paper milling machine, called the Hollander or Dutch machine, was invented in Germany. A cylinder lined with a large number of iron bands, housed in a strong wooden container, crushed the rags it took up out of a trough. It was set rotating by the water-wheel with the help of a system of gears. The Germans did not recognise the usefulness of these machines, and paid no attention to them. The Dutch snatched them up. They used them as hand mills initially, then after some time arranged for them to be driven by windsails.

“Golden age of paper milling in Holland” [pp. 196-203]. “The Dutch conducted their papermaking operations industrially, appointing a specific person for each individual assignment in their paper mills. They worked quicker and better than the German papermakers, who for the most part carried on the business only in the handicraft fashion” [p. 218].

The Dutch paper mills of the 17th century and the beginning of the 18th century can be regarded as an important example of a manufacture associated with machinery, in which individual jobs

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a Poppe mentions these works on p. 41 of Vol. II of his book, in notes 64 and 67.—Ed.
are performed by machines, although the whole thing does not constitute a system of machinery. At the same time there is a considerable division of labour in this.

"Sorting and washing of the rags. Clarification by water. Bleaching of the rags..."[pp. 205-08]. "Once the paper has been scooped, passed between the felts, and piled up in layers to form a pad or Puscht, it must be strongly pressed together. For a long time this was done by the so-called rod or lever press, set in motion by human power" [p. 209]. "Glazing, blueing" [pp. 212-17].

A mixture of mechanical and chemical processes.

"Glass polishing. Among the ancients only burning glasses; they did not know that glasses can magnify objects.

"The first trace of the use of magnification lenses in the Arab writer Alhazen, 12th century. Only at the end of the 13th century were spectacles invented. Roger Bacon. The oldest polishing mill first improved by Hook (1665). Telescope. Magnifying glass or microscope. (End of the 16th century.) The actual telescope first spread from Holland in 1609. Jansen constructed the first telescope in 1590. Europe first learned from Galileo how to make a proper telescope and employ it in astronomy. Then Kepler" [pp. 244-47, 249-50, 257-60].

Carriage manufacture.

"Numerous separate craftsmen worked in this trade. There were apart from the wheelwrights, harness-makers, tailors, locksmiths, brass-founders, turners, fringemakers, glaziers, painters, varnishers, gilders, etc. Later on, in the carriage factories, those workers were assembled together, with the product passing from one hand to the next" [p. 330].

Self-driving wagons, moved along without a harness by the aid of a system of gearing, found in Nuremberg in the 16th and 17th centuries [p. 348].

1) Stamping and hammering works.

"The ancients already stamped or fragmented the ore before smelting, washed and cleaned it, partly to accelerate the melting, partly to obtain the metal with as small a waste as possible. The ore was crushed to a powder in a mortar; this powder was then ground in an ordinary handmill, and subsequently cleaned and washed. The washing of the minute pieces of ore was done in sieves. Actual stamping works or stamping mills, with stampers, which pounded the ore in a stamping trough, were invented in Germany in the first years of the 16th century; the iron-shod stamper was positioned close to the shaft of the waterwheel, and the cams on this shaft raised the stamper during the rotation of the wheel. At the beginning there were merely dry stamping works, i.e. no water entered the stamping trough. But the crushed ore gave off such a thick dust during the functioning of these stamping works that the workers were physically unable to endure it, and then the subsequent smelting process could not progress properly. This situation gave rise very soon to the idea of wet stamping or stamping with water. This improved arrangement of stampers and stamping troughs had already been achieved in the 17th century, but the washing works first [became more widespread] in the 18th century", etc., etc. [pp. 381-84, 386].
The use of bellows.

"The oldest way of fanning the flames was to use a piece of skin, or tree leaves, or thick green branches. Later on they used reeds, through which the air was blown into the fire with the mouth. Leather bellows, where a quantity of air was incessantly blown out by the simple pressure of the hand from a container to a communicating pipe. Known very early on, among the Greeks. In smelting works too, large bellows of this kind were set in motion by hand. Up to roughly the beginning of the 14th century. Around this time the first bellows driven by waterwheels. Wooden instead of leather bellows, lasting 10 times longer than leather ones”, etc., “invented in Germany, Nuremberg, already before the middle of the 16th century” [pp. 387-90].

"Large hammer works were established in the 13th and 14th centuries for forming the metal, particularly iron, copper, brass and lead, into bars or sheets with heavy iron hammers, set in motion by the cams on a waterwheel shaft. At the beginning very inadequate, like all mills. Only in the 18th century was the shape of the cams, the design of the waterwheels, etc., and the blowing machines perfected, particularly by Swedish scientists” [p. 428].

//Poppe (Geschichte der Technologie) shows how the urban crafts (these being independent activities of free men) have developed since the 11th century, bound up with trade and science in the towns, and how the guilds, livery companies, mysteries, in short industrial corporations, have developed together with these crafts, politically too. There are many “orders” of this kind dating from the 12th and 13th centuries.

"Germany in those days possessed the greatest masters in almost every craft. Louis IX of France had the handicraftsmen organised into guilds by Stephan Boileau in 1270. Frederick I and Frederick II endeavoured to abolish the craft associations, which were becoming refractory. Influence of the craftsmen in the towns. All the attempts of princes to suppress the guilds were of no avail. Their importance increased more and more. The craftsmen violently demand not only a share in the government of the towns, but exclusive control of them. Golden age of the crafts in the Netherlands. The wool weavers play the most important role here. In 1304 a battle at sea between the Dutch and the Flemings, won by the former. In the 14th century conflict between the craftsmen and the urban authorities. The craft guilds always had periods of weakness, but always righted themselves. Indeed, each craft sets up a complete armament for itself. In the 14th century many inventions and discoveries. All kinds of weaving, metalworking, working in silver and gold, reach a very advanced stage. 15th century. No significant change in the organisation of the craft system. At the end of that century Nuremberg the most flourishing of the German towns. 16th century. Constant increase in crafts and trades. Germany is again outstanding in inventions. Spanish Netherlands. England” [Vol. I, pp. 13, 15-24, 27-29].

"In the 17th and 18th centuries the actual manufactures and factories emerge, especially in England and France” [p. 31].

"Manufacture and factory when numerous crafts come together and work towards a single goal. It is called manufacture when hands are directly used, or if they are in short supply, machines are used, to produce [XIX-1172] commodities. Factory when fire and hammers are used for this. Some trades cannot be carried on except on a

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a Here Marx summarises pp. 9-12 of Vol. I of Poppe’s book.—Ed.
large scale; e.g. porcelain making, glass making, etc., are therefore never handicrafts. Some trades, e.g. weaving, were already carried on on a large scale in the 13th and 14th centuries" [pp. 31-32].

"In the 18th century many men of learning set out with great energy to achieve a precise knowledge of the handicrafts, manufactures and factories. Some made them subjects of special studies. It was only in modern times that the connection of mechanics, physics, chemistry, etc., with the handicrafts" (he should have said production) "was properly recognised. Otherwise the rules and customary practices were handed down in the workshops from the masters to the journeymen and apprentices, and thus there was a conservative tradition. Previously, prejudices stood in the way of the men of learning. The term technology is first used by Beckmann in 1772. Even before the middle of the 18th century there is a treatise on the diseases of artisans and craftsmen, by the Italian Ramazzini. A complete technology was the work of Réaumur and Shaw. The former put his plan forward to the French Academy. HENCE: Descriptions des arts et métiers, faites ou approuvées par Messieurs de l'Académie Royale etc., in folio, Paris, beginning of 1761" [pp. 62-64, 81-82, 91-92].

Spinning and weaving.
1) Woollen materials.

"Before the 10th century the wool manufactures of Germany were the most renowned in Europe; the plant nurseries of the Netherlands manufactures. The cloth factories of Ghent were already flourishing in the middle of the 12th century. Florence, Milan, Genoa, Naples were the most renowned from the 13th century onwards" [pp. 243-44].

"Even the ancients did not convert the shorn wool into thread without preparing it first. It had first to be cleansed of impurities and dust. For this reason it was teased and willed or sorted and beaten, then washed, greased with olive oil or butter, to make it easier to work, and finally scribbled and carded. For washing the wool the ancients used a kind of soapwort (struthium).

"The ancients were to some extent familiar with the process of willeying or beating the wool, to improve the regularity of the fibres. Subsequently, wool beaters were introduced for this specific purpose. Nuremberg already had these in the 13th century. At the beginning of the 18th century, and perhaps even earlier, the wool was willed by machine, i.e. a special machine was used to disentangle it: the willye. In England more recently improvements were made to this machine (gigging mills, towling mills, machines for twitching wool).

"Pliny was already familiar with teasing, scribbling and carding, i.e. with implements with iron spikes for loosening, dividing and equalising the length of the fibres. Such scribblers were now improved, the number of teeth they had was increased, etc. Nevertheless, a considerable amount of time continued to be expended on this, and many people continued to be used in wool manufactures to disentangle and card a large quantity of wool. But these simple implements were used up to the middle of the 18th century and beyond. In 1775 scribbling mills and carding engines were used for the first time. Driven either by waterwheels or

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a The title was taken from note 92 on p. 92 of Vol. I of Poppe's book.—Ed.
b Here Marx adds in brackets three German synonyms denoting the operations listed.—Ed.
c Marx gives the two English terms in brackets after their German equivalents.—Ed.
Relative Surplus Value

by steam. Richard Arkwright was the man who smoothed the way for this invention. *50,000 wool carders* demonstrated against him at the Houses of Parliament. The machine did the job better, on a larger scale, and more cheaply. These machines consist of a number of cylinders to which toothed cards are attached; 2 pairs of cylinders with interlocking cards always work together...” [pp. 265-69].

“Now to draw out the carded wool into a single thread, to turn it into yarn by spinning. The ancients used the spindle for this purpose. The *spinning wheel* was a more recent invention. The first spinning wheels were *hand-wheels*, big wheels set in motion by the right hand of the person spinning, while the left hand drew out the thread. Only in 1530 was the small *treadle* invented, by Jürgens of Dorf bei Braunschweig. A *double spinning wheel*, or spinning wheel with 2 spools, was also invented in Germany. The aim of this was for two threads to be spun at the same time. The attempt had previously been made to see whether one person might not be able to spin on 2 spinning wheels at the same time, with long practice. This was indeed possible, but operating the treadle was too onerous. In the middle of the 18th century there also appeared spinning wheels which simultaneously reeled, doubled and twisted the spun [XIX-1173] yarn” [pp. 265-72].

“Spinning machines or spinning mills. A machine set in motion by the human hand, using a crank, or by a waterwheel or steam engine, which spins 60, 100 or more very fine and uniform threads at the same time, and can even be set in motion together with the *scribbling and carding machines*, using the same source of power.

“Spinning machines were already known in the first quarter of the 18th century (then only used for sheepwool). Probably in Italy first of all. *Arkwright* was the first to use them for cotton, in 1775. Difficulties were experienced in introducing this machine in England from the beginning of the 18th century, and similarly in France, even after Arkwright’s invention; they were first overcome by the *cotton manufacturers* and then by the *woollen manufacturers*... [pp. 273-76].

“The *reel* was invented for *parting the yarn into skeins, hanks or bundles*. The common *hand reel* first. Then the *more developed* variety of the clasp or *number reel*. Still more developed kinds of reel were connected up with spinning wheels in the 18th century. They even invented reels which indicated the number of skeins and threads with a pointer on a dial...

“After the invention of shearing and pressing, the teasing and dressing of the woollen cloths (stuffs) became so complicated that it could only be performed by skilled *cloth dressers* and *cloth shearers*, who already belonged to the most highly reputed craftsmen at the time of the revival of learning. *Gigging* and *shearing machines* were introduced into the English cloth factories in the 18th century, making it *unnecessary* for *carding and shearing* to be done by human hands. In 1758 *Everett* introduced the first water-driven shearing mill. 100,000 people who had been thrown out of work set fire to this machine.

“*Rolling or cylinder machines* were introduced in England, particularly in the second half of the 18th century, to replace the customary *mangling or rolling* of the cloth” [pp. 289-90, 292].

“*Fulling*, in order to clean, thicken, and strengthen the cloth, already practised among the Romans as *fullonum*, treading the cloth with the feet. After the invention of *fulling mills* the cleaning of the cloth was separated from the rest of the preparation, namely gigging and dressing. Fulling mills were already in existence at the end of the 10th century. They are *stamping or hammering works*. Both stamp” [pp. 286-87].
2) **Cotton materials.**

"The Dutch were first to master the weaving of calico when they drove the Portuguese out of most of their Indian possessions. The first calico manufactures in Holland at the end of the 17th century. Actually just calico printing works, printing on white calico bought up cheaply from India. After some time calico weaving as well in Holland, then Switzerland, Hamburg, Bremen, Augsburg, Austria, Saxony, Lusatia, etc. Printing presses, printing machines for calico" [pp. 313-14, 316].

//As soon as large-scale manufacture is somewhat developed, it employs separate machines for different simple processes such as milling, crushing, stamping, fulling, pressing, etc.; but the motive power has to overcome all the inadequacies of the mechanism.//

"Easier to clean cotton than wool.

"But the operation of disentangling the cotton threads is more difficult. The Indians and the Greeks planked or disentangled the threads with the planking bow, as hatters plank their hairs. Simple combing, teasing or carding was first set aside on a large scale in the middle of the 18th century, when Arkwright invented his carding machine. Spindles for spinning in the ancient world and India. In 1775 Arkwright took out the patent for his spinning machine.

"... The scutching machine had completely cleaned the willeyed cotton, and now it was the turn [XIX-1175] of the roving mills, which took up the cotton and pushed it out at the other end in the form of thick, sausage-shaped threads (roving). The spinning of the cotton into yarn is now performed by the mule, consisting of many bobbins, which picks up the roving itself, and draws out and twists them. Watertwist, the less twisted muletwist, and the mule itself, as Arkwright invented it. Soon a special machine was constructed for the weft, leaving the mule mostly for the spinning of warp. The new machine was called a jenny. Finally, the mule and the jenny were combined together to form a third machine, which spun nothing but muletwist, and muletwist was now much used for spinning the weft. The whole of the machinery, from the carding machine to the mule, was driven by a steam engine" [pp. 336-37, 340-42].

3) **Silk.**

"Several 100 different kinds of silk were woven in France before the French Revolution, of which 150 had been invented since 1730 alone. In Avignon there was a law that every apprentice might only devote himself to one single type of manufacture, and not learn to produce more than one type of material; this was of great assistance in promoting perfect mastery of the trade" [pp. 413-14].

4) **Knitting.**

"The stocking frame or stocking loom was invented in England; with it, one worker can knit 100 stitches almost in one moment without needing great exertion or skill. The most complicated machine in existence. It is entirely made of iron, and consists of more than 2,500 parts. Many hundred needles are in motion at the same time. Invented, at the end of the 16th century (1589), by William Lee, a graduate of St. John's College" [pp. 463-64].

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a Marx condenses in quoting.— *Ed.*

b Marx skips page number 1174.— *Ed.*

c Marx gives the English term in brackets after its German equivalent.— *Ed.*
In dealing with cotton spinning, Ure refers to:

Willow and scutching machine for opening and cleaning [the cotton]. Two kinds of scutching machine are used: the second is called a spreading or lapping machine. Then the carding machine.

With fine spinning: first carding and fine carding. Drawing and doubling. Drawing rollers (drawing machine, drawing frame or drawer). Roving. Roving frame (a kind of initial spinning machine). Finally the spinning machine for fine yarn.  

First, SOURCES OF MECHANICAL POWER.

"A prime Mover ... the great operative, without whose powerful aid all the human hands employed would be able only to accomplish small and feeble results. The ponderous machinery of the factories were all a useless erection unless it could be put into full and continuous movement. Prime movers: steam engines, windmills, waterwheels, air engines, electromagnetic engines, etc. Combinations of mechanism adapted to communicate motion. Some of these generate the force which actuates them, as the steam engine, electromagnetic engine, etc. Others are only arrangements for collecting mechanical power, either from the natural movement of water, or of that of air. Engines belonging to the latter class are dependent upon a supply of force, by its very nature uncertain and often intermittent, and which, if deficient, cannot be increased by man. Whereas the steam engine and its allied machines are absolutely at man's disposal, can be forced up to any amount of activity, can be set in action at any required [XIX-1176] time, and can be arrested at a moment's notice" [The Industry of Nations, Part II, London, 1855, pp. 61-62].  

"The steam engine can be so adjusted, as perfectly to attend to itself, to feed its furnaces, to replenish its boilers, and, in addition, to govern its rate of movement" [ibid., p. 68].

"Caloric engine of Ericsson. 'This invention,' says Mr. Ericsson, 'consists in producing motive power by the application of caloric to atmospheric air or other permanent gases or fluids susceptible of considerable expansion by the increase of temperature; the mode of applying the caloric being such that, after having caused the expansion or dilatation which produces the motive power, the caloric is transferred to certain metallic substances, and again retransferred from these substances to the acting medium at certain intervals, or at each successive stroke of the motive engine; the principal supply of caloric being thereby rendered independent of combustion or consumption [of fuel]. 'The same given quantity of heat which sets it in motion is used over and over again to keep up that motion; and no additional supply is wanted beyond what is requisite to compensate for a small loss incurred by escape and radiation'" [pp. 97-98].

"Manufacturing machines, machines representative of man himself engaged in industrial labour" [p. 120].

"The object of all the beautiful machinery connected with the first part of the preparation of cotton, prior to its being converted into thread, is to render the fibres clean and free from extraneous substances—to equalise their quality—and to render them as nearly parallel as possible" [p. 122].

New and ORIGINAL POWERLOOM.

"The old *powerlooms (the best of them) could produce not more than $\frac{1}{3}$ the amount of cloth as compared with the workings of the new looms, although twice

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* The last sentence is from The Athenaeum. Journal of Literature, Science, and the Fine Arts, February 19, 1853.—Ed.
the amount of labour is required to produce the same quantity in a given time. An experienced operative*” (with the modern *loom) “will produce 26 pieces, 29 inches wide and 29 yards long, of printing cloth of eleven picks per quarter inch, from two such modern looms, in a factory working 60 hours per week. The weaving of each piece costs 5½d. The same person, if set to work at one of the old looms, could only produce 4 similar pieces, each of which would cost 2s. 9d. for weaving alone*” [p. 156].

Stocking loom.
The best sort, the latest of the modern ones (19th century), the

“Circular loom of Chevalier Clausen, *adapted for weaving all kinds of looped fabrics, produces the fabrics by means of a continuous circular motion. It may be worked either by steam or hand. The great point of difference between this and the common stocking or knitting frame is, that the rows of loops are formed spirally, and not parallel to each other; the loops are also formed simultaneously upon different parts of the circumference of the frame.* The *goods are not liable to ‘running’, arising* otherwise from a *defect or breaking of any one of the loops. The movement in the circular loom being continuous, and in one direction only, and not alternating forwards and backwards as in the ordinary loom, no time is lost in the back strokes, and in consequence a larger quantity of work can be performed in a given amount of time.* The loom was shown by Clausen in the *Great Exhibition of 1851.* It has 1,200 needles, placed on the circumference, and will with ease make 80 revolutions in the minute. The quantity of loops or stitches made will be equal therefore to 1,200×80, equal to 96,000 per minute, and these produced by the hand power of one workman alone” [pp. 164-65].


“The simple looms are only capable of producing an unfigured fabric, and have no power to form embroidered tissues... For this purpose a peculiar apparatus is necessary, and looms to which this is attached are called Jacquard looms... If while the weaving were going forward one or two of the threads of the warp were lifted or depressed while the others were undisturbed, the cloth then made would exhibit a different appearance in that part of it where these disturbed threads were, to the other parts. It would show a certain mark on its surface; and if this disturbance were occasional, these marks would be repeated at a certain distance from one another, and thus a sort of figure would be produced in the cloth. This is what the Jacquard apparatus accomplishes... Invention of Mr. Barlow,* exhibited on the Great Exhibition. In this loom, two** (instead of one as previously) * “perforated cylinders are used, and the cards are disposed on these in alternate order, so that while one cylinder is in action, the other is changing its card and preparing for work. By this arrangement, the loom can be worked with a velocity 40% greater than that of the ordinary construction. The steadiness of its action also greatly increased, and the strain upon the warp diminished”* [pp. 159-60, 162].

LACE MACHINE (BOBBINET). (Tulle.)

“There is no WARP OR WEFT in the STOCKING FRAME and the *circular loom. The fabric is composed entirely of loops,* and of one continuous thread.* With the

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a The first international trade and industrial fair.—Ed.
b Marx quotes from The Industry of Nations with minor alterations.—Ed.
c The Industry of Nations further has: “which received the Council Medal at the Great Exhibition”.—Ed.
d Marx adds the German term in brackets.—Ed.
*lace machine, the warp does not materially differ from that of the common loom; the chief peculiarity resides in the weft, and in the most curious and ingenious arrangement of the shuttle, called in this machine the bobbins.*" [pp. 166-67].

This is the machine which Ure describes as being as far superior to the most complicated chronometer in richness and variety of mechanical invention as the latter is to an ordinary turnspit.\(^b\)

*Sewing machine.*\(^c\)

A further addition to be made to the prime motors is the hydraulic press.

*"Water engines in principle not differing from the steam engine: that is to say a column of water has been made to act upon a piston within a cylinder of the same general description as those of the steam engine. Hydraulic press, capable of such a wonderful variety of application as to be fit for the compression of a few bales of pocket-handkerchiefs, or for elevations of stupendous structures"* [pp. 107-08].

**Example of the specialisation and differentiation of implements.**

*"It has been stated that not less than 300 varieties of hammers are made in Birmingham, each adapted to some particular trade"* [p. 388].

**Steel pen manufacture. First division of labour, then production by machinery.**

"The introduction of the steel pen about 30 years old, and on its first being submitted to public approval each pen was charged at 6d. At the present moment 124 may be purchased for the same sum, and of equal, if not superior, quality. In 1820 the first gross of steel pens was sold, at the rate of £7 4s. the gross. In 1830 they had fallen to 8s., and the price gradually fell, until it reached the sum of 6d., which is its present limit. One of the Birmingham factories produces at the rate of 960,000 per day, or 289,528,000 per annum. The total production of the Birmingham makers amounts to at least 1,000 millions per annum. In the manufacture, the steel assumes the most wonderful variety of texture. At first it is soft as lead, afterwards it becomes as brittle as glass, and finally it is tempered to a state of elasticity as nearly [XIX-1178] as possible approaching that of the quill pen.*" [pp. 391-92, 394].

The Birmingham steel pen manufacture in its original state, up until about 25 years ago, was the picture of a modern system of manufacture, based on the division of labour. For individual processes it employed in part machine-like tools, in part machines (just as had been done in the original manufacture, once it reached a certain height of development) and in part steam-driven mechanisms, but with interruptions and hand labour in between.

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\(^a\) Marx quotes from *The Industry of Nations* with minor alterations.—Ed.

\(^b\) A. Ure, *Technisches Wörterbuch...,* Vol. I, Prague, 1843, p. 296.—Ed.

\(^c\) See *The Industry of Nations*, pp. 174-76.—Ed.

\(^d\) Marx adds the German term in brackets.—Ed.
**"A strip of thin sheet-steel, a of the proper width and thickness, is first prepared, by careful rolling and annealing. In this state it is ready to be cut into pens by means of a press, in which are fitted the proper tools for cutting out the 'blank.'** (Blank* here means the “plate”.) **"The use of the press is to give a regulated amount of pressure to the tools fitted to it. These presses are worked by women, who are so dexterous that the average product of a good hand is 200 gross, or 28,000 per day of 10 hours. Two pens are cut out of the width of the steel, the broad part to form the tube; and the points are cut to such a nicety, that there is but little waste. The 'blanks' are now to be pierced, and here the little central hole and the side slits are cut by another press. These semi-pens are now placed in an annealing oven to make them softer, after which they are ‘marked’, by the aid of a die worked by the foot, which stamps the name of the maker on the back. The half-finished little instrument is then placed in a groove and by a machine converted from a flat into a cylindrical form. This is called 'raising' the metal. The pens are again placed in the 'muffle', packed in small iron boxes with lids, and heated to white heat. They are then withdrawn, and suddenly thrown into a large vessel of oil, where they acquire a brittleness that makes them almost crumble at the touch. The next process is 'cleaning', then follows 'tempering', which restores the pens to the required elasticity, and is accomplished by placing them in a large tin cylinder, open at one end, and turned over a fire in the same manner that coffee is roasted. The heat changes the colour of the pens—first grey, then straw colour, next to a brown or bronze, and lastly to a blue. Still there is a roughness to be removed from the surface, which requires the pens to be placed in tin cans, with a small quantity of sawdust. These cans are horizontally placed in a frame, and made to revolve by steam, the pens rubbing against each other, by which means they are cleaned. After the 'scouring' process (which consists in placing the hardened pens in an iron cylinder, which is filled with [filings] pounded [in a] crucible, or other abrasive substance, the whole revolves by power, and the friction produces a bright clean surface on the pen), they are taken to the 'grinding room', where each individual pen is ground at the back in two ways, at right angles to each other, or rather over each other, the quality of the pen very much depending upon this operation. By the aid of a pair of nippers, the girl takes up the pen, holds it for a moment or so on a revolving 'bob' and the grinding is over. Now follow the pen to the 'slitting-room', where it is placed in a press, where the process is instantly effected. The pens are next examined, and sorted according to their qualities; after which they are varnished with a solution of gum, when they are considered ready for sale"** [pp. 392-93].

This is more than a dozen operations, to which must be added the transfer from one process to the next.

"It was as this kind of manufacture that *Mr. Gillott of Birmingham established the first steel pen factory on a large scale, and the works now carried on in his name are the largest in the world for this purpose. Upwards of 1,000 persons are occupied at these works, the majority of whom are females. About 180 million pens* were made in the year between May 1850 and May 1851, and the weight of the *sheet-steel consumed in their manufacture [amounted] to not less than 268,800 lbs or 120 tons" (ton=2,240 lbs) [p. 392].

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a Marx adds the German term(s) in brackets.— Ed.
"For some time the introduction of machinery in the steel pen manufacture appeared attended with insuperable difficulties, for there seemed no possibility of completing a steel pen by anything like a continuous process. This difficulty has, however, been surmounted, and in the Great Exhibition" (1851) "there was shown a machine now in great use, which effects this object. This machine is the invention of Messrs. Hinks, Wells, et Co., of Birmingham. It is entirely self-acting. It receives the steel as a flat ribbon, and cuts, pierces, and side-slits two pens at one stroke, performing six processes at once" * [pp. 393-94].

**Automatic workshop.**

**Paper factory.** (Modern.) Earlier this was a separate manufacture, very highly developed, especially by the Dutch, during the 17th century and at the beginning of the 18th. In this connection mills were employed in part for particular processes: first querns, then water or windmills.  

Precisely this manufacture was very **disconnected** in its manufacturing form, owing to the alternation of chemical and mechanical processes within it.

**Preparatory processes.** "Reduction of the rags, and then removing from them all foreign matters, colouring matters included.  

1) The first machine tears the rags into fine shreds, and at the same time removes the impurities. It consists of a large reservoir, partly filled with water, which is admitted by a tap, and kept running during the process. Across the vat a shaft runs, which carries upon it a wooden cylinder armed with teeth of steel, and at the bottom of the vat is a hollowed piece of wood also armed with teeth, and these parts of the engine are so adjusted that when the rags pass between them they are caught and torn into shreds. The cylinder armed with teeth is driven at a rapid rate by a band from the main shaft impelled by the steam engine. The operation of the engine is continued until the rags are reduced to a fine state of division, and are now called pulp. During the whole time water is continually flowing through the reservoir, but in diminishing quantities, and the impurities are drained away through wire-covered openings, the pure pulp and water alone remaining at last. The pulp is now very dirty" [The Industry of Nations, Part II, pp. 183-84].

2) Second process. "Removal of the colouring matter and rendering the pulp white. If only pure white linen rags are employed from the beginning, this bleaching is not only unnecessary but even injurious. When variously coloured rags are used or old writing paper, and such like materials, then the bleaching process is indispensable. By a large pipe communicating with the pulp engine, the semi-fluid mass is allowed to flow away into a reservoir, where it undergoes the bleaching process. The pulp is placed in cisterns, and mixed with a solution of chloride of lime. The colour is thus soon removed, and the pulp becomes bleached white" [pp. 184-85].

3) Third process. "The pulp is now pressed in the hydraulic press so as to reduce its bulk" * [p. 185].

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\[ b \] Marx adds the German term(s) in brackets.—*Ed.

\[ c \] Marx uses the corresponding German term, and adds the English term and a German synonym in brackets.—*Ed.
4) Fourth process. "It is then again washed, so as to remove the chloride of lime" [ibid.].

The preparatory processes are often considerably multiplied when the transition is made from manufacture or handicrafts to machinery—for the sake of the machine itself, because the material which is actually to be worked on, such as cotton, paper pulp, etc., needs to be much more even in quality, more uniformly arranged, for it to be subjected to a purely mechanical process. This is then always a repetition of the same process at different levels.

5) Fifth process. "More minute division is required. This is effected by another pulp machine, called the beater. This machine only differs from the first in the teeth being set closer together, and in the cylinder being made to revolve at a much higher velocity. The operation lasts some hours, and so much latent heat is extricated that the pulp becomes very sensibly warm, and is reduced to the last state of fineness. When this condition is attained, the pulp is now fitted for the production of paper, and is let off to the vat, from which it is supplied to the papermaking machine.*" [ibid.].

[XIX-1180] Then comes the actual paper machine, also preceded by a couple of other processes, the pulp-meter and from the meter to the strainer [pp. 186-87].

The bleaching forms, it seems, a process in itself, and the same is true of the application of the hydraulic press. The actual paper machine, on the other hand, is completely automatic.

Automatic workshop.

*"There are two great elements of success completely embodied in this wonderful automaton. In all manufacturing arts, one of the most important considerations is continuity of production. That manufacturing machine is the most perfect, and the most economical, which is capable of uninterrupted productiveness. Wherever the material to be manufactured can pass without interruption (and consequently without delay) from the first to the last stages of its treatment by machinery, there will be in all probability a better article produced, and at a less cost, than where at every stage it has to be carried from one place to another. No machine yet invented exhibits this more strikingly than that described. It is a complete system, for the raw material enters at one extremity, and the finished product emerges from the opposite end.

"In a second point also this machine exhibits its admirable construction, which is in its being entirely automatic. It receives no help from man, but accomplishes its allotted task by the combination and appropriate operation of the parts of which it is made. If assistance is necessary in any respect, it is in order to remove accidental difficulties, and not for the purpose of aiding in the manufacture. The action of the machine is also very rapid, the progress of the pulp from the first strainer to the finished roll of paper not generally occupying more than a few minutes"* [pp. 190-91].*

*) All these English quotations, in which no author is mentioned, come from: The Industry of Nations, Part II: A Survey of the Existing State of Arts, Machines, and Manufactures, London, 1855.
Relative Surplus Value

Hence continuity of production (i.e. there is no interruption in the phases the production of the raw material passes through). Automatic (man only [required] to remove accidental difficulties). Rapidity of action. The simultaneity of the operations is also increased by the machinery, as when the "blank" in the manufacture of steel pens is cut, pierced and side slitted by one stroke [p. 394].

(As an example of how one factory makes others necessary:

* "In connexion with the steel pen manufacture, a considerable trade in pencil-cases, pen-holders, and little articles necessary to the use of the steel pen, has sprung up" [p. 395].)

These are the final processes of paper manufacture:

"When the pulp is now fitted (by the second pulp engine) for the production of paper, it is let off to the vat, from which it is supplied to the paper making machine" [p. 185].

First process. * "The pulp is discharged first into two large reservoirs furnished with revolving arms or agitators, which stir up the mass and prevent its settling at the bottom" * [p. 186].

Second process. * "From these vats the pulp is conducted into an apparatus called a pulp-meter. This is an ingenious machine for insuring uniformity in the supply of the pulp to the rest of the machine. It consists of an arrangement of revolving buckets in a circular box, this box is filled with pulp, and as the buckets dip into it, they take up a certain quantity, which they then discharge in succession into a trough communicating with the first part of the machinery. In all processes where a continuous sheet is formed, as in cotton carding, and wool carding, etc., it is found greatly to secure the uniformity of the sheet, if the machine be supplied with measured quantities of the material, and for this purpose it is generally weighed out, and then supplied to the machine. The application of this principle to the paper engine [is new]" * [pp. 186-87].

[XIX-1181] Third process. * "The pulp is then conducted from the meter to the strainer. As it passes along the trough, a little channel of water from another machine, identical in its action with the pulp-meter, is added to it. This water serves to dilute the pulp to a proper consistency for future operations. The diluted pulp then flows in a single channel to" * [p. 187].

Fourth process. * "the sand-strainer. This is a trough in which a series of furrowed ridges of metal are arranged, over which the pulp flows in its onward progress. In thus flowing onwards (furrowed ridges) it deposits its heavier impurities, which settle at the bottom of the trough, and the pure pulp, which is of lighter specific gravity, flows forward" * [ibid.].

Fifth process. * "When the pulp has reached the end of the sand-strainer, it flows down into a strainer called a knot-strainer. It is very differently constructed to the preceding. It consists of a trough containing a number of brass bars, placed close together longitudinally, and most accurately planed and smoothed. These bars are in a movable frame, which is agitated at each side by a lever, and the bars are so closely set together as to permit nothing but the fibre of the paper to pass between them. Any knots which may have been in the pulp are removed and left on the upper surface of the bars, while the pulp filters down in a box placed for its

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a Marx adds the German term(s) in brackets.—Ed.
reception. As these knots accumulate they are taken away by an attendant” [ibid.].

Sixth process. *“The pulp is then again strained or filtered, and this time by ascension. Passing from the preceding strainer down into a metal box, it is carried forward to a third trough, in which bars similar to the last named, but inverted in their position, are placed. The pulp now filters upwards through these bars, and being now devoid both of all impurities and of all inequalities of texture, it is fit for the beautiful process to which it is about to be submitted” [pp. 187-88].

Seventh process. *“Proceeding from the last strainer it flows over a leather lip into a little trough containing a two-bladed agitator, called a hog. This agitator effectually stirs up the pulp, and keeps it from settling down at the bottom. It is then conducted on to” [p. 188]

Eighth process. *“an endless apron, made of perforated brass-wire.” Here the pulp first begins to part with its water, which streams down through the wire into a wooden reservoir placed underneath. But this water contains a small portion of the finer fibres of the pulp, and the material is too valuable to be wasted. It is therefore made to run out of this reservoir into a trough, which carries it back to the engine employed to dilute the pulp coming from the pulp-meter with water. Thus the waste water from the pulp is used over and over again, and it would appear scarcely possible that any of the material should be wasted. The wire apron being continually moved forward, receives a continuous supply of pulp, and carries it onwards. In passing on with the apron, the lateral edges of the pulp are confined, and made parallel by a band lying on the apron on each side, called a deckle band. These bands move with the apron, and the pulp finally leaves them, its edges being now tolerably firm and well defined. As the pulp passes along the wire web, the latter is shaken so as to facilitate the escape of the water. In proportion as it increases its distance from the strainers, the pulp becomes more and more firm by the constant loss of its watery parts, but it is even at the end of the wire cloth very soft and friable” [ibid.].

[XIX-1182] Ninth process. *“The marks called watermarks are now to be produced in the paper, if it should be intended to receive any. These marks consist, in fact, of a displacement of a portion of the pulp where they appear thinnest, by the pressure upon it while yet soft of a wire roller, upon which different devices are wrought. These devices are then reproduced in the substance of the paper, just as sealing wax receives the impress of a seal. And no matter what may be their variety, the soft pulp receives and retains it faithfully. This is effected in a very simple way. Just before the paper leaves the wire cloth, it passes under a roller made of brass wire, upon the surface of which the device is produced, by wires wrought into it, and the impress of this roller communicates itself to the paper” [p. 189].

Tenth process. *“Just prior to the pulp leaving the wire web, a very ingenious arrangement is made in the machine, with a view more perfectly to extract the water. It consists of a metal box placed under the travelling web, and communicating with three powerful air pumps. These pumps are set in motion by the steam engine, and produce a powerful exhaust or vacuum in the box. The effect of this on the superincumbent layer of pulp is to suck in the water, and to cause the fibres very completely to interlace one with another. The firmness of the texture of the paper is thus very materially promoted” [ibid.].

Eleventh process. *“The paper now passes between two rollers upon a web of felt, a

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a Marx adds the German term in brackets.—Ed.
leaving the web upon which it was produced, which returns for a continual fresh supply. These rollers are covered with felt, and squeeze out a considerable quantity of water, and the paper now becomes pretty firm.* But the water has still not been removed entirely, and the paper is still not quite dry and firm" [pp. 189-90].

Twelfth process. * "The damp but tolerably smooth sheet is received by a large cylinder revolving on its axis, but charged with high-pressure steam. The heat thus communicated dissipates the moisture as steam, and the paper becomes rapidly very nearly dry. In order, however, to complete it, it passes over several other cylinders similarly heated, and finally emerges from the last of the series a beautifully white, smooth, and continuous sheet" * [p. 190].

Parallel or subsequent processes.

Glazing the paper. * "When the paper is required to be glazed, it is effected by passing it between polished and heated cylinders, in passing through which it is subjected to the most severe pressure" * [p. 191].

Sizing and blueing the paper. * "It will be obvious that by mixing any substances such as gelatine, starch, or colouring matter, with the pulp, the quality and colour of the resulting paper is affected accordingly. The finer kinds of paper are generally impregnated with gelatine or size after the paper is made.* This is done outside the vat, because otherwise the felt used in the machine is injured. On the other hand, * sizing in the vat [offers] many advantages, when substitutes for gelatine can be used. Of these several kinds are employed. A mixture of alum and rosin, previously dissolved in soda, and combined with potato-starch, is now largely used for sizing in the vat by the continental makers. Paper thus made is less greasy to write upon, but does not bear the ink so well as those which are sized with gelatine. For writing papers in England the application of gelatine by an after process is still preferred, and is accomplished by means of rollers dipping in a trough of the size. At Mr. Joynson's mills, in Kent, fine writing paper is now made, sized with gelatine, dried, and cut into sheets at the rate of 60 feet a minute in length, and 70 inches in width. At another of the great paper mills 1,400 tons of paper are produced yearly. In Great Britain alone 130 million lbs [of] paper [are] manufactured annually" * [pp. 191-92].

[XIX-1183] Envelope Manufacture. (Branch of the paper-folding machine.) This was originally a manufacture.

"The folding, gumming, and embossing" (to emboss = to pick out in relief, relever en bosse) (These are the protruding figures, devices printed upon the upper end of the paper flap which closes the envelope.) "[are carried on] *by the ordinary modes of production; and at each of these operations every single envelope must be separately handled. Great economy gained by the machinery. The isolation of the different stages of manufacture consequent upon the employment of manual labour adds immensely to the cost of production, the loss mainly arising from the mere removals from one process to another. In embossing by hand a boy will perhaps get through 8,000 or 9,000 per day, and then there must be an assistant to turn down the flap, on which the device has been placed, and arrange the envelopes in separate parcels*" [p. 200].

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a Marx quotes from The Industry of Nations with minor alterations.— Ed.

b Marx adds the German term(s) in brackets.— Ed.
The "FOLDING" in hand manufacture of this kind was done

*"by means of a bone 'folding stick', an experienced workwoman folding about 3,000 per day."* [Now a machine] makes *about 2,700 per hour"* [p. 198].

The transition from handicrafts (as in all kinds of weaving, even when done with refined versions of the handloom) and manufacture, where the division of labour predominates, to large-scale industry is continuous, in that a mass of new branches of labour, such as Needle, Pen, Envelope making, etc., are first carried on for a short time in the handicraft fashion, then as manufactures, and soon after that by machine. This naturally does not exclude that other branches are directly introduced as machine-based—those in which big supplies are to be delivered from the outset (as with transport) or where the nature of the product requires a big supply (as with telegraphy, etc.).

The casting of type (letters for printing) can be seen as an example of a manufacture resting on the division of labour. Five main operations.

1) **Casting the type.** *"Each workman can create from 400 to 500 types an hour"* [p. 203].
2) **Breaking off the type** "(the LEAD and ANTIMONY in the METAL poison the LITTLE BOYS who have to do this), *breaking off to a uniform length. At this operation a quick boy can break off from 2,000 to 3,000 types an hour, although, be it observed, by handling new type a workman has been known to lose his thumb and forefinger from the effect of the metallic poisons" [ibid].
3) "The types are rubbed on a flat stone, which takes off all roughness or 'bur' from their sides, as well as adjusts their 'beards' and their 'shanks'." A good rubber can finish about 2,000 in an hour" [p. 204].
4) "The types, by men or boys, fixed into a sort of composing stick about a yard long, where they are made to lie in a row with their 'nicks' all uppermost: 3,000 or 4,000 per hour can be thus arranged" [ibid.].
5) "The bottom extremities of these types, which had been left rough by the second process, are, by the stroke of a plane, made smooth, and the letter ends being then turned uppermost, the whole line is carefully examined by a microscope; the faulty types are extracted; and the rest are then extricated from the stick, and left in a heap"* [ibid.].

Thus if 1 FOUNDER casts 500 TYPES in 1 hour, and a boy breaks off 3,000 in 1 hour, 6 FOUNDERS to ONE BOY are needed. And since 1 RUBBER TUBS 2,000 IN AN HOUR, there are 4 FOUNDERS to 1 RUBBER, and if one ARRANGER sets 4,000 PER HOUR, there are 8 FOUNDERS to 1 ARRANGER.

With division of labour into MULTIPLES the following should be noted: Assume that there are 3 different operations, related in such proportions that 2 men must be employed in the first operation, and 1 man in the 2nd, to work on what the first

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a Marx adds the German term in brackets.—*Ed.*
operation has provided, whereas [XIX-1184] the 3rd operation requires 4 to work on the product of the 1st and 2nd operations. So the following numbers must be employed: operation I, 2; operation II, 1; operation III, 4—a total of 7. These multiples proceed from the principle of the division of labour, so that despite the different periods of time required by the various operations, all the workers are still employed in those operations simultaneously, exclusively, and for equally long periods of time. The less time a given operation costs for a particular quantity of the phase of the product provided by it, or of the particular function involved (e.g. stoking, repair of the machines, etc.), the greater must the number of other workers be to enable one individual to be employed in performing exclusively this function.

If, however, I employ many founders, and therefore a proportionately large number of breakers, rubbers, and arrangers, the principle of multiples being given, this is the principle of simple cooperation. Unless the work is done on a certain scale, the division cannot be carried out at all.

Many attempts have been made, with varying degrees of success, to cast the types using a system of machinery. This will succeed eventually. Once a certain kind of production attains the form of manufacture, the constant endeavour is to transform it into factory production with machines.

A [result of production] by machinery, especially where already existing machinery is improved or driven out by new machinery, is the *economisation of space, hence reduction of the cost of production. Powerloom.*

*The original form of the powerloom very clumsy,* very similar to the old [hand]loom. The new one very altered. a "The modern powerloom (for weaving ordinary yarn) *was only about half the size of the cumbersome original machine, and was made chiefly of iron, while the former was principally constructed of wood.* This *powerloom [is] a more complicated piece of mechanism than it appears to be. And this need not surprise us, when it is remembered that it fulfils all the duties of the weaver. It throws the shuttle, operates upon the healds, the batten and the beams, just as if an intelligence was communicated to it. It raises and depresses the alternate threads of the warp, it throws the shuttle, it drives up each thread of weft with the batten, it unwinds the warp off the warp-beam, and it winds up the woven material upon the cloth roller. But still more remarkably, this loom will not go without weft. On the old plan it was indifferent to the loom, so to speak, whether it had weft or not. Its operations were continuous, and the empty shuttle flew as before, but of course without making any cloth until the attendant stopped it and mended the thread, or placed a fresh bobbin in. But the loom of Messrs. Kenworthy and Bullough immediately stops under such circumstances. The moment the slender thread breaks, or is absent from its accustomed place, the noisy machinery

a Cf. the illustrations in *The Industry of Nations*, Part II, pp. 154-55.— Ed.
is instantly arrested, the shuttle ceases to fly and the wheels to move. The attendant then replaces the thread, and all goes on as before. By this ingenious contrivance the quality of the cloth is greatly improved, and much of the care and watchfulness of the weaver is rendered unnecessary, for the arrest of the machinery immediately informs him of the accident. This apparatus* is called *the self-acting stop*" [pp. 154-57].

"The *warp, before it is brought to the powerloom, has to be prepared by the unwinding of the threads off bobbins, and arranging them parallel to each other. In order to strengthen them, the threads of the warp have also to be sized and dressed with paste; both these operations [XIX-1185] are done by machinery, with a little assistance from the attendants" [p. 158].

"The shuttleless powerloom for weaving ribbons* and fringes* Exhibited* 1851 i.a.

*The ordinary loom for weaving ribbons and other narrow fabrics requires, for the perfect play of the shuttle, a space three or 4 times greater than is occupied by the web. In all looms hitherto constructed, the shuttle has been an indispensable necessity. To overcome this, and to economise space, invention of Messrs. Reed of Derby*" [pp. 162-63].

The machine factory.

* "The construction of a machine to bring iron into shape must differ very materially from one intended to deal with the soft and delicate fibre of silk or cotton. A far greater exercise of force is necessary for the former class of engine. Without the steam-hammer, the lathe,* and the drill,* such machines as the printing press, the powerloom, and the carding-engine could not have been constructed"* [pp. 221-22].

The first machinery depended on hand labour, on manufacture, for its construction. Once the machine had been invented, and, of special importance here, once a form of power completely at man's disposal and applicable in any amount, such as steam, had been discovered to set the machine in motion, the production of machinery by machinery became possible. On the other hand, a large number of working machines invented later on, such as those just mentioned, and also philosophical instruments,213 require the existence of machines for their production. The first steam engines were built in the mode of manufacture and handicrafts. Similarly the first machines which were driven by the steam engine, such as spinning and weaving machines, mills, etc. The improvement of quality by machinery—its impact on use value—does not concern us here as such. But its impact has a double importance for the production process: 1) Where a raw material or semi-manufacture is brought under the sway of machinery, the ease with which the process advances to its next phase depends in part upon, is conditioned by, the degree of perfection of the material it has to work with. Its homogeneity, etc., is a condition for its further treatment by machinery. 2) Still more important is the

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* Marx adds the German term in brackets.—Ed.

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uniformity, the mathematical exactness of form, etc., required when the elements of machines and philosophical instruments are to be produced. The degree of success here depends absolutely on this quality, and the extent to which the unreliability of handwork is removed from these things, so they are subjected to the regularity of the working machine, which has been precisely calculated in advance.

Working machine as distinct from the other parts of the machinery, hence from the prime motor and the directing, or transmission, mechanism.

*"In all machines there are certain parts which actually do the work for which the machine is constructed, the mechanism serving only to produce the proper relative motion of those parts to the material upon which they operate. These working parts are the tools with which the machine works"* [p. 222].

Here we have the correct view. The tools with which the human being worked reappear in the machinery, but now they are the tools with which the machine works. Its mechanism brings about the movements of the tools (previously performed by the human being) required to treat the material in the manner desired or to accomplish the purpose desired. [XIX-1186] It is no longer the human being, but a mechanism made by human beings, which handles the tools. And the human being supervises the action, corrects accidental errors, etc.

Firstly, what appears from the outset in a machine is that it is a reunion of these tools, which are set in working motion at once by the same mechanism, whereas a human being could only set in motion one such tool at once, or given unusual virtuosity at most 2, since he has only 2 hands and 2 feet. A machine works simultaneously with a large number of tools. Thus many 100 spindles on a bobbin-frame, many 100 combs on a carding engine, over 1,000 needles on a stocking-frame, many sawblades on a sawing machine, hundreds of knives on a chopping machine, are set in motion at the same time, etc. Similarly (2) the number of shuttles on the mechanical loom. This is the first reunion of instruments in the machine. It must, apart from this, be from the outset a reunion of this working machinery with the mechanism which sets it in motion and with the prime motor, which moves the mechanism. Second reunion: arises from the fact that the different machines through which the raw material has to pass in the succession of processes are connected with each other, and are driven by the same motive power. There is thus continuity of the production process and system, i.e. a combination of the processes carried out by different machines in the different phases. Third reunion. A number of
**Division of Labour and Mechanical Workshop**

**WORKING MACHINES** of this kind are driven by the same motive power, with the corresponding **PREPARATORY MACHINES** for the earlier phases, united in a workshop. The principle of simple cooperation is applied to the machines and the workers employed on them. This is one of the most important aspects of developed machine production. **Firstly because of** the saving on the **PRIME MOTOR** and the economical distribution of the **MOVING POWER**. **Secondly** the smaller the scale of production, the more costly the **PREPARATORY PROCESSES**, partly because of the cost of the machinery itself; partly because the number of workers required for the work falls in proportion to the increase in the size of the operation, and the **INTERMEDIARY WORK**, e.g. the transfer of the product from one process to another, is reduced, where it is done by workers, in inverse proportion to the scale on which the work is done. **Thirdly**. Just as in simple cooperation, the costs of the collectively used conditions of labour such as buildings, fuel, heating, **OVERLOOKERS**, etc., fall in proportion as the scale of production rises. There is, further, in addition the principle which arises out of the division of labour that [the tasks of the] **MANAGER**, the mechanic, the **ENGINEER**, the stoker, etc., can in part be handed over to workers who are exclusively concerned with them, in part are just as necessary on a large scale as they are on a small scale. Finally (leaving aside the utilisation of waste products) the simultaneous exploitation of many workers is only possible in this way, and the amount of surplus value realised by the individual capital depends on this, if its rate is given.

**Secondly**. Or instead of the reunion of many **TOOLS** in a machine, many **TOOLS** appear to be combined together from the point of view of their power, their dimensions and their sphere of action, in the way that many hammers appear to be combined in a **STEAM-HAMMER**. Here, where the **TOOL** of machinery is distinguished from the **TOOL** of the worker by its dimensions, a mechanical driving force is required from the outset. This kind of machinery can therefore never exist in the handicraft manner, i.e. in such a way that it can be driven by a single worker or his family, or a pair of journeymen with a master craftsman.

With the above, there is now an answer to the question of what distinguishes a machine from a tool. Once the tool is itself driven by a mechanism, once the tool of the worker, his implement, of which the efficiency depends on his own skill, and which needs his labour as an intermediary in the **WORKING PROCESS**, is converted into the tool of a mechanism, the machine has replaced the tool. In this case the mechanism must already have attained a degree of development which makes it capable of receiving its motive power.
from a mechanically driven prime motor, instead of receiving it as before from a human being or an animal, in short from prime motors which possess voluntary movement.

[XIX-1187] As long as the latter is still the case, the machine only appears as a machine-like handicraft tool. In proportion as its dimensions grow and it develops into a system of production, mechanical must replace human motive power.

In its first form, however, the machine (which at the same time throws out of work a mass of workers employed in handicrafts and manufacture, since it allows one person to perform what would otherwise be performed by 10 or 20) annihilates the system of manufacture and simple cooperation based on the division of labour, and appears to replace it once again with a system of handicrafts.

Simple cooperation is doubly annihilated, in that one weaver now does what was done by many weavers assembled in a manufactory; and on a larger scale e.g. with mowing and threshing machines, building machines for raising heavy weights, machines for breaking stones, etc. But secondly, in that everywhere that power needed to be produced by simple cooperation, the mechanical motive power replaces this.

But this does not rule out 1) that machine factories may be built straight away as such, without passing through the previous stages; 2) that in work where the exercise of force predominates from the outset the motive power must also be mechanical from the outset, i.e. with no relation to human or animal muscle power.

If the machine proceeds from simple handicrafts, e.g. if machine weaving replaces hand weaving, a machine must perform simultaneously the various operations performed previously by the handicraftsman. This does not appear as a system of processes accomplished by the reunion of different machines. At most, that is, in weaving, the preparation of the warp as a preparatory process. This is now also mechanical. On the other hand, in spinning, e.g., preparatory processes which are simple in hand spinning are separated into a series of processes.

Or the machine proceeds from a system of manufacture based on the division of labour, and then either a complex single machine replaces the separate operations, as with the production of envelopes, steel pens, etc., or the previously separated operations are replaced by a series of processes carried out by a system of machinery, as with the spinning of wool, etc., and also, particularly as an example, papermaking.

The explanation that a machine is a complicated tool and a tool a
The explanation that you have a machine where the tool is not driven by human power, and a tool where man is the prime mover, would make a dog-cart or a plough drawn by oxen a machine, but a mechanical stocking loom or a bobbinet machine, etc., a tool. It contains no element from which the social change can be explained. It runs counter to the history of the development of machinery in general, and to the history which the first handicrafts and manufactures are still passing through daily in their transition to the machine-based factory. It depends altogether on the state of affairs in which the essential nature of machinery was not yet so far developed that the application of the prime mover was a matter of free choice, according to the level at which the machine is to operate.

The system of mechanical production can go further, and unite branches of production previously independent of each other, as e.g. in the factories where spinning and weaving are united, and form a continuous system.

In the year 1861 (see Parliamentary Return: Factories, 11 February 1862) there were altogether 2,715 factories in England and Wales (not including Scotland and Ireland), [XIX-1188] of which 671 were employed in spinning and weaving. There were in these factories 13,274,346 spindles, 235,268 powerlooms and 215,577 persons employed [Factories..., p. 3]. (Included among these persons are *all managers, clerks, overlookers, engineers, mechanics, and all other employed in the factory, except the owners or occupiers constituting the firm* [p. 1].)

If one reflects that the total number of spindles used at the same time in all the English cotton factories=28,352,125, the total number of powerlooms=368,125, and the total number of persons employed=407,598, one sees what an overwhelming position is occupied by spinning and weaving combined. Those 671 factories employed 143,947 steam horsepower, and 3,823 water horsepower. The number of powerloom weavers came to 99,504.

The number of boys under 13 years old was 11,289, the number of girls under 13 years old was 9,224, making children under 13 together=20,513. Women and girls over 13=115,117. Thus children (female and male under 13) and women=135,630. Hence the number of men employed (all the clerks employed in the offices, those employed in the warehouse, etc., engineers, mechanics)=79,947. The number of males between 13 and 18=19,699. If one deducts

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* Factories. Return to an Address of the Honourable the House of Commons, dated 24 April 1861. Ordered, by the House of Commons, to be Printed, 11 February 1862.—Ed.
this group, which still includes a large proportion of children, the number of males over 18 years old comes to 60,248, of which at least 4,000 are not employed in factory labour. There thus remain 56,248 employed males over 18 years old.

To the total number of English cotton factories, 2,715, with 28,352,125 spindles, 368,125 powerlooms (149,539 powerloom weavers), 263,136 steam [horse]power and 9,825 water [horse]power, there correspond 407,598 persons. Within this number there are 39,156 children under 13 years old. Number of females above 13 years: 216,512. Thus children under 13, girls over 13 and women together come to 255,668 people. Men between 13 and 18: 38,210. Together 293,878. There remain 113,720 men over 18, from which figure at least 15,000 must be deducted for those not employed in the factory itself. There remain about 98,000 [p. 3].

Factories occupied in spinning alone number 1,079. Number of spindles: 15,077,299. Power: 99,976 steam and 4,883 water. Number of persons employed: 115,192 [ibid.].


(The total number of 2,715 factories includes 243 factories which are not included in either of the above descriptions [pp. 2-3].)

We will now look at the woollen, etc., factories in England and Wales. (Same Return for 1861 [pp. 4-5].) [See Table 1 on p. 429.]

Total of woollen factories (including, in addition to the above, 129 factories employed in finishing and dressing, and 120 nondescript factories): 1,456, with 1,846,850 spindles, 20,344 powerlooms, 2,066 gigs, 25,233 steam, 6,675 water, and 76,309 persons employed.

If we analyse this number, 5,931 should be deducted, being children under 13 years old (3,333 males and 2,598 females). Moreover, 29,613 females over 13 (among whom there are in turn many children) [should also be deducted]. With the above, this makes 35,544. Males between 13 and 18, again including many children, account for a further 9,811. There remain 30,954 males above 18. Of whom at least 7,000 need to be deducted. There remain 23,954 males [p. 5]. [See Table 2 on p. 429.]

But it will now be better to make up a list for all kinds of production alongside each other, in order to display the relation of the combined factories to the others. From this one can see the concentration which takes place as a result of this combination. To ease comprehension it should be remarked that the excess of the total number of factories over the number indicated under specific [Continued on p. 434]
### Woolen Factories

<table>
<thead>
<tr>
<th>Number of Factories</th>
<th>Spindles</th>
<th>Power-Looms</th>
<th>Gigs</th>
<th>Steam</th>
<th>Water</th>
<th>Number of Children Under 13 Years</th>
<th>Number of Males Between 13 and 18</th>
<th>Total</th>
<th>Number of Females</th>
<th>Number of Males</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>440</td>
<td>1,086,352</td>
<td>19,277</td>
<td>807</td>
<td>14,313</td>
<td>2,759</td>
<td>1,913</td>
<td>1,815</td>
<td>4,799</td>
<td>21,354</td>
<td>16,969</td>
<td>46,850</td>
</tr>
<tr>
<td>729</td>
<td>760,498</td>
<td>258</td>
<td>7,690</td>
<td>3,307</td>
<td>1,184</td>
<td>705</td>
<td>3,014</td>
<td>5,465</td>
<td>8,531</td>
<td>18,899</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>1,067</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>36</td>
<td>37</td>
<td>98</td>
<td>829</td>
<td>409</td>
<td>1,409</td>
<td></td>
</tr>
</tbody>
</table>

### Worsted Factories

[XIX-1189] *Worsted Factories in England (1861)* [p. 6].

a) Factories employed in spinning and weaving

<table>
<thead>
<tr>
<th>Number of Factories</th>
<th>Spindles</th>
<th>Power-Looms</th>
<th>Number of Weavers</th>
<th>Amount of Moving Power</th>
<th>Children Under 13 Years</th>
<th>Males Between 13 and 18</th>
<th>Males Above 18</th>
<th>Total Males</th>
<th>Females</th>
<th>Total Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td>633,390</td>
<td>25,814</td>
<td>18,106</td>
<td>13,368</td>
<td>3,858</td>
<td>3,955</td>
<td>24,642</td>
<td>10,806</td>
<td>18,457</td>
<td>28,597</td>
<td>47,054</td>
</tr>
</tbody>
</table>
I) **Cotton**

<table>
<thead>
<tr>
<th>Numbers of factories</th>
<th>Number of spindles</th>
<th>Power-</th>
<th>Gigs</th>
<th>Power-</th>
<th>Children under 13</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>spindles</td>
<td>looms</td>
<td>steam</td>
<td>water</td>
<td>between 13 and 18</td>
<td>above 13</td>
</tr>
<tr>
<td>a) Spinning and weaving</td>
<td>671</td>
<td>13,274,346</td>
<td>235,268</td>
<td>99,504</td>
<td>143,947</td>
<td>9,224</td>
<td>19,699</td>
</tr>
<tr>
<td>b) Spinning only</td>
<td>1,079</td>
<td>15,077,299</td>
<td></td>
<td>99,976</td>
<td>4,883</td>
<td>8,661</td>
<td>6,212</td>
</tr>
<tr>
<td>c) Weaving only</td>
<td>722</td>
<td>131,554</td>
<td></td>
<td>49,182</td>
<td>15,240</td>
<td>406</td>
<td>1,623</td>
</tr>
<tr>
<td>d) Total</td>
<td>2,715</td>
<td>28,352,125</td>
<td>368,125</td>
<td>149,539</td>
<td>263,136</td>
<td>9,825</td>
<td>21,774</td>
</tr>
</tbody>
</table>

II) **Woolen**

<table>
<thead>
<tr>
<th>Numbers of factories</th>
<th>Number of spindles</th>
<th>Power-</th>
<th>Gigs</th>
<th>Power-</th>
<th>Children under 13</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>spindles</td>
<td>looms</td>
<td>steam</td>
<td>water</td>
<td>between 13 and 18</td>
<td>above 13</td>
</tr>
<tr>
<td>a) Spinning and weaving</td>
<td>440</td>
<td>1,086,352</td>
<td>19,277</td>
<td>807</td>
<td>15,009</td>
<td>14,313</td>
<td>2,759</td>
</tr>
<tr>
<td>b) Spinning only</td>
<td>729</td>
<td>760,498</td>
<td>258</td>
<td>7,690</td>
<td>3,307</td>
<td>1,184</td>
<td>705</td>
</tr>
<tr>
<td>c) Weaving only</td>
<td>34</td>
<td>1,067</td>
<td>26</td>
<td>826</td>
<td>268</td>
<td>26</td>
<td>36</td>
</tr>
<tr>
<td>d) Total</td>
<td>1,456</td>
<td>1,846,850</td>
<td>20,344</td>
<td>2,066</td>
<td>15,835</td>
<td>25,233</td>
<td>6,675</td>
</tr>
</tbody>
</table>

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*a Factories. Return to an Address of the Honourable the House of Commons, dated 24 April 1861, pp. 2-3; cf. this volume, pp. 425-26.—Ed.  

*b Cf. this volume, pp. 426, 429.—Ed.*
### III) WORSTED\(^a\)

<table>
<thead>
<tr>
<th></th>
<th>Spindles</th>
<th>Power-</th>
<th>Weavers</th>
<th>Moving</th>
<th>Power</th>
<th>Children</th>
<th>Males</th>
<th>Females</th>
<th>Under 13</th>
<th>Males</th>
<th>Females</th>
<th>Between 13 and 18</th>
<th>Males</th>
<th>Females</th>
<th>Above 13</th>
<th>Males</th>
<th>Females</th>
<th>Above 18</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Spinning and weaving</td>
<td>125</td>
<td>633,390</td>
<td>25,814</td>
<td>18,106</td>
<td>13,368</td>
<td>781</td>
<td>3,858</td>
<td>3,955</td>
<td>3,793</td>
<td>24,642</td>
<td>10,806</td>
<td>18,457</td>
<td>28,597</td>
<td>47,054</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>Spinning only</td>
<td>206</td>
<td>612,136</td>
<td></td>
<td>8,958</td>
<td>786</td>
<td>2,344</td>
<td>2,932</td>
<td>1,946</td>
<td>11,437</td>
<td>3,201</td>
<td>7,491</td>
<td>14,369</td>
<td>21,860</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>Weaving only</td>
<td>157</td>
<td>17,154</td>
<td>10,630</td>
<td>2,421</td>
<td>84</td>
<td>66</td>
<td>19</td>
<td>618</td>
<td>9,238</td>
<td>3,141</td>
<td>3,825</td>
<td>9,257</td>
<td>13,082</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>Total</td>
<td>512</td>
<td>1,245,526</td>
<td>42,968</td>
<td>28,736</td>
<td>25,426</td>
<td>1,667</td>
<td>6,268</td>
<td>6,906</td>
<td>6,424</td>
<td>45,674</td>
<td>17,700</td>
<td>30,392</td>
<td>52,580</td>
<td>82,972</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### [XIX-1190] IV) FLAX\(^b\)

<table>
<thead>
<tr>
<th>Factories</th>
<th>Number of spindles</th>
<th>Power-looms</th>
<th>Weavers</th>
<th>Moving</th>
<th>Power</th>
<th>Children</th>
<th>Males</th>
<th>Females</th>
<th>Under 13</th>
<th>Males</th>
<th>Females</th>
<th>Between 13 and 18</th>
<th>Males</th>
<th>Females</th>
<th>Above 13</th>
<th>Males</th>
<th>Females</th>
<th>Above 18</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Spinning and weaving</td>
<td>14</td>
<td>42,080</td>
<td>766</td>
<td>466</td>
<td>1,707</td>
<td>100</td>
<td>299</td>
<td>441</td>
<td>294</td>
<td>2,456</td>
<td>701</td>
<td>1,294</td>
<td>2,897</td>
<td>4,191</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>Spinning only</td>
<td>89</td>
<td>302,228</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>Weaving only</td>
<td>27</td>
<td>1,394</td>
<td>1,062</td>
<td>441</td>
<td>37</td>
<td>5</td>
<td>2</td>
<td>63</td>
<td>1,140</td>
<td>544</td>
<td>612</td>
<td>1,142</td>
<td>1,754</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>Total</td>
<td>136</td>
<td>344,308</td>
<td>2,160</td>
<td>1,528</td>
<td>8,505</td>
<td>976</td>
<td>886</td>
<td>1,108</td>
<td>1,383</td>
<td>13,277</td>
<td>3,651</td>
<td>5,920</td>
<td>14,385</td>
<td>20,305</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) Factories. Return to an Address..., p. 6; cf. this volume, p. 429.—Ed.

\(^b\) Ibid., p. 7.—Ed.
### V) Hemp Factories

<table>
<thead>
<tr>
<th>Category</th>
<th>Spinning</th>
<th>Weaving</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>250</td>
<td>33</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>264</strong></td>
<td><strong>139</strong></td>
</tr>
</tbody>
</table>

### VI) Jute Factories

<table>
<thead>
<tr>
<th>Category</th>
<th>Spinning</th>
<th>Weaving</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>620</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>620</strong></td>
<td><strong>62</strong></td>
</tr>
</tbody>
</table>

[XIX-1191] VII) Silk Factories in England

<table>
<thead>
<tr>
<th>Factories</th>
<th>Spindles</th>
<th>Power-Looms</th>
<th>Weavers</th>
<th>Moving Power</th>
<th>Children Under 11 Years</th>
<th>Children Between 11 and 13</th>
<th>Children Between 13 and 18</th>
<th>Males Over 13</th>
<th>Females Over 18</th>
<th>Males and Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Spinning and Weaving</td>
<td>49</td>
<td>254,426</td>
<td>2,965</td>
<td>2,201</td>
<td>903</td>
<td>109</td>
<td>71</td>
<td>193</td>
<td>589</td>
<td>444</td>
</tr>
<tr>
<td>b) Spinning</td>
<td>244</td>
<td>1,051,484</td>
<td>3,760</td>
<td>688</td>
<td>589</td>
<td>832</td>
<td>1,146</td>
<td>2,644</td>
<td>2,043</td>
<td>16,079</td>
</tr>
</tbody>
</table>

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*a* Factories. *Return to an Address...*, p. 8.—*Ed.*

*b* Ibid., pp. 9-10.—*Ed.*
<p>| | | | | | | | | | | |</p>
<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>422</td>
<td>7,670</td>
<td>5,007</td>
<td>996</td>
<td>28</td>
<td>20</td>
<td>38</td>
<td>584</td>
<td>7,425</td>
<td>3,690</td>
</tr>
<tr>
<td></td>
<td>761</td>
<td>1,305,910</td>
<td>10,635</td>
<td>7,208</td>
<td>5,916</td>
<td>834</td>
<td>702</td>
<td>1,130</td>
<td>1,418</td>
<td>3,543</td>
</tr>
</tbody>
</table>

**[XIX-1190] VIII) Jute Factories in Scotland**

<p>| | | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Spinning and Weaving</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12</td>
<td>16,680</td>
<td>497</td>
<td>445</td>
<td>981</td>
<td>40</td>
<td>24</td>
<td>54</td>
<td>345</td>
<td>2,248</td>
<td>957</td>
</tr>
<tr>
<td>b) Spinning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>13,858</td>
<td></td>
<td>736</td>
<td>20</td>
<td></td>
<td>267</td>
<td>1,236</td>
<td>227</td>
<td>494</td>
<td>1,236</td>
</tr>
<tr>
<td>c) Weaving</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>57</td>
<td>39</td>
<td>20</td>
<td></td>
<td>1</td>
<td>50</td>
<td>9</td>
<td>10</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>30,538</td>
<td>554</td>
<td>484</td>
<td>1,737</td>
<td>60</td>
<td>24</td>
<td>54</td>
<td>613</td>
<td>3,534</td>
</tr>
</tbody>
</table>

<p>| | | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>27</td>
<td>30,538</td>
<td>554</td>
<td>484</td>
<td>1,737</td>
<td>60</td>
<td>24</td>
<td>54</td>
<td>613</td>
<td>3,534</td>
</tr>
</tbody>
</table>

**IX) Flax Factories in Ireland**

<p>| | | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Spinning and Weaving</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>217,064</td>
<td>2,491</td>
<td>1,868</td>
<td>4,471</td>
<td>383</td>
<td>34</td>
<td>186</td>
<td>1,488</td>
<td>9,423</td>
<td>2,187</td>
</tr>
<tr>
<td>b) Spinning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>375,917</td>
<td>5,751</td>
<td>1,796</td>
<td></td>
<td>192</td>
<td>256</td>
<td>1,997</td>
<td>11,627</td>
<td>3,303</td>
<td>5,492</td>
</tr>
<tr>
<td>c) Weaving</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>2,175</td>
<td>1,446</td>
<td>460</td>
<td>141</td>
<td></td>
<td>208</td>
<td>1,825</td>
<td>384</td>
<td>592</td>
<td>1,825</td>
</tr>
<tr>
<td>d) Total</td>
<td>100</td>
<td>592,981</td>
<td>4,666</td>
<td>3,314</td>
<td>10,710</td>
<td>2,384</td>
<td>226</td>
<td>442</td>
<td>3,761</td>
<td>23,130</td>
</tr>
</tbody>
</table>

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\[a\] Ibid., p. 12.— *Ed.*

\[b\] Ibid., p. 19.— *Ed.*
headings arises from the inclusion in the total of finishing and dressing factories or factories engaged in other special tasks which do not fall under one of the general categories. The list only covers England and Wales (1861). Hosiery factories and lace manufactures are not included here. [See tables on pp. 430-33.]

First of all, then:

1) Cotton. The number of combined factories is 671 here. The number of spinning alone is 1,079, of weaving alone is 722, and 1,079+722=1,801, hence the proportion of the first type is almost $\frac{1}{3}$ already. The combined factories alone employ 215,577 persons; the two other types together employ 115,192+63,160=178,352. Hence, although they amount to less than $\frac{1}{3}$ of the others, the combined factories employ 37,225 more persons.

Furthermore, there are on the average for 1 combined factory 19,782 spindles (and $\frac{624}{671}$; 350 and $\frac{418}{671}$ powerlooms; and 220 (and $\frac{150}{671}$) power. For 1 weaver there are 2 and $\frac{56,260}{99,504}$ powerlooms. The number of spinners is not indicated; they are instead lumped together with persons employed in the offices, warehouses and otherwise. But we shall see this when dealing with the children.

[XIX-1192]$^{215}$ For 1 combined factory there are: spindles, 19,782; powerlooms, 350; power, 220; proportion of weavers to powerlooms, 1 to $\frac{286,260}{99,504}$, weavers per factory over 148. Number of persons per factory: over 321.

The average for 1 spinning factory, in contrast, is: number of spindles, 13,973; power, 97; number of persons per factory, 106; proportion of persons to spindles, 1 person to about 130 spindles.

Average for 1 weaving factory: powerlooms, 182; power, 22; proportion of power to persons, $[\frac{4576}{15,646}]$.

According to the proportion which exists in the spinning only cotton mill, group I a) (spinning and weaving) would have to employ 102,110 persons for its 13,274,346 spindles. For weaving, according to the proportion in the weaving only concerns I c), [group I a)] would have to employ 88,115 persons for its 235,268 powerlooms. Thus somewhat more than 190,225 persons altogether. But it employs 215,577.

In the case of I c) there is 1 weaver for 2.67 powerlooms. In the case of I a) 1 weaver for 2.36. Thus fewer weavers are needed in case I c), the weaving only factories, than in I a) (to a small fraction).

In I b) the following relationship holds between the number of spindles and the power: 143.7 spindles to 1 power. In I c) there are ... 8.4 powerlooms to 1 power.
According to the proportion found in I b), I a) ought to employ a power of 92,375.4 for its spindles. And according to the proportion in I c) it ought to employ 28,008 for its looms. But it employs much more power than this.

In example I there is no saving in workers or power to be seen, nor is there any relative increase in the number of spindles and looms. Admittedly, to make a complete comparison one ought in all 3 cases to have the product of I.

[XIX-1193] In the case of I b), the total of 115,192 persons includes 14,873 children under 13, 13,003 males between 13 and 18, and 54,851 females above 13. There appear to be somewhat more children and women employed altogether in the case of the combined factories I a). We now want to turn to the other category, where there is perhaps something else to see. With I we only see that there is a growth in concentration; the average combined factory sets in motion more power, more spindles, more looms and more people than the non-combined factories I b) and I c).

Let us apply ourselves to table II) Woollen Factories.*

Here the concentration is much more significant than under I, in cotton, which is due to the fact that spinning and weaving mills are not so large as cotton manufacturing ones.

The number of combined factories is 440, that of non-combined factories is 763. The proportion of combined to non-combined is 1:1.7, more than a half. II a) employs 26,542 more people than II b) and II c), which employ together only 20,308: hence it employs more than twice the number. It employs 325,854 more spindles, 18,210 more looms, and 523 more gigs; furthermore, it employs 5,781 more power.

There are for 1 factory (on the average):

<table>
<thead>
<tr>
<th>Spindles</th>
<th>Looms</th>
<th>Gigs</th>
<th>Power</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>II a)</td>
<td>2,468.9</td>
<td>43.8</td>
<td>1.8</td>
<td>38.8</td>
</tr>
<tr>
<td>II b)</td>
<td>1,043.2</td>
<td>0.3</td>
<td>15</td>
<td>6.8</td>
</tr>
<tr>
<td>II c)</td>
<td>31.3</td>
<td>0.7</td>
<td>8.6</td>
<td>1.4</td>
</tr>
</tbody>
</table>

The ratio between people and power cannot of course be seen from these figures, since the average does not apply to any particular factory.

According to the proportions in II b), II a) would have to employ power of 35.5 for spindles. (We are leaving the gigs out of

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* Here Marx repeats the corresponding table, given on p. 430 of this volume. He omits the line containing the totals.—Ed.
consideration in all 3 cases.) It also needs a further 12 for its looms, hence 47.5 altogether. But it only employs a power of 38.8, 8.6 less. There is therefore a saving, a more economical or more intensive employment of power. In II b) there is 1 person for every 40.2 spindles, or for 760,498 spindles+258 GIGS=760,756 there are 18,899 people. Thus 40.2. In II c) there are people to the amount of 1,409 for 1,067 looms and 26 GIGS=1,093. II a), on the other hand, employs 20,084 powerlooms and GIGS. This is 18.3 times more. If the proportion in II b) were followed, II a) would have to employ 27,023 people for its spindles; and if the proportion of II c) were followed for its looms and GIGS it would have to employ somewhat over 25,784; taken together this is 52,807. But it only employs 46,850, thus 5,957 less. There is therefore a saving in workers relative to [XIX-1194] the mass of working machinery put in motion.

Out of its total of 18,899 people, II b) employs 1,184 males and 705 [females] under 13 years old=1,889, hence \( \frac{1}{10} \) plus a fraction too small to be worth mentioning. 3,014, or somewhat under \( \frac{1}{6} \), or more precisely the 6.2th part, or \( \frac{10}{62} \) of the total number of people employed are youths between 13 and 18 years old. It employs 5,465 females of over 13, hence not quite \( \frac{1}{3} \) or more precisely the 3.4th part=\( \frac{10}{34/10} = \frac{10}{34} = \frac{5}{17} \). It employs 8,531 males of over 18, hence less than \( \frac{1}{2} \), or more precisely 2.2 or \( \frac{10}{22/10} = \frac{10}{22} = \frac{5}{11} \). The total number of women it employs is 6,170, hence less than \( \frac{1}{3} \), or more precisely the 3.06th part. And it employs 12,729 men; somewhat more than \( \frac{2}{3} \), more precisely the 1.4th part or \( \frac{10}{14/10} = \frac{10}{14} = \frac{5}{7} \). So we now have the proportion for II b).

II b) The proportional share of the different categories in the whole people employed:

<table>
<thead>
<tr>
<th>Children under 13</th>
<th>Youths between 13 and 18</th>
<th>Females over 13</th>
<th>Males over 18</th>
<th>Total of females</th>
<th>Total of males</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABOUT 1/10</td>
<td>6.2 or 5/31</td>
<td>3.4 or 5/17</td>
<td>2.2=( \frac{5}{11} )</td>
<td>3.06 under 1/3</td>
<td>1.4=( \frac{5}{7} )</td>
</tr>
<tr>
<td>somewhat under 1/6</td>
<td>not quite 1/3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If we now pass to II c), we find 826 weavers to 1,067 looms, or 1 weaver to 1.2 looms. Further, 73 children under 13 out of
1,409=the 19.3th part, or less than \(\frac{1}{19}\). Further, 98 youths between 13 and 18, hence the 14.3th part of the whole, less than \(\frac{1}{14}\). Further, 829 females over 13. Hence \(1.7\) or \(\frac{10}{17}\), or over \(\frac{1}{2}\). 409 men over 18 or the 3.4th part=\(\frac{5}{17}\), less than \(\frac{1}{3}\). Women altogether account for 866, or the 1.7th part, or \(\frac{10}{17}\), less than \(\frac{2}{3}\). Finally men=543 or not quite \(\frac{2.5}{17}\)=\(\frac{2}{5}\).

The proportion for II c):

<table>
<thead>
<tr>
<th>Number of Weavers to Power-Looms</th>
<th>Children</th>
<th>Youths</th>
<th>Females</th>
<th>Men</th>
<th>Total of Females</th>
<th>Total of Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>under 13</td>
<td>19.3</td>
<td>14.3</td>
<td>(1.7) or (\frac{10}{17})</td>
<td>(3.4) or (\frac{5}{17})</td>
<td>1.7</td>
<td>ABOUT (\frac{2.5}{17}) or (\frac{2}{5}) but not quite.</td>
</tr>
<tr>
<td>over 13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>under 18</td>
<td>(\frac{1}{19})</td>
<td>(\frac{1}{14})</td>
<td>(\frac{1}{2})</td>
<td>(\frac{1}{3})</td>
<td>(\frac{2}{5})</td>
<td></td>
</tr>
</tbody>
</table>

If we now pass to II a) we find 15,009 weavers to 19,277 looms. Hence 1 weaver to 1.2 powerlooms. 3,728 children under 13. Divided into 46,850, this is 12.5, not quite \(\frac{1}{12}\); \(\frac{10}{125}=\frac{2}{25}\). 4,799 youths between 13 and 18=9.5,\(^{b}\) less than \(\frac{1}{9}\) or \(\frac{10}{95}\). 21,354 females above 13 makes 2.1, less than \(\frac{1}{2}\) or \(\frac{10}{21}\). 16,969 males over 18. Makes less than 2.8. Males altogether: 1.9. [XIX-1195] Females: the same.

Hence the proportion for II a):

<table>
<thead>
<tr>
<th>Weavers per Loom</th>
<th>Children under 13</th>
<th>Youths 13-18</th>
<th>Women over 13</th>
<th>Males over 18</th>
<th>Males and Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 1.2</td>
<td>under (\frac{1}{12})</td>
<td>under (\frac{1}{9})</td>
<td>under (\frac{1}{2})</td>
<td>less than 2.8</td>
<td>are roughly evenly divided. Somewhat more males.</td>
</tr>
</tbody>
</table>

The number of children under 13 and youths between 13 and 18 has fallen in comparison with II b). This is to be explained from the introduction of machinery which makes the children in part superfluous, as we can see from the Factory Inspectors' Reports; an arrangement which originates from the fact that the Manufacturers found it vexing to have to employ two sets of so-called half-times. But the number of females over 13 years old has grown almost from \(\frac{1}{9}\) to \(\frac{1}{2}\), and thus the overall ratio of women to men has also grown, in comparison with II b). If, however, we make a comparison with II c), it is difficult to determine the ratio, since in

---

\(^{a}\) The exact figure is 1.62. Marx put 1.6, then changed it to 1.7, and used the latter in the subsequent calculations.—Ed.

\(^{b}\) The exact figure is 9.7. Marx, however, used 9.5 in the subsequent calculations.—Ed.
weaving the female element predominates still more over the male here.

Let us now pass to III) **WORSTED FACTORIES.**

The number of combined factories is 125, that of the others is 363, hence less than \( \frac{1}{3} \); but the number of people employed in the combined factories is larger by 12,112: 21,254 more **spindles** are employed, 8,660 more **powerlooms**, and 1,900 more **power**.

There are for 1 **average** factory:

<table>
<thead>
<tr>
<th></th>
<th>Spindles</th>
<th>Looms</th>
<th>Power</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>III a)</td>
<td>5,067(^{3/25})</td>
<td>206.5</td>
<td>113(^{24/125})</td>
<td>376(^{34/125})</td>
</tr>
<tr>
<td>III b)</td>
<td>2,971(^{55/105})</td>
<td>109(^{41/157})</td>
<td>47(^{31/103})</td>
<td>106(^{12/103})</td>
</tr>
<tr>
<td>III c)</td>
<td>109(^{41/157})</td>
<td>109(^{41/157})</td>
<td>15(^{150/157})</td>
<td>83(^{51/157})</td>
</tr>
</tbody>
</table>

We shall leave aside the fractions, even though this makes the calculation merely approximate.

III b): \( 28(\frac{3}{106} \) spindles to 1 worker. III c): \( 1^{26/88} \) **powerlooms** to 1 worker.

There appears to be no **saving of labour** in this case.

[XIX-1196] VII) **SILK FACTORIES.**

Large-scale industrial production of silk is relatively new in England (compared with wool and cotton, similarly with flax in Scotland, Ireland, etc.), the number of factories in this branch is therefore relatively large, and their size in contrast is relatively small. Hence here the combined factories also constitute a less significant proportion than in the other cases.

The number of combined factories is 49, that of the others is 666; hence the former are **about** \( \frac{2}{27} \) of the total number; but the number of spindles employed by these \( \frac{2}{27} \) is almost \( \frac{1}{4} \) of those employed by the 244 spinning factories, and the number of **loom**s employed by them is **over** \( \frac{1}{3} \) of those employed by the 422 weaving factories, etc. The more precise ratio emerges from the following calculation:

There are for 1 **average** factory:

<table>
<thead>
<tr>
<th></th>
<th>Spindles</th>
<th>Looms</th>
<th>Power</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>VII a)</td>
<td>5,192(^{18/49})</td>
<td>60(^{26/49})</td>
<td>20(^{32/49})</td>
<td>195(^{1/49})</td>
</tr>
<tr>
<td>VII b)</td>
<td>4,309(^{22/61})</td>
<td>18(^{14/61})</td>
<td>2(^{90/211})</td>
<td>27(^{363/422})</td>
</tr>
<tr>
<td>VII c)</td>
<td>18(^{37/211})</td>
<td>2(^{90/211})</td>
<td>27(^{363/422})</td>
<td>27(^{363/422})</td>
</tr>
</tbody>
</table>

---

a Here Marx repeats the corresponding table, given on p. 431 of this volume. He omits the line containing the totals.—Ed.

b See this volume, pp. 432-33.—Ed.

c Here Marx repeats Table VII) Silk Factories, given on pp. 432-33 of this volume. He omits the line containing the totals.—Ed.
The ratio between power, people, and quantity of machinery, as it appears in these averages, is absolutely imaginary; they are only intended to demonstrate concentration. On the other hand, however, we once again see here the undeniable fact //and here it is still more significant than before// that there is economy of power in the combined factories, in certain branches.

We now give some further examples of flax and jute factories in Ireland and Scotland.\(^a\) [See table on p. 440.]

24 combined; but 125 others. Hence less than \(\frac{1}{5}\) of the latter, and about \(\frac{1}{6}\) of the total number.

The more precise ratios emerge from the following table:

On an average, each factory has:

<table>
<thead>
<tr>
<th>Spindles</th>
<th>Looms</th>
<th>Power</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>X a)</td>
<td>3,413</td>
<td>91 5/8</td>
<td>2027/24</td>
</tr>
<tr>
<td>X b)</td>
<td>2,350</td>
<td>78 27/42</td>
<td>178 17/84</td>
</tr>
<tr>
<td>X c)</td>
<td>140 27/41</td>
<td>47 59/41</td>
<td>182 28/41</td>
</tr>
</tbody>
</table>

We come now to VIII) Jute Factories. Scotland.

This is an entirely new kind of factory. First emerged after the Russo-British War.\(^b\) Not significant in England.\(^b\)

Total number of factories 27. Combined factories 12, almost half. Employ more spindles and looms than the rest put together.

On an average, each factory has:

<table>
<thead>
<tr>
<th>Spindles</th>
<th>Looms</th>
<th>Power</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>1,390</td>
<td>41 5/12</td>
<td>85 1/12</td>
</tr>
<tr>
<td>b)</td>
<td>1,066</td>
<td>58 2/13</td>
<td>133 1/15</td>
</tr>
<tr>
<td>c)</td>
<td>28 1/2</td>
<td>10</td>
<td>30</td>
</tr>
</tbody>
</table>

[XIX-1198] Finally: IX) Flax Factories. Ireland.\(^b\)

Altogether 94 factories, of which 19 are combined.

There are for 1 average factory:

<table>
<thead>
<tr>
<th>Spindles</th>
<th>Looms</th>
<th>Power</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>11,424</td>
<td>131 2/19</td>
<td>2559/19</td>
</tr>
<tr>
<td>b)</td>
<td>6,265</td>
<td>125 47/60</td>
<td>289 35/60</td>
</tr>
<tr>
<td>c)</td>
<td>145</td>
<td>40 1/15</td>
<td>161 12/15</td>
</tr>
</tbody>
</table>

Manufacture emerges from handicrafts by a double route:

1) Simple cooperation. The concentration in a single room of many handicraftsmen all doing the same thing, and many

---

\(^a\) See Factories. Return to an Address...—Ed.

\(^b\) Here Marx repeats the corresponding table, given on p. 433 of this volume. He omits the line containing the totals.—Ed.
<table>
<thead>
<tr>
<th>Factories</th>
<th>Spindles</th>
<th>Power-loom</th>
<th>Power-loom</th>
<th>Amount of</th>
<th>Children</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Spinning and Weaving</td>
<td>81,930</td>
<td>2,199</td>
<td>2,061</td>
<td>4,679</td>
<td>176</td>
<td>33</td>
<td>111</td>
<td>1,017</td>
<td>7,879</td>
<td>1,855</td>
<td>2,905</td>
<td>7,990</td>
<td>10,859</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Spinning</td>
<td>197,455</td>
<td>5,830</td>
<td>776</td>
<td>271</td>
<td>454</td>
<td>1,552</td>
<td>10,318</td>
<td>2,374</td>
<td>4,197</td>
<td>10,772</td>
<td>14,969</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Weaving</td>
<td>5,767</td>
<td>3,786</td>
<td>1,936</td>
<td>30</td>
<td>8</td>
<td>241</td>
<td>5,894</td>
<td>1,347</td>
<td>1,588</td>
<td>5,902</td>
<td>7,490</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Table to p. 439]
handicraft tools. This is the characteristic feature of the old weaving manufacture and the further preparation of cloth. Almost no division of labour at all here. At most for certain auxiliary operations, some of them preparatory, some finishing. The main economy here is: the communal use of the general conditions of labour, such as the building, heating, etc. The overall supervision of the manufacturer, hence the element which is peculiar to capitalist production in general.

Ure says in *Philosophie des manufactures*, Vol. II (pp. 83-84):

"It deserves to be remarked, moreover, that handworking is more or less discontinuous from the caprice of the operative, and therefore never gives an average weekly or annual product at all comparable to that of a like machine equally driven by power. For this reason hand-weavers very seldom turn off in a week much more than one-half of what their loom could produce if kept continuously in action for 12 or 14 hours a day, at the rate which the weaver in his working paroxysms impels it" [A. Ure, *The Philosophy of Manufactures*, London, 1835, p. 333].

The mechanical workshop of course enjoys this advantage as much over the system of manufacture as it does over the system of handicrafts. In the mechanical workshop the motion and speed of the machine (prime motor) rules over human labour, in manufacture and handicrafts the reverse is the case. But it also applies to manufacture in contrast to handicrafts, to a lesser degree. In the latter, the handicraftsman is more or less a human being who works; in the former he is a worker who as such and qua worker belongs to someone else, who solicits his aid merely in his quality as a machine for working.

[XIX-1199] 2) The unification into a single factory of crafts divided into many independent branches. The division is present in advance here, but every part of the work is carried on as an independent handicraft. The first thing that happens now is the annihilation of this isolation and independence. The difference is summed up in the fact that the particular form of labour no longer produces the product as a particular commodity, but merely as an integral part of a commodity. The separate product ceases to be a commodity as such. Once this unification of what was previously divided has taken place, subdivision develops further on the basis of this spontaneously evolved manufacture, which found its components already divided and self-acting. To this combination of previously dispersed handicrafts, found in manufacture, there corresponds, within large-scale industry, the combination of factories, one of

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*a* Marx presumably quotes from the Paris edition of 1836.—*Ed.*

*b* Marx quotes in French.—*Ed.*
which produces a semi-manufactured object, while the other uses it as its raw material. This is how it is with spinning and weaving. The prerequisite for this was that both branches had already been separately brought under the system of machine production.

Just as one should not think of sudden changes and sharply delineated periods in considering the succession of the different geological formations, so also in the case of the creation of the different economic formations of society. In the womb of the handicrafts, manufacture develops in its initial stages and even machinery is employed here and there, in individual spheres and for individual processes. The latter point is even truer for the actual period of manufacture, in which water and wind (or even human and animal power as mere remplaçants\(^a\) for water and wind) are employed for individual processes. But these are isolated cases and do not constitute the character of the ruling period, do not form its pivot, as Fourier says.\(^b\) The greatest inventions—gunpowder, the compass, printing—belong to the handicraft period, as also does the clock, one of the most remarkable automata; just as the most brilliant and revolutionary discoveries in astronomy, those of Copernicus and Kepler, belong to a time when all mechanical aids to observation were in their infancy. Similarly, the construction of the spinning machine and the steam engine rested on the handicrafts and manufacture which built them; they also rested on the science of mechanics, developed within this period, etc.

But the general law which is valid throughout, is that the material possibility of the later form is created in the earlier form; both the technological conditions and the economic structure of the workshop which corresponds to them. Machine labour is directly called into existence as a revolutionising element by the excess of needs over the possibility of satisfying them with the old means of production. But this excess of demand is itself given by the discoveries made still on the handicraft basis, by the colonial system founded under the domination of manufacture, and by the world market relatively firmly established by the colonial system.\(^c\)

Once the revolution in the productive forces has been achieved—which is displayed in technological terms—a revolution also starts in the relations of production.

In so far as machines are employed in manufacture, they are,

\(^a\) Substitutes.—*Ed.*


\(^c\) Cf. present edition, Vol. 28, pp. 335-36.—*Ed.*
correspondingly, produced either in the handicraft manner or on the basis of the division of labour applied in manufacture. As soon as machine production becomes dominant, its means of production—the machinery and tools employed by it—must themselves be produced by machines.

[XIX-1200] Except where animals can be employed purely mechanically, as with turning a mill, their employment is entirely dependent on their voluntary movement, and the direction of their will by the human will, a principle which has nothing in common with machine production. Moreover, they can only be employed as power in manufacture to a very small degree, because their employment on a mass scale would take up tremendous space.

Mr. John C. Morton, at the Society of Arts (January 1860), read a paper on the Forces Used in Agriculture, dealing particularly with the displacement of horsepower by steam power, and referring to the advantages of machinery, where animal (as also human) power is displaced by mechanical power, which is cheaper, and can act more uniformly over a greater period of time:

* "The forces referred to are ... steam power, horsepower, and manual labour... Purely mechanical power, supplied by the steam engine, may be more extensively used with every improvement of the land which tends to give uniformity to its condition... Force derived from horses, required where crooked hedge-rows, and other obstacles, prevent uniform action, and which constantly diminishes... In operations requiring more exercise of the will, but less actual power, the only competent force is that directed from moment to moment by the human mind—manual labour..."

Mr. Morton reduces these forces to

"horsepower"* (as used in reference to steam engines), "i.e. the unity assumed as equal to pull or lift 33,000 lbs one foot per minute. By calculations given, the cost of steam power is estimated at 3d. per hour, while the cost of horse labour is 5½d. per horsepower per hour, and the steam power can be continued for much more lengthened periods than the horse labour. So that the force supplied by steam 'horsepower' at 3d. per hour, is nearly twice as great as that supplied by actual horsepower"* //since the horse can only be employed for 8 hours in this manner!//

* "at 5½d. per hour. And where steam power can be used, the quality of the work performed by its aid"* //on account of its uniformity of motion// * "is superior to that done by horsepower. This applies to threshing, chaff-cutting, grinding and [the] like"* (similarly sowing, mowing) * "and seems equally applicable to steam-ploughing... By comparing the mere force of manual labour with the two other forces, it is found that to do the work of the steam engine 66 men would be required at 15s. per hour, and to do the work of the horsepower 32 men would be required at 8s. per hour. Competition of manual labour as a force, with steam or

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a Marx adds the German term in brackets.—Ed.
b Marx gives in brackets the noun "chaff-cutter", its German equivalent and the translation of the word "chaff".—Ed.
horsepower, is therefore obviously out of the question... By steam power at least 3 out of every 7 horses on arable land may be dispensed with all the year, at a cost not exceeding the cost of these horses during the 3 or 4 months, when alone they are really needed on the land."*

One may see from the above firstly in a sphere where steam power, horsepower and manual labour compete in agriculture—their relative values, as to power and economy; 2) that a plough is not a machine. Leaving aside the older form of the plough, where the farmer does more work behind the plough than the horse or the ox in front of the plough, the employment of steam presupposes uniformity of the soil, just as a locomotive presupposes rails instead of a road. These conditions are part and parcel of the [XIX-1201] employment of the machine, i.e. a working mechanism able to receive its moving force from a merely mechanical force.

The development of the mechanical workshop into a system is straight away made necessary in spinning by the fact that the raw material in its preparatory phases must be mechanically prepared, in order to be able to be worked upon by machinery. And these preparatory processes for their part require relatively much more assistance of manual labour, if carried on on a small scale, instead of a large one. The system therefore requires for its part once again the combination or cooperation of a great lot of working machines which are fed by the preparatory processes.

Nothing could be more incorrect than to conceive the medieval system of corporations and guilds, in which the division of labour amongst particular handicrafts forms at once the basis of a social and political organisation, as something "unfree". It was the form in which labour emancipated itself from landed property, and definitely the period in which labour stood at its highest point, socially and politically. In order to understand its real character, one must study German history in particular, since in Germany, unlike France, royal power did not conspire with the emerging burgher estate against the feudal elements. One would then find that the system of corporations and guilds, constantly suffering setbacks in the struggle against imperial and feudal power, constantly reasserts itself afresh against it. Only when the material basis—the technological basis of organisation—had ceased to be dominant, when it had therefore lost its revolutionary and ascending character, when it had ceased to be appropriate to the epoch and entered into conflict, partly with manufacture, partly, later on, with large-scale industry, did it start to be protected, as a reactionary element, by reactionary governments and the estates in alliance with them.
Saving and gain of raw material by use of machinery. In milling. In sawing, e.g., the machine (in fact a colossal razor) which cuts, or shaves, the veneer, as compared both with the earlier cylindrical sawing machine, in which a number of saws were inserted, and with the handsaw, and still more with the axe and the knife.

COTTON GIN.
The most imposing example is the reclamation of cultivable land by hydraulic machines.

BOAT MAKING MACHINES, from the boats carried by steamships and down to cutters and the smallest river boats, for crossing from one side to the other. These were previously made in the yards, in handicraft fashion, with little division of labour and with machinery used at most for planing. Now made entirely by automatic machinery, first in America. Now carried on on a large scale by a company near London.

We now proceed further with the English quotation on p. 1185.

As soon as we are to be able not only to extend the dimensions of machines at will, but also to develop them into a system of machinery, a driving force—and prime mover—applicable at any level must be available. Hence no development of machinery was possible without steam. The steam engine was in fact invented before the industrial revolution. Imperfect. Now along with its industrial necessity its form is also discovered. The elements of the machine were present before Watt gave it the form industrially applicable to manufacture.

[XIX-1202] "Steam engine: a machine which is able to bring about a mechanical effect through the action of water steam. The first idea for this [was put forward] in the second half of the 17th century. To bring about movement by using steam it was necessary not only to produce the steam pressure but to remove it afterwards and to be able to condense the steam.

"Papin invented the safety valve in 1680; later he also arrived at the idea of making the steam act in a cylinder on a kind of piston. He covered the base of the cylinder with a layer of water, converted it into steam by placing the cylinder over heat, and thus drove the piston to the top. By taking away the heat, or removing the cylinder from the heat, he effected a condensation of the steam, so that the atmospheric pressure acted on the piston of the cylinder, which was open above, thereby forcing it down. Papin published experiments of this nature in 1690 in the Acta Lipsiensia."

"Savery, an English captain, came upon the same idea at about the same time, and had already actually constructed several machines when in 1696 he published a description of them. The principle of Savery's machine differed from that of Papin's in that he did not use a piston to transmit the effect of the steam, and he

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a Marx adds the German term in brackets.— Ed.
b See this volume, pp. 421-22.— Ed.
was also able to accomplish the condensation of the steam much more conveniently and more quickly. His achievement was the building of the first large-scale steam engine. Savery later made use of Papin’s safety valve. Savery’s machine was employed in raising water. It consumed an extraordinary quantity of fuel, and was difficult to construct in very large dimensions. Water could not be raised very far with it. Much effort was put into finding an improvement, in particular in trying to apply to it Papin’s first ideas of a piston-driven machine. It was 2 Englishmen who first succeeded completely in this endeavour, “Thomas Newcomen, blacksmith, and “John Cawley, glazier, and they should be considered the first to introduce the piston-driven steam engine. Since Savery, thanks to his patent, possessed the sole right to create a vacuum by the condensation of steam, Newcomen and Cawley entered into association with him, by taking out a patent in 1705, in the names of all 3, ‘to condense steam directed under the piston, and to bring about an alternating movement through its connection with a lever’. The construction of this ‘atmospheric’ machine, later named after Newcomen alone, not only offered the advantage that, if one wanted to raise water with it, the steam did not come into contact with the water at all, but also that it provided at the same time the possibility of bringing about any kind of movement” [A. Ure, Technisches Wörterbuch..., pp. 423-26].

This application of mechanical power took place where, as with wind and water mills in manufacture, great exertion of force was necessary (stamping, turning, raising) and where in fact human labour acted as an automatic prime motor creating its own power, whereas the implement of labour was manipulated not with the hand but was directly connected with the transmission mechanism, the shaft, crank, etc.

“Newcomen later improved the machine by changing the method of obtaining condensation: the cold water, instead of being poured onto the outside of the cylinder, was sprayed into it.

“The taps and the steam distributor initially had to be operated by hand, until a boy called Humphry Potter, who was employed to attend a Newcomen engine, had the idea of connecting the handles of the taps and distributors to the beam (with strings) and letting the machine operate them itself. [XIX-1203] “The Newcomen engine was still far from perfect, a particular disadvantage being the condensation of water in the cylinder of the engine, which resulted in a considerable loss of heat; while the cylinder itself never became completely cool. All attempts to remedy this basic deficiency were fruitless, and the construction of the steam engine remained the same for nearly 70 years. Then Watt came onto the scene.

“Watt’s first engine was one in which the steam produced only the downstroke of the piston, i.e. a single action engine. The upstroke was produced, once the piston had reached the bottom of the cylinder, by closing the steam inlet and letting the steam previously introduced flow over and under the piston, the pressure on the two sides thus being neutralised. A counterweight attached at the other end of the beam, together with the pumping rods installed there for raising the water, could therefore easily effect the ascent of the piston... Useful as the single action Watt engine still is for raising water and salt-springs, it is well-nigh useless for accomplishing any other mechanical work” [ibid., pp. 426-28, 430].
Thus the first single action Watt engine was in fact only an improved version of the steam engine, not as a general prime motor, but in the original special function it had in the epoch of manufacture, that of a machine for pumping water.

"Most industrial applications make it necessary to convert the linear motion of a piston into rotary motion; with the single action engine this is admittedly possible, but if the motion produced is to be highly uniform, this can only be achieved if an inert object of tremendous weight (a flywheel) is set in rotary movement. But the engine has to waste a tremendous amount of power to move such an object; this power could otherwise have been employed usefully, not to mention the resulting increase in wear and tear on pivots and bearings.

"These circumstances led Watt to invent the double action steam engine. In this case the steam produces both the upstroke and the downstroke of the piston, the counterweight becomes entirely unnecessary, and the flywheel, which has to be attached to ensure uniform motion, can be much lighter. In 1782 Watt took out a patent for the double action engine, and from this time onwards the steam engine emerges as useful for all branches of industry.

"Improvements subsequent to Watt in the double action steam engine for the most part concerned subsidiary matters. In particular, it was sought to construct the engine in such a way that it took up as little space as possible. It was for this reason in particular that attempts were made to get rid of the beam, and connect the radius bar of the crank directly with the piston rod... Engines which operate purely through expansion, without condensation, air and cold-water pumps, are Woolf engines" [pp. 430, 432, 435-36, 441].

A steam engine therefore requires the following elements:

1) A boiler, with its appliances for firing, stoking, etc.

[XIX-1204] 2) A steam cylinder, with piston, piston-rod and stuffing box.

3) A regulating appliance (valve), both on the inside and the outside,

and

4) in condensation engines—a condenser, with an air and water pump.

The steam engine as a product of the period of manufacture. Here not as a general prime motor but only for a particular purpose, the raising of water. Moreover, not originally automatic, since the opening and closing of the taps, partly to introduce water into the boiler, partly to cool down the cylinder and condense the steam, as also the opening and closing of the steam distributor at the end of the pipe connecting the boiler to the cylinder (the end facing the boiler), was originally done by hand. Nor was it an engine worked purely by steam, but rather an engine in which atmospheric pressure was essential. (The cylinder was above; Watt was first to make it enclosed. In his first engine, however, there was still a counter-weight, attached to the other end of the beam, the one facing the pump, which actually produced the upstroke through its weight.)
Atmospheric pressure was essential because, after the steam was condensed through the spraying of cold water on the cylinder, a semi-vacuum arose inside. Watt's first engine was itself merely an improved version of the steam engines used for raising water in the period of manufacture. Only with his 2nd engine, the double action engine, was he able to transform it into a general prime motor for industry as a whole.

Railways.

Here too the beginning belongs to the period of manufacture.

"The oldest rails were made of wood, and rails of this type are said to have been in use already 200 years ago in quarries and mines in England and Germany. The discovery that a horse could pull more than 4 times as much on rails as on ordinary roads led in 1798 to the construction of the first line with cast iron rails for the general purposes of transport. The first railways used nothing but horses for transport. The first idea of employing steam engines to move vehicles on wheels came from Dr. Robinson of Glasgow in 1759. In 1761 Watt pursued the idea, and after him in 1786 the brilliant Oliver Evans in North America. But it was only in 1802 that the Englishmen Trevithick and Vivian constructed the first steam locomotive, which was able to pull a load of 10 tons along a railway line at a speed of 5 English miles per hour. All kinds of experiments. A theoretical prejudice that the friction of the wheels on a smooth rail would not be sufficient to prevent a mere sliding of the wheels, their rotation on the spot, making it impossible to pull heavy loads. In 1814 Stephenson constructed the first genuinely serviceable steam locomotive for the Stockton and Darlington Railway. These locomotives were only for transporting freight. In October 1829 Stephenson's locomotive won the prize at a competition on the Liverpool and Manchester Railway. Condition: it had to pull a weight 3 times its own at a speed of 10 English miles an hour. In 1839, on the same line, the 13-ton locomotive St. George pulled a load of 135 1/2 tons at an average speed of 21 4/5 English miles per hour" [ibid., pp. 545, 567-69].

"1851 Great Western Railway Company: such engines have been constructed for it since 1847. It pulls * a passenger train of 120 tons, at [an] average speed of 60 miles per hour. The evaporation of the boiler, when in full work, is equal to 1,000 horsepower, of 93,000 lbs per horse—the effective power, as measured by a dynamometer,* is *equal to 743 horsepower. The weight of the engine [XIX-1205] empty is 31 tons; coke and water, 4 tons—engine in working order, 35 tons.

"Long after the extended use of the steam engine by the miner, the manufacturer, and the navigator, it was still to be applied to the purposes of locomotion on land"* [The Industry of Nations, Part II, pp. 83, 86, 88].

The first steamboat, produced by Fulton (and Livingstone), was The Clermont, begun in New York in 1806. It was launched in 1807. (First voyage from New York to Albany.) (145 miles at 5 miles per hour.) [J. D. Tuckett, A History of the Past and Present State of the Labouring Population..., p. 277.]

//Further comments on railways:

"Railways, as a mode of communication between distant places, were projected in England before any artificial canals. The rails were first made of *wood, [and] were laid down to facilitate the transport of coal from the collieries at Newcastle; and in some other parts, long pieces of timber were laid in the ruts of
the roads, to prevent them from becoming impassable.* Until within a very few years, *railroads have been considered as supplementary to canals, to be employed in short distances, or where the nature of the ground precluded the application of inland navigation...* It is now about 50 or 60 years since iron rails were gradually substituted for wood in railroads" (this was written in 1846)...

*"Railroads were only considered fit for heavy goods, [such] as coal, iron, or stone. The locomotive engine, for drawing carriages on railroads, was not thought of,* though Watt,* in his patent, describes a scheme for which he formed a steam carriage, but he never carried it into practice. Murdoch, his pupil, an engineer, when connected with Boulton and Watt,* was the first * who actually constructed a steam carriage in this country, [in] 1782... The first practical application* of the *steam engine to the propulsion of carriages [was] effected* by *Trevithick and Vivian, who patented their invention [in] 1812...* They *constructed an ingenious steam carriage for common roads and exhibited it in London; but the generally defective state of the roads caused the patentees to abandon this application of their invention...* The railways *gradually extended their operations upon the collieries in the North of England.* Great advantage of this... On the 15th of September 1830 the railway (between Manchester and Liverpool) was opened by the passage of 8 locomotive engines, all built by Stephenson and Co.; to these were connected 28 carriages. In 1836 the first railway mania; overtopped in 1845-48" [J. D. Tuckett, op. cit., Vol. 1, pp. 282-84, 287.]

"Then Henry Bell, a Scotchman, for many years a house carpenter, established the first regular English steamship passage in January 1812, between Glasgow and Helensburgh (a watering place on the Clyde). This Bell was ruined; *reduced to indigence. David Napier contrived at length a new and superior mode of construction. [In] 1818 he established the Rob Roy,* of about 90 tons, between Greenock and Belfast. Before 1818 *steamboats but rarely ventured beyond the precincts of the river and coasts of the Friths, and there only in fine weather" [ibid., pp. 278-81]. "About 1836-37 the project of crossing the Atlantic first started. The Sirius the first steam vessel which [XIX-1206] performed it. Government assistance was found necessary. Cunard (a Canadian) first obtained a grant from the British Government for a line of Post Office steamers between Liverpool and Boston. Government assistance * with the lines progressively set up after that."

"West India Company; Pacific Company; Cape Screw Steam Packet Ship Co.; Peninsular and Oriental Company; East India Company, for the line between Suez and Bombay" * [The Industry of Nations, Part II, pp. 79-80].

*Now back to p. 1185.*

The great extent to which the working machine differs from the actual body of the machinery is also shown in its manufacture, in that the two things fall under different branches of industry.

*"Accordingly, in machinery for spinning and its preparatory processes, for weaving of all kinds, and for papermaking, there are a variety of such working tools, as, for example, spindles and flyers, fluted rollers, heckles, and all the varieties of card clothing, weavers’ reels and shuttles, the wirecloth used by papermakers, etc., the making of each of which articles constitutes a distinct branch, and is carried on by a different sort of workmen from those who make the machines. For the machine-makers usually purchase these parts from their proper makers, when they fit up their machines for sale.* There are ingenious machines (and even *automatic) used for making

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*a See this volume, pp. 421-22. The quotation further below continues the extract on the working machine given on p. 422 of this volume.—* Ed.
these working parts or tools of the machine—such as the card-setting engine, for making cardcloth for cotton, etc., and the automatic bobbin-making engine. There are also several very clever machines for making the healds for weavers' looms, and automaton engines for making the dents employed in weaving. Generally, however, these parts of machines require manual labour trained up for this kind of work exclusively”* [The Industry of Nations, Part II, pp. 222-23].

“Among constructing engines there is * Nasmyth's steam hammer, [which is] capable of smiting a block of granite into powder, and as capable of breaking a nutshell without injury to the kernel. Patent for it taken* [out in] 1842. Used in large engineering establishments, some of which have 3-4 of these hammers, of 30, 15, 5 cwt., etc., for different kinds of work; the *steam hammer requires for itself the attendance of one person only. The most gigantic machine of the kind at Messrs. Mare's large works: hammer of 6 tons weight, with a stroke of 6 feet.* This great hammer is called 'Thor.' Forges *a paddle wheel shaft for a pair of marine engines of 16 1/2 tons, 27 feet 9 inches in length.* With the *aid of a powerful crane, a the welding a and forging of this large mass is rendered as simple and easy as that of a horseshoe in the hands of a country smith.* In the exhibition of 1851 there was a hammer of this kind, with an anvil weighing 8.* tons; the hammer itself [weighs] 1 1/2 tons, [and is] suspended from the piston rod a; the piston, which works in the cylinder, placed at the top of the machine, [is] 16 inches [in] diameter, and the extreme fall of the hammer (in steam engines called [the] stroke) is equal to 42 inches; the pressure of steam usually employed being equal to 40 lb. on the square inch. The hammer being on the self-acting principle, every degree of blow, from that of merely cracking an eggshell to that of a dead pressure of 500 tons, is attainable. By admitting the steam under the piston, the hammer is elevated to the desired height, and by its own gravity the hammer falls; but the fall may be instantly eased, if desirable, by the admission of steam, according to the particular kind of blow required. In ordinary works, as many as 70 blows are given in a minute.* Used in *iron shipbuilding establishments, anchormakers, large engine builders, and at the principal railway manufacturing establishments; the making up of iron, either from scraps, old rails, hoops, a or from the pile is also effected by means of this hammer” [ibid., pp. 223-26]. b

[XIX-1207] “Before the introduction of this adjunct to the smithy, the forging of large marine engine shafts was not only a tedious, but an uncertain process; and many an accident which has occurred to the ocean steamers to be traced to the imperfect forging of iron; for, without blows of sufficient energy, it is impossible to expel the scoria a from between the bundles of iron rods, which, as in the United States, they attempted to weld together to form their main shafts”* [p. 226].

“Apart from this *formidable kind of work, [they are] employed in the stamping out of dish covers, and the moulding and forming of silver plate.* In his patent of 1784, taken out in April, Watt already has in mind this kind of application for the *steam engine. He alludes to a probable mode of applying the piston-rod of a steam engine, in connexion with a heavy hammer or Stamper, for forging iron and other metals*” [p. 227]. b

This is the greatness of Watt, that in a patent taken out in April 1784 he foresees all possible applications for the steam engine, and puts them forward as possibilities, for locomotion, for the forging of metals, etc.

a Marx adds the German term in brackets.—Ed.
b Marx quotes with minor alterations.—Ed.
"A still more powerful hammer for some ironworks at Doulais. Hammer of 6 tons weight, [a] clear fall of 7 feet perpendicular, anvil 36 tons in one solid mass. Under such control as to be made to drive a nail into soft wood, with a succession of most delicate taps. This monster hammer employed for giving some 6 or 8 tremendous blows to the masses of iron called 'blooms', from which the railway bars are rolled, so as to weld them into one solid mass before they are drawn out. This invention also invented for driving piles" [pp. 227-28].

"Ordinarily the instrument used for forging is what is called a tilt-hammer. Heavy mass of metal, weighing 3 to 4 tons, the head of which is placed upon the anvil, which is sunk in the ground, while the shank[a] rests upon pivots, in a strong frame. In order to lift this hammer, a large wheel is arranged near the head, upon the circumference of which projecting pieces or cogs[a] are placed. As this wheel revolves, the cogs catch one after another under the head of the hammer, lift it up a certain distance, and then release it, when it falls on the object placed on the anvil. Its force is merely that acquired by its own weight, to which is superadded the impetus of its fall. But the height to which such a hammer can be raised is very limited, and in real power it is far inferior to Nasmyth's hammer. The moving power of the tilt hammer may be steam, applied through the medium of pulleys and shafting, or water power from a waterwheel, used in the same way" [pp. 228-29].

"These [are] forging machines. Ryder's patent forging machine,* in which 5 or more hammers act at once, rising and falling 700 *times in a minute; chiefly used for forging mule and throttle spindles for cotton machinery, screw-bolts, files.*a This machine is smaller and more complicated. It has a high velocity together with a powerful stroke (on a much smaller scale than the above)" [pp. 229-31].

"Riveting machinery: in both" (this and the previous *machine) "iron in the heated state is the material commonly operated upon. The forging engine reduces the metal into form, and moulds it at the will of the worker; the riveting engine [XIX-1208] simply crushes up a red-hot bolt, and so clasps two iron plates inseparably together.

The first application of machinery to riveting iron plates was introduced by Mr. Fairbairn of Manchester.* He himself says: *"The invention of the riveting machine originated in a turn-out of the boilermakers in the employ of this firm about 15 years ago. On that occasion the attempt was made to rivet two plates together by compressing the red-hot rivets in the ordinary punching-press. The success of this experiment immediately led to the construction of the original machine, in which the movable die was forced upon the rivet by a powerful lever, acted upon by a cam. A short experience proved the original machine inadequate to the numerous requirements of the boilermakers' trade, and the present form was therefore adopted about 8 years since. This machine is in a portable form, and can be moved on rails.* Through this machine 12 times the quantity is done in the same time and *one man's labour saved. The riveting is done without noise" [pp. 231-34].

"It may be safely stated that but for this machine the construction of the tubular[a] iron bridges would have been almost impracticable. The invention of this machine, like that of several others used in manufactures, as the result of a 'turn-out' on the part of the operatives, only gives additional testimony to the folly

[a] Marx adds the German term(s) in brackets.—Ed.
[b] Marx quotes with minor alterations.—Ed.
[c] Marx adds the verb "rivet" and three corresponding German synonyms in brackets.—Ed.
of such proceedings. The object of introducing the rivets into these holes while red-hot (the tubes of the great bridges) is to secure the subsequent powerful contraction of the metal in cooling by which the plates are bound together with the most powerful force*

This is a very pretty line of reasoning about strikes. Machinery is favourable to the workers when the manufacturer introduces it without their participation, but unfavourable when pushed on by them. On the other hand, it is precisely as a result of the turn-outs that such significant machines as the selfactor, or Fairbairn's riveting machine (without which tubular iron bridges are almost impracticable), etc., have been introduced. So this is good, the more so because the introduction of machinery is in general good for the worker. But when strikes are in question, machinery is presented as bad for the worker. He should not accelerate his fate.

"Another stationary riveting machine of *Mr. Garforth at Manchester puts in 360 rivets per hour, with the attendance of 1 man and 3 boys. In this engine the force for driving up the rivet is entirely obtained from the thrust of a piston-rod, impelled forward by high-pressure steam"* [pp. 234-35].

"Punching machine,* for perforating. The one in *Woolwich Dockyard [is] quite self-acting. The pressure necessary to penetrate an iron plate .08 of an inch in thickness by a punch half an inch in diameter, requires a power of 6,025 pounds, and through one of .24 inch in thickness it demands a force of 17,100 pounds" [pp. 236-37].

"The shearing engine is generally connected with the punching engine, and is placed at the opposite side to the punch, or above it, as may be most convenient. The shearing portion is a flat bar of steel, brought to a cutting edge, and acting against a similar edge on the bed of the recess, somewhat like a pair of scissors. It is a wonderful spectacle to enter one of the large machine-shops at Manchester, and to behold a row of these monster engines at work. To hear the clanging of the metal as hole after hole is made in it; to see it cut like a sheet of paper, and shaped into its required figure; and to feel the solid ground trembling under the effects of these cyclopean instruments... The punching and the shearing engine are to the machine-maker what the scissor is to the tailor, and the auger [XIX-1209] to the carpenter. They are the rudimentary constructing instruments, and are among the most indispensable furniture of the iron factory"* [p. 237].

These, therefore, are the principal cyclopean constructing instruments.

Leaving aside this enormous power, machine construction makes necessary the greatest mathematical precision of the individual parts and the production of these en masse, involving the employment of working machinery on a large scale.

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a Marx quotes with minor alterations.— Ed.
b Marx adds, in brackets, the noun "punch" and three German terms corresponding to it, and the verb "punch" with two variant German translations.— Ed.
c Marx adds the German term in brackets.— Ed.
Application of self-acting machinery to the construction of more refined machines.*

* "The almost mathematical accuracy and precision with which the forms of the various details, whether of the most delicate, of most ponderous machines are executed, is highly deserving of notice. To produce pieces of machinery so perfect by manual dexterity and labour"* (and the clock?) *"were hardly possible; and if possible, would entail so great an expense, that neither in quantity nor price could we by any increase of machinery and skilled population have kept pace with the demand which has followed upon the increased perfection and facilities of production realised by improved mechanism.

"Only 60 years ago, nearly every part of a machine had to be made and finished to its required form by mere manual labour; i.e. we were entirely dependent on the dexterity of the hand and the correctness of the eye of the workman, for accuracy and precision in the execution of the parts of machinery. With the advances of the mechanical processes of manufacture invented by Watt, Arkwright, Crompton, Brunel, Didot and Jacquard, a sudden demand for machinery of unwonted accuracy arose, while the number of skilled workmen then existing were neither sufficiently numerous nor skilful to meet the wants of the times. Mr. Henry Maudslay, about 40 years ago" (about* 1810 or 1814) *"introduced the slide principle into the tools and machines employed in the production of machinery; and, but for the introduction of this principle, we never could have attained to the advanced stage in machine-making in which we now are (the slide*).

"The principle here alluded to is embodied in a mechanical contrivance which has been substituted for the human hand for holding, applying and directing the motion of a cutting-tool to the surface of the work to be cut, by which we are enabled to constrain the edge of the tool to move along or across the surface of the object, with such absolute precision, that with almost no expenditure of muscular exertion, a workman is enabled to produce any of the elementary geometrical forms—lines, planes, circles, cylinders, cones and spheres—with a degree of ease, accuracy, and rapidity, that no amount of experience could have imparted to the hand of the most expert workman. The slide principle is embodied in the slide-rest, now become a part of every lathe, and applied in a modified form in the boring mill, the planing machine, the slotting engine, the drilling machine, etc. Simple and outwardly unimportant as this appendage to lathes may appear, it is not, we believe, averring too much to state, that its influence in improving and extending the use of machinery has been as great as that produced by Watt's improvements of the steam engine itself. Its introduction went at once to perfect all machinery, to cheapen it, and to stimulate invention and improvement. Soon after its introduction the slide-rest was made self-acting, that is, its motion along or across the surface to which the tool it held was applied were rendered independent of the attention of the workman in charge of it"* [pp. 238-39].

The slide-rest therefore represents the human hand in general.

* "Boring engine, by which the cylinders of steam engines, hydraulic presses, etc., are cut out and smoothed on the inside. In these machines, the cylinder to be bored is firmly secured upon a frame prepared to receive it, and the cutting instruments are gradually advanced by a screw into its interior; the cutting tools revolve as they enter, and remove portions of the metal gradually until the whole cylinder is bored. In the best arrangements of these machines the [XIX-1210]

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a Marx gives both the English and the German term.— Ed.
advance of the boring tool is entirely automatic. The boring machine may be in
general terms described as a contrivance for working a bore or tool, which, by a rotary
motion on its axis, cuts out a hollow cylinder in any substance it is applied to.

"The cylinders of steam engines and those of hydraulic presses require to be
bored with extreme accuracy and care, since any inequality in the diameter of the
cylinder would certainly cause great leakage when a high pressure was applied to the
piston working in it. It is only by the aid of this engine that our prime movers are
obtained; for it may be safely stated, that the manufacture of a steam engine of any
working dimensions could not be accomplished without the assistance of the boring
engine. It is also applied for other machines, such as pumps, etc." [pp. 239-41].

The lathe.

"Scarcely any part of a machine exists to which the use of the lathe has not
been in some way or other necessary. It is an instrument of universal value"*[p. 241].b

"The construction of the simple foot-lathe is essentially also that of a
machine driven by steam. *The only part absent is the axle and the flywheel, for
this part is not here necessary, since the rotary motion is communicated from a
shaft by means of a band, and this shaft is actuated by the steam engine. In heavy
works, however, and indeed in all power lathes of any value, the self-acting principle
is introduced, and adjustments are made to accomplish that object. The use of the
lathe in manufacturing work is necessarily confined, as a general rule, to the
production of cylindrical bodies, or for giving a round form to particular parts of
machines" [pp. 241-43].

Shaping machine (slotting engine). (Much more modern introduction
than the lathe.)

"The principle on which this engine works is simply that of a vertical chisel moving up and down, and cutting through the metal as it descends. By an
ingenious arrangement of cogs the bed is capable of being moved in concert with
the rest of the machine, and thus continually presents a fresh surface for the tool
to act against. It is a most interesting sight to observe these iron workmen chiselling
their obdurate work into shape, without any sort of human assistance. It will be
easily understood that any machine capable of cutting down in a vertical direction
can be applied for giving a definite form to a block of metal. Any angular figure
that can be produced by this engine under the control of the workman, in whose hands
it becomes, in fact, a powerful knife, cutting out just as he sees fit" [pp. 244-45].b

"Planing machine." An iron carpenter, for all that the latter effects upon wood
with his planes, the machine accomplishes by means of its tools. Precision and Power. By
it the most accurate plane surfaces may be produced, for the machine is incapable
of giving out incorrect work, and these surfaces are, consequently, far superior to
those obtained formerly by the file of the skilful workman. In the best work done
by hand, some slight deviation from absolute rectilinear motion is always
observable. It differs from the shaping machine in this, that the work is cut by
being carried against a stationary cutting tool. The tool, it is true, is capable of lateral
and vertical movements, but this is merely so as to present to it a fresh part of the
work, as* [XIX-1211] in the *sliding rest* of the *lathe. The object intended to be
planed, is firmly secured to the bed of the machine, and this being capable of a

a Marx adds the German term in brackets.—Ed.
b Marx quotes with minor alterations.—Ed.
to-and-fro motion, is set going. A cutting tool is arranged in a strong frame across
the length of the engine, and the carrying forward of the bed of the machine with
the work on it, brings the latter in contact with the tool, which planes, or rather
ploughs along its surface, scraping up a shaving of iron as the work passes beneath
it" [pp. 245-47].

"Drilling machine. A vertical lathe, with this exception, that the work is
stationary, while the tool revolves" [p. 247].

"Measuring machine.* One of them is adapted to measuring to the 10,000th of
an inch and the other to the 1,000,000th part of an inch" [p. 248].

* "These are machines chiefly of the present [19th] century;* with the exception of
the last one mentioned they are * all used for reducing iron* (and copper) *to
shape" [p. 249].

"The machinery used for wood-work is not less ingenious. It is chiefly of American
origin. In that country machinery for working in wood is even more largely
employed than with us, and these machines find their way into workshops of a
smaller character. Much greater value of manual labour in that country ... as little
work as possible is done by hand ... more attention paid to economy of time and
labour, and to production of rapid results with the least possible expenditure, than
to great durability and finish. [Where] natural obstacles [are] to be contended with
by a scattered population, not elegance of workmanship, but boldness of design" *
[pp. 249-50].

The pump is a machine which employs steam power alone, instead
of human power. One milliard tons (1,000 million tons) of water
were pumped out of the Lake of Harlem in 1836-37 in this way,
using colossal steam engines, connected to the pistons b of 11 pumps.*

//"Before 1836 the Dutch * used to drain their low-lying country by machinery
principally moved by wind-power. 12,000 windmills, with an aggregate power of
60,000 horses"* (thus 5 [horse] power per mill) (this shows the * small dimensions
upon which wind-power to be used), "are required to prevent 2/3 of the Kingdom
of Holland from relapsing to the state of morass and lake from which it has been
rescued. A few small steam engines were also used*" [p. 253].//

* "In England, drainage [is] extensively carried on by aid of the steam engine,
and especially by Mr. Gurney. Not less than 680,000 acres, once in a state of
morass //the fens of Lincolnshire and Cambridgeshire//, are now rich in corn and
cattle. The machinery used by Mr. Gurney for raising the water has been in all
cases a series of scoop-wheels.* They somewhat resemble the undershot
waterwheel; but instead of being turned by the impulse of the water * they [are
used to] lift it, and are moved by steam power. The quantity discharged by the
80 horse engine is nearly 5 tons of water in a second, or about 16,200 tons of
water in an hour" [pp. 254-55].

[XIX-1212] "Centrifugal pumps. (Appold's machine, 1851 Exhibition. Used*

*) *"A more striking example of the use of the common pump could scarcely be
selected. This colossal apparatus differs in no essential respect as regards the
pumping machinery from ordinary lift pumps"* [p. 254].

a Marx adds the German term in brackets.— Ed.

b Marx wrote "piston-rod" over this word, without putting any insertion
mark.— Ed.

30*
earlier in AMERICA and *France.) The ordinary pump only yields in its best form 45% of work, the remainder of the motive power employed in it being lost through its defective arrangements. Some of the worst kinds of pumps yield only 18% of work, and thus absorb 72% in overcoming the resistance, frictions, etc. Appold's pump makes 600 revolutions per minute, and, at that rate, does an average duty of 70% on the power employed"* [pp. 255, 257, 259].

There are various other centrifugal pumps [pp. 260-63].

Washing and drying machine [p. 266].

* "For various purposes in the arts a current of air in rapid motion is required.* E.g. *the whole series of foundry operations, steel-grinding, lace-gassing, warp-drying, etc. In all these procedures a blast of air is absolutely needed.

"The common bellows is constructed upon very faulty principles, and is of course wholly unfit for the wants of the manufacturer. One of its chief defects lies in the interruption of its action, by reason of which it is not capable of giving out a regular and continuous stream of air. To effect this a new adjustment of its parts is necessary. The nozzle* must communicate with a second chamber, in which the air can accumulate under pressure, and the pumping part of the bellows, its lower part, must throw the air into the reservoir, and not, as in the common bellows, directly through the nozzle.

"The smith's bellows is a better machine. Here there is a reservoir for the air; and the current is continuous and not intermittent. By connecting the arm acting on the blacksmith's bellows with the crank* of a steam engine or waterwheel a power air pump of a simple kind is formed; and this sort of machine is often employed where a better one cannot be procured. The volume of air, however, which it is capable of giving out is very small, and cannot be made to receive any high degree of velocity. The pressure, however, up to which the reservoir can be loaded by weights is an advantage, since a small but very powerful jet of air can thus be procured.

"Air machines can, in fact, be arranged under the same head as hydraulic machines. Some are constructed upon the pumping principle, and others on the centrifugal. Bellows belong to the class of pumping machines. For small forges, as in machine shops for the smaller parts of machines, an improved kind of smith's bellows is constructed. Enfer's apparatus a great improvement upon the blacksmith's bellows.

"As it is found in hydraulics that a pump is the only engine which can be satisfactorily used for driving out water at a high pressure, and that centrifugal engines are only fit for low lifts and large quantities; so in this case, the centrifugal air engine is little adapted to the wants of the forge, where a compact and powerful blast is needed more than a broad current of air"* [pp. 272-74].

* The blowing fan (driven also by steam power). //The fan, moved by a handle,* and used on a small scale, an exact type of it.///*

* "In iron foundries of [XIX-1213] continual employment. Air is drawn in at the openings round the axis of the machine, it then passes along the vanes,* and is driven off at their tips* into the tube connected with the apparatus" [pp. 274-76].

"Air pump. Philosophical instrument213; but of primary consequence in the construction of the low-pressure steam engine, for keeping up the vacuum of the
condensing chamber, in the manufacture of sugar, etc. On the great scale applied in *seasoning wood*. The timber is placed in a large vessel of iron half-filled with the seasoning solution, the whole is then hermetically secured, and the air is exhausted by the *air pump* driven by a steam engine. A vacuum having thus been obtained, and the *air removed from the cells of the wood*, air is readmitted into the chamber, and by *its pressure on the surface*, the *liquid* is driven into the wood, thoroughly penetrating every interstice"* [pp. 276-77].

**Corn mills.**

*"It is found that the great friction and pressure necessary to reduce corn to powder heats it so much as to render it very liable to undergo decomposition, and the only method of preventing this is by introducing a current of air between the stones, and thus keeping the flour cool.

"One of the most magnificent flour mills in the Royal Dock-yard at Plymouth. The building is 240 feet long, and 70 feet in height. In the centre 2 steam engines of 45 horsepower, on each side 12 pairs of stones, each performing 123 revolutions in a minute, and grinding 5 bushels of corn per hour, so that when the mill is in full work, 120 bushels of corn are ground in that time, and the flour is dressed by 8 machines. The corn is laid on the upper floor, and then is conducted by spouts, first to screening machines, or cylindrical sieves, arranged somewhat like an Archimedean screw. It is admitted at one end, and being cleaned of sand and dust in its passage, falls into a hopper, from which it passes by spouts to the mill stones.* Then it is *purified of bran.* The machines usually employed consist of a kind of cylinder made of *wirecloth*. The flour is passed into this, and is brushed through the meshes of the cloth by brushes. The flour is sometimes driven through the meshes of the cloth by fans, [which are] made to revolve very rapidly, and thus blow it through. The wirecloth [is] extremely fine in its texture. [At the] 1851 (Exhibition) [there were] specimens* with 22,500 *holes in a square inch. A length of more than 3,900 feet did not exceed one ounce in weight" [pp. 278-79].

"Philosophical instruments: at first of the rudest and simplest construction. The insensitiveness of a chemist's balance, the defective construction of a lens, the incorrect graduation of a thermometer, or the faulty subdivision of the circle of a transit instrument, vitiate all researches in which they are employed.* The accuracy of the PHILOSOPHICAL INSTRUMENTS is therefore of the highest value for scientific advance. Conversely, the *steam engine and the [electric] telegraph* (clocks too for the most part) "are inventions originating entirely in physical science... The old microscope and telescope only gave faulty impressions" [pp. 288-90].

**LIGHT.** 1851 death of Daguerre [p. 291].

[XIX-1214]* Electromagnetism.

*The iron is rendered magnetic by transmitting the voltaic electricity through the bundle of copper wire with which it is enveloped.

*Professor Oersted first discovered that a magnetic needle placed within the influence of a current of electricity circulating through a coil of wire, has immediately a tendency to deflect, or turn aside, communicated to it. In this consists the* 

[Continued on p. 462]

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*a Marx adds the German term in brackets.— Ed.

b Marx quotes with minor alterations.— Ed.*
Proportions of Children, Men and Women Employed in the Factories Proper of the United Kingdom

[XIX-1215] I) Cotton

<table>
<thead>
<tr>
<th>Number of Factories</th>
<th>Children under 13 Males</th>
<th>Females</th>
<th>Males between 13 and 18</th>
<th>Females above 13</th>
<th>Males above 18</th>
<th>Males</th>
<th>Total Females</th>
<th>Males and Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) England and Wales 2,715</td>
<td>21,774</td>
<td>17,382</td>
<td>38,210</td>
<td>216,512</td>
<td>113,720</td>
<td>173,704</td>
<td>233,894</td>
<td>407,598</td>
</tr>
<tr>
<td>b) Scotland 163</td>
<td>307</td>
<td>325</td>
<td>2,661</td>
<td>32,884</td>
<td>5,060</td>
<td>8,028</td>
<td>33,209</td>
<td>41,237</td>
</tr>
<tr>
<td>c) Ireland 9</td>
<td>336</td>
<td>1,910</td>
<td>488</td>
<td>824</td>
<td>1,910</td>
<td>2,734</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Total 2,887</td>
<td>22,081</td>
<td>17,707</td>
<td>41,207</td>
<td>251,306</td>
<td>119,268</td>
<td>182,556</td>
<td>269,013</td>
<td>451,569</td>
</tr>
</tbody>
</table>

II) Woollen

<table>
<thead>
<tr>
<th>Number of Factories</th>
<th>Children under 13 Males</th>
<th>Females</th>
<th>Males between 13 and 18</th>
<th>Females above 13</th>
<th>Males above 18</th>
<th>Males</th>
<th>Total Females</th>
<th>Males and Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) England and Wales 1,456</td>
<td>3,333</td>
<td>2,598</td>
<td>9,811</td>
<td>29,613</td>
<td>30,954</td>
<td>44,098</td>
<td>32,211</td>
<td>76,309</td>
</tr>
<tr>
<td>b) Scotland 184</td>
<td>29</td>
<td>9</td>
<td>1,327</td>
<td>4,592</td>
<td>3,855</td>
<td>5,211</td>
<td>4,601</td>
<td>9,812</td>
</tr>
<tr>
<td>c) Ireland 39</td>
<td>75</td>
<td>417</td>
<td>370</td>
<td>445</td>
<td>417</td>
<td>862</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Total 1,679</td>
<td>3,362</td>
<td>2,607</td>
<td>11,213</td>
<td>34,622</td>
<td>35,179</td>
<td>49,754</td>
<td>37,229</td>
<td>86,983</td>
</tr>
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</table>

III) Worsted

<table>
<thead>
<tr>
<th>Number of Factories</th>
<th>Children under 13 Males</th>
<th>Females</th>
<th>Males between 13 and 18</th>
<th>Females above 13</th>
<th>Males above 18</th>
<th>Males</th>
<th>Total Females</th>
<th>Males and Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) England and Wales 512</td>
<td>6,268</td>
<td>6,906</td>
<td>6,424</td>
<td>45,674</td>
<td>17,700</td>
<td>30,392</td>
<td>52,580</td>
<td>82,972</td>
</tr>
</tbody>
</table>

a The following tables (pp. 458-62) are based on Factories. Return to an Address of the Honourable the House of Commons, dated 24 April 1861. See this volume, pp. 425-40.—Ed.
<table>
<thead>
<tr>
<th>Country</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Females</th>
<th>Males</th>
<th>Females</th>
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<th>Females</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>3</td>
<td>15</td>
<td>33</td>
<td>15</td>
<td>47</td>
<td>15</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>2</td>
<td>487</td>
<td>43</td>
<td>58</td>
<td>487</td>
<td>545</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td>Vacate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>5</td>
<td>502</td>
<td>57</td>
<td>105</td>
<td>502</td>
<td>607</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
VI) **Jute**

[Factories under 13 years old]

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>females</th>
<th>males between 13 and 18</th>
<th>females</th>
<th>males above 13</th>
<th>males above 18</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) <strong>England</strong></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) <strong>Scotland</strong></td>
<td>27</td>
<td></td>
<td></td>
<td>6</td>
<td>84</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>c) <strong>Ireland</strong></td>
<td>5</td>
<td></td>
<td></td>
<td>10</td>
<td>17</td>
<td>10</td>
<td>229</td>
</tr>
<tr>
<td>d) <strong>Total</strong></td>
<td>36</td>
<td></td>
<td></td>
<td>31</td>
<td>71</td>
<td>629</td>
<td>3,847</td>
</tr>
</tbody>
</table>

VII) **Silk**

[Total factories under 11 years old between 11 and 13 years]

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>females</th>
<th>males between 11 and 13</th>
<th>females</th>
<th>males above 11</th>
<th>males above 13</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) <strong>England</strong></td>
<td>761</td>
<td>702</td>
<td>1,130</td>
<td>1,418</td>
<td>3,543</td>
<td>3,185</td>
<td>31,217</td>
</tr>
<tr>
<td>b) <strong>Scotland</strong></td>
<td>8</td>
<td>17</td>
<td>176</td>
<td>26</td>
<td>735</td>
<td>150</td>
<td>193</td>
</tr>
<tr>
<td>c) <strong>Ireland</strong></td>
<td>2</td>
<td>7</td>
<td>21</td>
<td>13</td>
<td>77</td>
<td>16</td>
<td>36</td>
</tr>
<tr>
<td>d) <strong>Total</strong></td>
<td>771</td>
<td>702</td>
<td>1,130</td>
<td>1,442</td>
<td>3,740</td>
<td>3,224</td>
<td>32,029</td>
</tr>
</tbody>
</table>

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*a The source has: 34. — Ed.*
HOSIERY FACTORIES (driven partly by hand, partly by power)

<table>
<thead>
<tr>
<th>FACTORIES</th>
<th>CHILDREN UNDER 13</th>
<th>MALES BETWEEN 13 AND 18</th>
<th>FEMALES UNDER 13 YEARS</th>
<th>MALES ABOVE 18</th>
<th>MALES</th>
<th>TOTAL FEMALES</th>
<th>MALES and FEMALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) England</td>
<td>vacate</td>
<td>411</td>
<td>2,108</td>
<td>1,544</td>
<td>1,955</td>
<td>2,108</td>
<td>4,063</td>
</tr>
<tr>
<td>b) SCOTLAND</td>
<td>0</td>
<td>9</td>
<td>217</td>
<td>198</td>
<td>207</td>
<td>217</td>
<td>424</td>
</tr>
<tr>
<td>c) IRELAND</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>d) TOTAL</td>
<td>69</td>
<td>420</td>
<td>2,325</td>
<td>1,742</td>
<td>2,162</td>
<td>2,325</td>
<td>4,487</td>
</tr>
</tbody>
</table>

GENERAL SUMMARY

<table>
<thead>
<tr>
<th>FACTORIES</th>
<th>SPINDLES</th>
<th>POWER LOOMS</th>
<th>POWER-LOOM WEavers</th>
<th>AMOUNT OF POWER</th>
<th>CHILDREN UNDER 13 MALES</th>
<th>FEMALES</th>
<th>MALES BETWEEN 13 AND 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>England and Wales</td>
<td>5,652</td>
<td>33,095,603</td>
<td>444,233</td>
<td>202,847</td>
<td>328,747</td>
<td>20,003</td>
<td>34,381</td>
</tr>
<tr>
<td>SCOTLAND</td>
<td>568</td>
<td>2,615,220</td>
<td>40,073</td>
<td>23,294</td>
<td>34,609</td>
<td>5,960</td>
<td>681</td>
</tr>
<tr>
<td>IRELAND</td>
<td>158</td>
<td>739,205</td>
<td>6,560</td>
<td>4,423</td>
<td>11,938</td>
<td>3,376</td>
<td>243</td>
</tr>
<tr>
<td>UNITED KINGDOM</td>
<td>6,378</td>
<td>36,450,028</td>
<td>490,866</td>
<td>230,564</td>
<td>375,294</td>
<td>29,339</td>
<td>35,305</td>
</tr>
</tbody>
</table>
principle of the ordinary form of electric telegraph used in this country. * Oersted also discovered * the magnetism induced in a soft bar of iron by the circulation round it of an electric current. Thus by making and unmaking the magnet a series of signals can be transmitted to any distance. Telegraphs in the United States on this principle *” [pp. 328-29].

[See tables on pp. 458-61.]

<table>
<thead>
<tr>
<th></th>
<th>MALES</th>
<th>FEMALES</th>
<th>MALES AND FEMALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>England and Wales</td>
<td>271,440</td>
<td>371,167</td>
<td>642,607</td>
</tr>
<tr>
<td>Scotland</td>
<td>25,343</td>
<td>69,712</td>
<td>95,055</td>
</tr>
<tr>
<td>Ireland</td>
<td>11,490</td>
<td>26,382</td>
<td>37,872</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>308,273</td>
<td>467,261</td>
<td>775,534</td>
</tr>
</tbody>
</table>

Females about $^{10/16}=^{5/8}$ of the total, and males $=^{3/8}$. The number of males is smaller if 5 are deducted per each of the 6,378 factories to account for males not actually in the factories. 31,890 males should therefore be deducted, say 30,000.

[XIX-1218] The number of children under 13 comes to 69,593, nearly $^{1/11}$ of the total. The total number of children cannot be given, since with the males all those between 13 and 18 are lumped together, with the females all those over 13.

The number of males over 18 only comes to 201,636, of whom over 31,000 must be deducted; say 31,000. There remain 170,636.

If we take the number as given in the statistics, the proportion of males over 18 = ABOUT $^{5/19}$, less than $^{1/3}$.

If we take the number after deduction of the 31,000, the number of males over 18 = ABOUT the 4.5th part, or less than $^{1/4}$.

There are 230,564 weavers to 490,866 looms. Approximately 2.1 looms to 1 weaver.

The proportion of spindles to workers is more difficult to calculate. Firstly we must deduct the workers employed on the looms. Secondly those employed outside the factory, and those not engaged in direct factory labour. Thus the engineers, stokers, mechanics, etc., must also be reckoned here. And there are at least 8 to be deducted per average factory. Removing the weavers leaves 544,970. And removing 8 per factory over 6,378 factories leaves 493,874. But now there are the additional difficulties 1) that we do not know how many are otherwise employed in the weaving industry; and 2) that the gigs (only in the woollen industry) are not separately listed.

But the total number of gigs is only 2,163. They can therefore
be left out of account. But we find approximately 113,308 persons in the categories covering factories where weaving alone is done (first a further deduction of 4,487 has to be made for hosiery; there remain 489,378). Of these only 81,049 are weavers, more than $\frac{3}{10}$ of a person to 1 weaver; approximately.

But we have given the number of spindles per person elsewhere.

[Horse]power altogether is 404,633. After deducting those not employed in the factory this is almost 2 [horse]power to 1 person. But these numbers must only be used for the sex and age ratios, since what needed to be said on the other points has been said elsewhere.

We have:

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1861</td>
<td>2,887 COTTON factories in the United Kingdom, employing 451,569 persons = over 156 per factory</td>
</tr>
<tr>
<td>1835</td>
<td>1,250 employing 193,544 persons = over 155 per factory</td>
</tr>
</tbody>
</table>

1861: MALES 182,556; FEMALES 269,013 = 1:1.4, thus about $1:1\frac{2}{5}$
1835: 100,258 119,124 = 1:1.1. 1:1\frac{1}{10}

Horsepower and spindles cannot be compared, owing to deficiencies in the last lists, those of 1836.

Further:

1861: 2,211 WOOLLEN and WORSTED factories with 173,046 = over 78 persons per factory
1835: 1,315 with 158,484 = over 120

1861: MALES 81,255; FEMALES 91,791 = 1:1.1
1835: MALES 39,360 27,569 = 1.4:1

[XIX-1219] And in the flax factories:
1861: 399 factories with 87,429 persons = over 219 per factory
1835: 352 with 32,868 = over 93

1861: MALES: 24,616; FEMALES: 62,813 = 1:2.5
1835: MALES: 10,342 22,526 = 1:2,1

Finally in the silk factories:
1861: 771 factories with 52,429 persons = 68 persons per factory
1835: 237 30,407 = over 128

---

a Marx did not complete the calculation.—Ed.
b See this volume, pp. 434, 436, 438.—Ed.
Relative Surplus Value

1861: Males 15,530; females 36,899 = 1:2.3  
1835: Males 9,969  

1861: in 6,268 cotton, wool and worsted, flax and silk factories, there were: 
Males above 18: 198,351. Total number: 664,473 
1835: in 3,154 of these factories, there were: 
Males above 18: 88,859. Total number: 344,623 

1861: the proportion of males above 18 to the total number = 1:3.3  
1835: = 1:3.8

4 persons to 1 horsepower is the average (Reports of [the] Inspectors of Factories, October 1856, p. 9).*

General returns were made by order of Parliament in 1835, 1838, 1850, 1856, and 1861.

[XIX-1220] I. United Kingdom

Number of factories

<table>
<thead>
<tr>
<th></th>
<th>1838</th>
<th>1850</th>
<th>1856</th>
<th>1861</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>1,819</td>
<td>1,932</td>
<td>2,210</td>
<td>2,887</td>
</tr>
<tr>
<td>Woollen</td>
<td>1,322</td>
<td>1,497</td>
<td>1,505</td>
<td>1,679</td>
</tr>
<tr>
<td>Worsted</td>
<td>416</td>
<td>501</td>
<td>525</td>
<td>532</td>
</tr>
<tr>
<td>Flax</td>
<td>392</td>
<td>393</td>
<td>417</td>
<td>399</td>
</tr>
<tr>
<td>Silk</td>
<td>268</td>
<td>277</td>
<td>460</td>
<td>771</td>
</tr>
<tr>
<td></td>
<td>4,217</td>
<td>4,600</td>
<td>5,117</td>
<td>6,268</td>
</tr>
</tbody>
</table>

Horsepower employed

<table>
<thead>
<tr>
<th></th>
<th>1838</th>
<th>1850</th>
<th>1856</th>
<th>1861</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>59,803</td>
<td>82,555</td>
<td>97,132</td>
<td>394,100c</td>
</tr>
<tr>
<td>Woollen</td>
<td>20,617</td>
<td>22,144</td>
<td>25,901</td>
<td>36,477</td>
</tr>
<tr>
<td>Worsted</td>
<td>7,176</td>
<td>11,515</td>
<td>14,904</td>
<td>28,204</td>
</tr>
<tr>
<td>Flax</td>
<td>11,089</td>
<td>14,292</td>
<td>18,322</td>
<td>46,081</td>
</tr>
<tr>
<td>Silk</td>
<td>3,384</td>
<td>3,711</td>
<td>5,176</td>
<td>7,050</td>
</tr>
<tr>
<td></td>
<td>102,069</td>
<td>134,217</td>
<td>161,435</td>
<td>411,912</td>
</tr>
</tbody>
</table>

Powerlooms

<table>
<thead>
<tr>
<th></th>
<th>1836</th>
<th>1850</th>
<th>1856</th>
<th>1861</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>108,751</td>
<td>249,627</td>
<td>298,847</td>
<td>399,992</td>
</tr>
<tr>
<td>Woollen</td>
<td>2,150</td>
<td>9,439</td>
<td>14,453</td>
<td>21,770</td>
</tr>
<tr>
<td>Worsted</td>
<td>2,969</td>
<td>32,617</td>
<td>38,956</td>
<td>43,048</td>
</tr>
</tbody>
</table>

a Reports of the Inspectors of Factories to Her Majesty’s Principal Secretary of State for the Home Department for the Half Year ending 31st October 1856. London, 1857, p. 11; cf. also this volume, pp. 458-61.—Ed.
b Ibid., p. 30.—Ed.
c The source has: 294,100.—Ed.
d Ibid., p. 16.—Ed.
### Spindles Employed in the United Kingdom

<table>
<thead>
<tr>
<th>Year</th>
<th>1850</th>
<th>1856</th>
<th>1861</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silk</td>
<td>1,714</td>
<td>6,092</td>
<td>9,260</td>
</tr>
<tr>
<td>Flax</td>
<td>209</td>
<td>3,670</td>
<td>7,689</td>
</tr>
<tr>
<td>Total</td>
<td>115,793</td>
<td>301,445</td>
<td>369,205</td>
</tr>
</tbody>
</table>

**Average Number of Spindles in Each Factory, United Kingdom**

<table>
<thead>
<tr>
<th>Year</th>
<th>1850</th>
<th>1856</th>
<th>1861</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>14,000</td>
<td>17,000</td>
<td>About 17,000 (not quite)</td>
</tr>
<tr>
<td>Worsted</td>
<td>2,200</td>
<td>3,400</td>
<td>Over 3,725</td>
</tr>
<tr>
<td>Flax</td>
<td>2,700</td>
<td>3,700</td>
<td>Over 4,195</td>
</tr>
</tbody>
</table>

**Average Number of Spindles per Horsepower, United Kingdom**

<table>
<thead>
<tr>
<th>Year</th>
<th>1850</th>
<th>1856</th>
<th>1861</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>275</td>
<td>315</td>
<td>146^?</td>
</tr>
<tr>
<td>Worsted</td>
<td>86</td>
<td>102</td>
<td>?</td>
</tr>
</tbody>
</table>

### Persons Employed, United Kingdom, Total Number

<table>
<thead>
<tr>
<th>Year</th>
<th>1835</th>
<th>1838</th>
<th>1850</th>
<th>1856</th>
<th>1861</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>219,386</td>
<td>259,104</td>
<td>330,924</td>
<td>379,213</td>
<td>451,569</td>
</tr>
<tr>
<td>Woollen</td>
<td>55,461</td>
<td>54,808</td>
<td>74,443</td>
<td>79,091</td>
<td>86,983</td>
</tr>
<tr>
<td>Worsted</td>
<td>15,880</td>
<td>31,628</td>
<td>79,737</td>
<td>87,794</td>
<td>86,063</td>
</tr>
<tr>
<td>Flax</td>
<td>33,212</td>
<td>43,557</td>
<td>68,434</td>
<td>80,262</td>
<td>87,420</td>
</tr>
<tr>
<td>Silk</td>
<td>30,745</td>
<td>34,303</td>
<td>92,544</td>
<td>56,137</td>
<td>52,429</td>
</tr>
<tr>
<td>Total</td>
<td>354,684</td>
<td>423,400</td>
<td>596,082</td>
<td>682,497</td>
<td>775,534</td>
</tr>
</tbody>
</table>

Thus there was a positive decline [in 1856-61] in the number of persons employed in the worsted and silk factories.

### Children under 13 Years

<table>
<thead>
<tr>
<th>Year</th>
<th>1835</th>
<th>1838</th>
<th>1850</th>
<th>1856</th>
<th>1861</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>28,673</td>
<td>12,327</td>
<td>14,993</td>
<td>24,648</td>
<td>39,788</td>
</tr>
<tr>
<td>Woollen</td>
<td>9,451</td>
<td>6,203</td>
<td>7,094</td>
<td>6,703</td>
<td>5,969</td>
</tr>
<tr>
<td>Worsted</td>
<td>3,959</td>
<td>4,534</td>
<td>9,956</td>
<td>11,228</td>
<td>13,178</td>
</tr>
</tbody>
</table>

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^a Ibid., p. 14.—Ed.
^b Ibid., p. 16.—Ed.
^c Ibid., p. 17.—Ed.
^d Ibid., p. 31; cf. also this volume, p. 462.—Ed.
^e The source has: 42,544.—Ed.
^f Here and below, *Reports of the Inspectors of Factories... for the Half Year ending 31st October 1856*, p. 30.—Ed.
It should be remarked that in 1835 over $\frac{2}{3}$ of the children still worked **full time** (17,147 worked only **8 hours and attended school**). Since 1838 children have only worked **half time**, and in the **silk industry** children between the ages of 8 and 11 (not between 11 and 13) have worked **half time and attended school**.

**MALES BETWEEN 13 and 18**

<table>
<thead>
<tr>
<th></th>
<th>1835</th>
<th>1838</th>
<th>1850</th>
<th>1856</th>
<th>1861</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>27,339</td>
<td>41,046</td>
<td>37,059</td>
<td>38,941</td>
<td>41,207</td>
</tr>
<tr>
<td>Woolen</td>
<td>8,042</td>
<td>11,018</td>
<td>11,884</td>
<td>11,134</td>
<td>11,213</td>
</tr>
<tr>
<td>Worsted</td>
<td>2,081</td>
<td>3,755</td>
<td>7,695</td>
<td>7,116</td>
<td>6,614</td>
</tr>
<tr>
<td>Flax</td>
<td>3,457</td>
<td>5,953</td>
<td>8,012</td>
<td>8,950</td>
<td>7,974</td>
</tr>
<tr>
<td>Silk</td>
<td>2,654</td>
<td>4,739</td>
<td>4,951</td>
<td>6,059</td>
<td>3,224</td>
</tr>
<tr>
<td>Total</td>
<td>44,573</td>
<td>66,509</td>
<td>67,864</td>
<td>72,220</td>
<td>70,235</td>
</tr>
</tbody>
</table>

**FEMALES ABOVE 13**

<table>
<thead>
<tr>
<th></th>
<th>1835</th>
<th>1838</th>
<th>1850</th>
<th>1856</th>
<th>1861</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>105,545</td>
<td>141,184</td>
<td>183,912</td>
<td>211,742</td>
<td>251,306</td>
</tr>
<tr>
<td>Woolen</td>
<td>19,150</td>
<td>18,833</td>
<td>26,810</td>
<td>30,579</td>
<td>35,179</td>
</tr>
<tr>
<td>Worsted</td>
<td>8,136</td>
<td>20,321</td>
<td>46,901</td>
<td>51,371</td>
<td>47,652</td>
</tr>
<tr>
<td>Flax</td>
<td>19,961</td>
<td>29,828</td>
<td>46,843</td>
<td>55,863</td>
<td>60,690</td>
</tr>
<tr>
<td>Silk</td>
<td>14,904</td>
<td>20,806</td>
<td>29,027</td>
<td>38,271</td>
<td>32,029</td>
</tr>
<tr>
<td>Total</td>
<td>167,696</td>
<td>230,972</td>
<td>333,493</td>
<td>387,826</td>
<td>426,856</td>
</tr>
</tbody>
</table>

**MALES ABOVE 18**

<table>
<thead>
<tr>
<th></th>
<th>1835</th>
<th>1838</th>
<th>1850</th>
<th>1856</th>
<th>1861</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>57,829</td>
<td>64,547</td>
<td>94,960</td>
<td>103,882</td>
<td>119,268</td>
</tr>
<tr>
<td>Woolen</td>
<td>18,818</td>
<td>18,754</td>
<td>28,655</td>
<td>30,675</td>
<td>35,179</td>
</tr>
<tr>
<td>Worsted</td>
<td>1,704</td>
<td>3,020</td>
<td>15,185</td>
<td>18,079</td>
<td>31,501</td>
</tr>
<tr>
<td>Flax</td>
<td>4,504</td>
<td>6,009</td>
<td>11,998</td>
<td>13,643</td>
<td>15,223</td>
</tr>
<tr>
<td>Silk</td>
<td>4,105</td>
<td>4,306</td>
<td>7,068</td>
<td>10,121</td>
<td>10,162</td>
</tr>
<tr>
<td>Total</td>
<td>86,960</td>
<td>96,636</td>
<td>157,866</td>
<td>176,400</td>
<td>211,332</td>
</tr>
</tbody>
</table>

In looking at the increase in the number of workers employed in the factories the following distinctions must always be made: this occurs either a) as a result of the spread of an established machine industry (e.g. the cotton spinning factory); or b) through subsumption under machine production of spheres previously subordinated to handicraft production (particularly where one kind of production, e.g. cotton spinning or weaving, is taken over by
machinery, and machinery is then gradually applied to every kind of spinning and weaving); or lastly c) through incorporating into the factory certain branches of a machine-based industry which previously stood outside the factory and were carried on in handicraft fashion. Thus the Reports of the Inspectors of Factories for 31 October 1856 remarks as follows in relation to the above tables\(^a\) (the data for 1861 of course missing):

[XIX-1224] *“The increase of cotton looms”* (since 1838) *“has been consequent upon the extension of trade, not from power having been applied to any special article formerly woven solely by hand”* (this is therefore an example of a), above; *“but in the other fabrics it will be found that power is now applied to the carpet loom, the ribbon loom, and to the linen loom, in which its application had hitherto been very much restricted. In these three fabrics, intricate and carefully conceived alterations were necessary to adapt the looms to steam power”* (i.e., p. 16). (The latter process is an example of b).)

*“The application of power to the process of combing wool ... extensively in operation since the introduction of the ‘combing machine’, especially ‘Lister’s’ ... undoubtedly had the effect of throwing a very large number of men out of work. Wool was formerly combed by hand, most frequently in the cottage of the comber. It is now very generally combed in the factory, and hand labour is superseded, except in some particular kinds of work, in which hand-combed wool is still preferred. Many of the hand combers found employment in factories, but the produce of the hand comber bears so small a proportion to that of the machine, that the employment of a very large number of combers has passed away”* (l.c., [p.] 16).

*“The increased employment of men in worsted factories is doubtless owing in some measure to the process of ‘combing wool’ being now very generally performed in the factories since the introduction of combing machines”* (this is thus an example of c)); *“and the large proportion of men employed in woollen factories arises from the heaviness of the material, and consequently of the work, in dressing and finishing factories”* (l.c., [pp.] 19-20).

*“It will be seen,”* the same Report says, *“that the number of children has decreased since 1835 very considerably in woollen and flax factories, while it has gradually increased in worsted factories. The decrease in the former is to be attributed to the introduction of machinery, now rapidly increasing, whereby the labour of children is entirely superseded.”* (This was a consequence of the Ten Hours’ Bill.) *“The greater number of children now employed in worsted factories is not a consequence of an increased demand for juvenile labour, but of the immense development of the worsted manufacture during the last twenty years... The largest proportion of children is employed in worsted factories—being double the proportion of cotton factories—the smallest proportion in flax factories”* (l.c., [p.] 19).

Since silk and worsted factories are the only ones in which we find on comparing 1856 and 1861 an absolute (and not merely relative) decline in the number of persons employed, it is worth while looking at these facts more closely.

But first the following should be quoted on the spread of

---

\(^a\) See this volume, pp. 465-66.— Ed.
Relative Surplus Value

machinery, or rather of power-driven machinery, from the above Report.

* "The adaptation of power to machinery heretofore moved by hand is almost of daily occurrence... the minor improvements in machinery having for their object the 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 [XIX-1225] constant, and though sometimes apparently of no great moment, have somewhat important results" (l.c., 1856, 31st October, p. 15).*

In the same place it says:

* "There has been no mechanical invention of recent years which has created so great a revulsion in the mode of manufacture, and eventually in the habits of the operatives, as the spinning jenny and throstle frame did"* (l.c., [p.] 15).

Here the correct sequence of events is correctly expressed. The "mechanical invention" first. Thereby there was created a "revulsion in the mode of manufacture" (mode of production) and hence in the relations of production, hence the social relations and "eventually" in the "habits of the operatives".

* "The application of power to the loom is the cause of the greatest diversion of labour from an old channel to which recent public attention has been drawn. The sufferings of the handloom weavers were the subject of an inquiry by a Royal Commission, but although their distress was acknowledged and lamented, the amelioration of their condition was left, and probably necessarily so, to the chances and changes of time, which it may now be hoped have nearly obliterated those miseries, and not improbably by the present great extension of the powerloom. It has never been possible to ascertain the number of handlooms, but an estimate has been given that the number of handloom weavers and their families consisted of about 800,000 persons in 1838. At that date steam power was employed almost exclusively for cotton looms, or for fabrics mixed with cotton, but immediately afterwards there was a rapid increase in the number of powerlooms for all fabrics, woollen, worsted, flax, and silk, and their increase has continued to the present time"* (l.c., [p.] 15).

The same Reports for 1856, 31st October, has the following to say about the growth of factories (I am adding the data for 1856-61):

* "The average increase of factories from 1838 to 1850"* (12 years) *"was at the rate of 32 per annum, while from 1850 to 1856 it has been at the rate of 86 per annum"* (and from 1856-61 //excluding the newly added hemp and jute factories, as well as the "mechanical" hosiery factories// 230 per annum). *"In the former period" (1838-50) "the increase was confined to factories engaged in the manufacture of cotton, woollen, and worsted, and the increase was in the following proportions: in cotton factories 6%: woollen factories 13%; worsted factories 20%. In the period between 1850 and 1856, the principal increase has been in cotton and silk factories. The aggregate increase is, in cotton factories 14.2%; woollen 5%; worsted 4.7; flax 6.1; silk 66.0%"* (l.c., [p.] 12).

[XIX-1226] The increase for the period between 1856 and 1861 is: cotton by 13%, woollen 11%, worsted 1%. Flax: reduction by 5%. Silk: increase by 67%.
What is interesting, therefore, is that 1) in flax the number of factories declined between 1856 and 1861 by about 5%, or 18 in 5 years (average of each year). This shows concentration. But 2) in silk, on the other hand, where there was the biggest increase in the number of factories, there was also a decline in the number of workers, and the same thing occurred in worsted.

**Flax Factories**

<table>
<thead>
<tr>
<th>Year</th>
<th>Factories</th>
<th>Spindles</th>
<th>Looms</th>
<th>Power</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>399</td>
<td>3,670</td>
<td>14,292</td>
<td>68,434</td>
<td></td>
</tr>
<tr>
<td>1856</td>
<td>417</td>
<td>7,689</td>
<td>18,322</td>
<td>80,262</td>
<td></td>
</tr>
<tr>
<td>1861</td>
<td>399</td>
<td>1,216,674</td>
<td>36,081</td>
<td>87,429</td>
<td></td>
</tr>
</tbody>
</table>

The spindles must be looked into later. So here there is enormous concentration. The amount of power has almost doubled in 5 years [1856-61]; thus an increase of almost 100%. The number of people employed, in contrast, has only grown by about 8%. The number of factories has fallen.

In worsted the growth of factories has been very slight, at 1%, and the number of workers has fallen.

**Worsted Factories**

<table>
<thead>
<tr>
<th>Year</th>
<th>Factories</th>
<th>Spindles</th>
<th>Looms</th>
<th>Power</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>501</td>
<td>32,617</td>
<td>11,515</td>
<td>79,737</td>
<td></td>
</tr>
<tr>
<td>1856</td>
<td>525</td>
<td>38,956</td>
<td>14,904</td>
<td>87,794</td>
<td></td>
</tr>
<tr>
<td>1861</td>
<td>532</td>
<td>1,289,172</td>
<td>28,204</td>
<td>86,063</td>
<td></td>
</tr>
</tbody>
</table>

This is a very good example. Just like the one of the flax factories.

**Silk Factories**

<table>
<thead>
<tr>
<th>Year</th>
<th>Factories</th>
<th>Spindles</th>
<th>Looms</th>
<th>Power</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>277</td>
<td>6,092</td>
<td>3,711</td>
<td>42,544</td>
<td></td>
</tr>
<tr>
<td>1856</td>
<td>460</td>
<td>9,260</td>
<td>5,176</td>
<td>56,137</td>
<td></td>
</tr>
<tr>
<td>1861</td>
<td>771</td>
<td>1,338,544</td>
<td>7,050</td>
<td>52,429</td>
<td></td>
</tr>
</tbody>
</table>

This example is very good.

[XIX-1227] Concentration.

*"There are now" (1856) "but 8 more woollen factories than in 1850, and yet the power employed in woollen factories has increased during the same period by 3,757 horses"* (l.c., [p.] 13).

**Economy of power.** It says in the same Reports of the Inspectors of Factories for 31st October 1856:

*"Great as the increase of the power employed undoubtedly is,—59,366 horsepower between 1838 and 1856—it is nevertheless much below the actual
additional force available and in motion for manufacturing purposes. The Return of 1838 gave the number of steam engines and of waterwheels, with the amount of horsepower employed. At that time the figures represented a much more accurate estimate of the actual power employed than do the figures in the Returns either of 1850 or 1856. The figures given in the Returns are all of the nominal power of the engines and wheels, not of the power actually employed or capable of being employed. The modern steam engine of 100 horsepower is capable of being driven at a much greater force than formerly, arising from improvements in its construction, the capacity and construction of the boilers, etc., and thus the nominal power of a modern manufacturing steam engine cannot be considered more than an index from which its real capabilities may be calculated" * (l.c., [pp.] 13-14).

"In the Reports for October 1852 Mr. Horner quotes *a letter from James Nasmyth, the eminent civil engineer, of Patricroft, near Manchester, explaining at some length the nature of recent improvements in the steam engine, whereby the same engine can be made to perform more work with a diminished consumption of fuel.*" Its says at the end of this letter:

*"It would not be very easy to get an exact return as to the increase of performance or work done by the identical engines to which some or all of these improvements have been applied; I am confident, however, that, could we obtain an exact return, the result would show that from the same weight of steam-engine machinery we are now obtaining at least 50% more duty or work performed on the average, and that, as said before, in many cases the identical steam engines which, in the days of the restricted speed of 220 feet per minute, yielded 50 horsepower, are now yielding upwards of 100" * [p. 14].

The Reports for 31st October 1856 comments further:

*"The fact that the nominal horsepower of the steam engine is but an index of its actual force, will be further evident upon a comparison of horsepower and machinery employed in 1850 and 1856. In the former period the factories of the United Kingdom employed 134,217 nominal horsepower to give motion to 25,638,716 spindles and 301,445 looms. The number of spindles and looms in 1856 was respectively 33,503,580 of the former and 369,205 of the latter, which, reckoning the force of the nominal horsepower required to be the same as in 1850, would require a force equal to 175,000 horses, but the actual power given in the Return for 1856 is 161,435, less by above 10,000 horses than, calculating upon the basis of the return of 1850, the factories ought to have required in 1856. The number of persons employed bears exactly the same proportion for nominal horsepower as in 1838 and 1850, [XIX-1228] viz. four persons" * (l.c., [p]p. 14-15).

The Reports of the Inspectors of Factories for 31st October 1856 concludes (in the general report):

*"The facts thus brought out by the Return appear to be that the factory system is increasing rapidly; that although the same number of hands are employed in proportion to the horsepower as at former periods, there are fewer hands employed in proportion to the machinery; that the steam engine is enabled to drive an increased weight of machinery by economy of force, and other methods, and that an increased quantity of work can be turned off by improvements in machinery, and in methods of manufacture, by increase of speed of the machinery, and by a variety of other causes" * ([p.] 20).²

Child labour.

*"The educational clauses of the Factory Act being held in such disfavour by millowners" (Reports of the Inspectors of Factories [...] 31st October 1856, p. 66, report of Sir John Kincaid).*

(One only needs to read these Reports to be convinced of the "grotesque" way in which the clauses on schooling ARE COMPLIED WITH. Daily ATTENDANCE FOR SOME HOURS AT SCHOOL.)

*"Children who are required in cotton, woollen, worsted and flax factories to attend school from the age of 8 years to that of 13 are, if employed in silk-throwing mills, released from school at 11 years of age, and are then employed for full time. Even this very modified application of the half-time system was only required by the Factory Act of 1844, previous to which time their exemption from the restrictions upon the labour of children was in practice complete" (report of Mr. Alexander Redgrave, p. 77).

"The so-called education clauses in the Factory Acts enact no more than that the children shall attend a school... Before the passing of the Act of 1844, certificates of school attendance were not very rare, which had been signed by the schoolmaster or schoolmistress with a +, as they were unable to write. On one occasion, on visiting a place called a school, from which certificates of school attendance had issued, I was so struck with the ignorance of the master, that I said to him, 'Pray, Sir, can you read?' His reply was—'Aye, summat (somewhat)', and as a justification of his right to grant certificates, he added, 'At any rate, I am before my scholars.'

"The Inspectors, when the Bill of 1844 was in preparation, did not fail to represent the disgraceful state of the places called schools, certificates from which they were obliged to admit as a compliance with the law; but they were successful only in obtaining thus much, that since the passing of the Act of 1844, the figures in the school certificate must be filled up in the handwriting of the schoolmaster, who must also sign his Christian and surname in full" (Reports ... 31st October 1855, [pp.] 18-19. L. Horner).*


*"The practice of setting children prematurely to work ... prevailed in the 17th century to an extent which, when compared with the extent of the manufacturing system, seems almost incredible. At Norwich, the chief seat of the clothing trade, a little creature of 6 years old was thought fit for labour. Several writers of that time, and among them some who were considered as eminently benevolent, mention, with exultation, the fact, that in that single city boys and girls of tender age created wealth exceeding what was necessary for their own subsistence by 12,000 pounds a year. The more carefully we examine the history of the past, the more reason shall we find to dissent from those who imagine that our age has been fruitful of new social evils. The truth is, that the evils are, with scarcely an exception, old. That which is new is the intelligence which discerns and the humanity which remedies them."*  

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* Quoted from Reports of the Inspectors of Factories ... for the Half Year ending 31st October 1855, London, 1856, p. 18.—Ed.
"The Legislature is alone to blame, by having passed a delusive law, which, while it would seem to provide that the children employed in factories shall be educated, contains no enactment by which that professed end can be secured. It provides nothing more than that the children shall on certain days of the week, and for a certain number of hours (3) on each day, be inclosed within the four walls of a place called a school, and that the employer of the child shall receive weekly a certificate to that effect signed by a person designated by the subscriber as a schoolmaster or schoolmistress" (Reports of the Inspectors of Factories ... 30th June 1857, report of L. Horner, [p.17].

Horner says in the same report, pp. 17-18:

*"But it is not only in the miserable places above referred to that the children obtain certificates of school attendance without having received instruction of any value, for in many schools where there is a competent teacher, his efforts are of little avail from the distracting crowd of children of all ages, from infants of 3 years old and upwards; his livelihood, miserable at the best, depending on the pence received from the greatest number of children whom it is possible to cram into the space. To this is to be added scanty school furniture, deficiency of books, and other materials for teaching, and the depressing effect upon the poor children themselves of a close, noisome atmosphere. I have been in many such schools, where I have seen rows of children doing absolutely nothing; and this is certified as school attendance, and, in statistical returns, such children are set down as being educated.

"The effect of the half-time system appears to have caused the employment of the smallest number of children who would be subject to that system" (Reports of the Inspectors of Factories ... 30th June 1857, report of Mr. Alexander Redgrave, [p.] 78).*

A very pretty example of factory education is to be seen in printworks (before these were entirely subject to the Factory Act, i.e. before 1861):

[XIX-1230] *"The school attendance of children employed in printworks is thus provided for:

"Every child before being employed in a printwork must have attended school for at least 30 days and not less than 150 hours during the 6 months immediately preceding such first day of employment, and during the continuance of its employment in the printwork it must attend for a like period of 30 days and 150 hours during every successive period of 6 months, reckoned from the first day of its employment.

"The attendance at school must be between 8 a.m. and 6 p.m. No attendance of less than 2 hours and a half nor more than 5 hours, on any one day, shall be reckoned as part of the 150 hours.

"Under ordinary circumstances the children attend school morning and afternoon for 30 days, for at least 5 hours each day, and upon the expiration of the 30 days, the statutory total of 150 hours having been attained—having in their language 'made up their book'—they return to the printwork, where they continue until the 6 months have expired, when another instalment of school attendance becomes due, and they again seek the school until the book is again made up... Very many boys, having attended school for the required number of hours (150), when they return to school after the expiration of their 6 months' work in the

a Should be April.—Ed.
Division of Labour and Mechanical Workshop

printwork, are in the same condition as when they first attended school as printwork boys ... [they] have lost all that they gained by their previous school attendance" (Reports of the Inspectors of Factories ... 31st October 1857, report of Alexander Redgrave, [pp.] 41-42).

"In other printworks the children's attendance at school is made to depend altogether upon the exigencies of the work in the establishment; the requisite number of hours is made up each 6 months by instalments consisting of from 3 to 5 hours at a time, spreading over perhaps the whole six months... For instance, the attendance on one day might be from 8 a.m. to 11 a.m., on another day from 1 p.m. to 4 p.m., and the child might not appear at school again for several days, when it would attend, perhaps from 3 p.m. to 6 p.m.; then it might attend for 3 or 4 days consecutively or for a week, then it would not appear in school for 3 weeks or a month, after that, upon some odd days at some odd hours when the operative who employed it chose to spare it; and thus the child was, as it were, buffeted from school to work, from work to school, until the tale of 150 hours was told"* (i.e., [pp.] 42-43).

Influence of the Ten Hours' Bill in increasing the intensity of labour.

*"The great improvements that have been made in machinery, of all kinds, have vastly improved their productive powers; improvements to which a stimulus was doubtlessly given, especially as regards the greater speed of the machinery in a given time, by the restrictions of the hours of work. These improvements, [XIX-1231] and the closer application which the operatives are enabled to give, have had the effect... of as much work being turned off in the shortened time as used to be in the longer hours" (Reports of the Inspectors of Factories ... 31st October 1858, report of L. Horner, [p.] 10).*

"The Children's Employment Commission, the reports of which have been published several years, brought to light many enormities, which still continue—some of them much greater than any that factories and printworks were ever charged with"* (i.e., [p.] 10).

Concentration:

*Chief branches of Scotch manufactures, in the course of 20 years between 1835 and 1857, as quoted from Parliamentary Returns:

<table>
<thead>
<tr>
<th>Year</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1835</td>
<td>170</td>
<td>3,392</td>
<td>13,409</td>
</tr>
<tr>
<td>1857</td>
<td>168</td>
<td>8,331</td>
<td>31,722</td>
</tr>
</tbody>
</table>

"The flax branch shows a decrease of 2 in the number of mills, but with the large addition of 18,313 in the number of hands employed, showing the extent to which small mills have been superseded by the larger class, during the period mentioned" (Reports of the Inspectors of Factories ... 31st October 1858, report of Sir John Kincaid, [p.] 30).*

He has this to say of one school, in the same report:

*"The school apartment was about 15 feet long and 10 feet wide; and within that space, we counted 75 children screaming something unintelligible, at the top of their voices" (i.e., p. 32).*

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a Marx also quotes this passage in Notebook V of this manuscript (see present edition, Vol. 30, p. 338).— Ed.
Age of the children and INVENTIONS TO GET RID OF TWO SETS OF HALF-TIMES.

* "The mill-occupier requires juvenile labour in his factory, and obtains it in the manner enjoined by statute. The question of real age is one with which he does not trouble himself. What he looks for in the juvenile hands is strength to enable them to perform their respective work. If the child has strength for the work, it is not a question of whether the child is of the age at which he may be legally withdrawn from school and half-time employment, but whether its appearance will justify the certifying surgeon in granting to it a full-time certificate for employment in his factory... My attention was called to an advertisement which appeared in the local newspaper of an important manufacturing town of my district, of which the following is a copy:

"Wanted from 12 to 20 boys, not younger than what will pass for 13 years of age... Wages 4s. per week. Apply..." (Reports of the Inspectors of Factories ... 31st October 1858, report [XIX-1292] of Alexander Redgrave, [pp.] 40-41).

"Thus there are frequently two antagonists to the half-time system of education, the parent who seeks full-time wages, and the manufacturer who seeks the full-time worker. Most manufacturers, when the nature of the employment will permit of the arrangement, and when a sufficient supply of older hands can be procured, dispense with the labour of half-time children, i.e. children under 13 years of age... The manufacturers of textile fabrics have been singled out, as it were, from all other manufacturers by whom children are employed..."*

//Because it was in these factories that the FACTORY SYSTEM was first developed in its full hideousness. The CHILDREN'S EMPLOYMENT COMMISSION was actually called into being by these MILLOWNERS, in order to prove the existence of as great, and even greater, ENORMITIES in the other branches of MANUFACTURING and mining, in the coalmines, and the glass, porcelain, etc., factories.// (l.c., [p.] 42.)

*"Employers of labour would not unnecessarily retain 2 sets of children under 13 if they could obtain a sufficient number of children fit for the work above that age. In fact one class of manufacturers, the spinners of woollen yarn, now rarely employ children under 13 years of age, i.e. half-times."*

(The expression is a good one. The workers are only time, FULL-TIMES OR HALF-TIMES.)

*"They have introduced improved and new machinery of various kinds, which altogether supersedes the necessity for the employment of children; f.i.: I will mention one process... wherein, by the addition of an apparatus, called a piecing machine, to existing machines, the work of 6 or 4 half-times, according to the peculiarity of each machine, can be performed by one young person. 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 by the aid of the human apparatus, and undoubtedly the half-time system had some share in stimulating the invention of the 'piecing machine'" (l.c., [pp. 42-] 43).*

Baynes (of Blackburn, at that time MAYOR of Blackburn) says in a LECTURE given in 1858 ON THE COTTON STATISTICS:

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"Each real and mechanical horsepower will drive 450 self-acting mule spindles with preparation, or 200 thistle spindles, or 15 looms for 40 inches cloth, with winding, warping, and sizing. Each horsepower in spinning will give employment to $2\frac{1}{2}$ operatives, but in weaving to 10 persons, at wages averaging full 10s. 6d. a week to each person—men, women, and children, including half-times.* For the average numbers spinning production at 13 ounces per spindle..." *a

* Water power and steam power.*

"In the early days of textile manufactures, the locality of the factory depended upon the existence of a stream having a sufficient fall to turn a waterwheel; and, although the establishment of these water mills was the commencement of the breaking up of the domestic system of manufacture, yet the mills necessarily situated upon streams, and frequently at considerable distances the one from the other, formed part of a rural rather than of an urban system; and it was not [XIX-1233] until the introduction of steam power as a substitute for the stream, that factories were congregated in towns and localities where the coal and water required for the production of steam were found in sufficient quantities. The steam engine is the parent of the manufacturing towns, and it is thus from a comparatively modern date that the rapid extension of some and the origin of other towns is to be reckoned." (Reports of the Inspectors of Factories ... 30th April 1860, report of Alexander Redgrave, [p. 36]).*

In the spinning factory there are many processes

"from the first sorting of the raw material to the final spinning of the yarn, carders, rovers, drawers, jobbers, spinners, pieceners, etc.* On the other hand, with weaving, the whole is completed in one process, that of weaving, which requires, moreover, but one class of hands." *b

* Bleaching and Dyeing Works Act of 1860 (came into operation on 1st August 1861).* c

* "In most of the cotton, worsted, and silk mills, an exhausting state of excitement necessary to enable the workers satisfactorily to mind the machinery, the motion of which has been greatly accelerated within the last few years, seems to me not unlikely to be one of the causes of that excess of mortality from lung diseases which Dr. Greenhow has pointed out in his recent admirable Report on the subject" (Reports of the Inspectors of Factories ... 31st October 1861, report of Robert Baker, [pp.] 25-26).*

"From Dr. Greenhow's report, comparing the pulmonary mortality which exists in the silk* and other *textile districts, and districts with other industries where females and children are largely employed,* with the *mortality in the standard healthy districts (rural) of England d:

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b The source has not been found.— Ed.

c See Reports of the Inspectors of Factories ... for the Half Year ending 31st October 1861, London, 1862, p. 19.— Ed.

d Ibid., pp. 26-28.— Ed.
Relative Surplus Value

<table>
<thead>
<tr>
<th>Percentage of adult males engaged in manufacture</th>
<th>Death rate from pulmonary affection per 100,000 males</th>
<th>District</th>
<th>Death rate from pulmonary affection per 100,000 females</th>
<th>Percentage of adult women engaged in manufacture</th>
<th>Nature of female occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.9</td>
<td>598</td>
<td>Wigan</td>
<td>644</td>
<td>18.0</td>
<td>Cotton</td>
</tr>
<tr>
<td>42.6</td>
<td>708</td>
<td>Blackburn</td>
<td>734</td>
<td>34.9</td>
<td>Cotton</td>
</tr>
<tr>
<td>37.3</td>
<td>547</td>
<td>Halifax</td>
<td>564</td>
<td>20.4</td>
<td>Worsted</td>
</tr>
<tr>
<td>41.9</td>
<td>611</td>
<td>Bradford</td>
<td>603</td>
<td>30.0</td>
<td>Worsted</td>
</tr>
<tr>
<td>31.0</td>
<td>691</td>
<td>Macclesfield</td>
<td>804</td>
<td>26.0</td>
<td>Silk</td>
</tr>
<tr>
<td>14.9</td>
<td>588</td>
<td>Leek</td>
<td>705</td>
<td>17.2</td>
<td>Silk</td>
</tr>
<tr>
<td>36.6</td>
<td>721</td>
<td>Stoke-upon-Trent</td>
<td>665</td>
<td>19.3</td>
<td>Earthenware</td>
</tr>
<tr>
<td>30.4</td>
<td>726</td>
<td>Woolstanton</td>
<td>727</td>
<td>13.9</td>
<td>Earthenware</td>
</tr>
<tr>
<td>30.5</td>
<td>305</td>
<td>8 healthy districts</td>
<td>340</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[XIX-1234] "In this Table, in each district and in each kind of employment we observe that the average death rate both of males and females is more than twice as high as the average death rate in the 8 healthy districts ... a result which it seems impossible to account for, either by moral or climatic causes, and therefore the view taken by other enquirers, as well as by Dr. Greenhow, that there is something in congregated labour which seriously affects the health of the workers and ends in an increased mortality, is confirmed" (Reports of the Inspectors of Factories ... 31st October 1861, report of Robert Baker, [p.] 28).

"In the *silk manufacture* the daily work of children above 11 years* (between 11 and 13), *less Saturday, was limited to 10 hours per day,* between 1844 and 1850; before this period (since 1833) it was limited to 9 hours; by a law of 1850, children over 11 years old engaged in winding and throwing silk were to work $10\frac{1}{2}$ hours a day. This under the pretext that silk manufacture was lighter work", etc. [p. 26].

*“One thing, however, seems quite clear, that the allegation put forth in 1850 about the manufacture of silk being a healthier occupation than that of other textile fabrics not only entirely fails of proof, but the proof is quite the other way.”* (l.c., [p.] 27).

[In] *1833* the labour of females and young persons [was] limited to 12 hours per day, and 3 years allowed for the full development of the Act with respect to children.

The Quarterly Return of the Marriages, Births and Deaths registered in the divisions, counties, and districts of England, published by authority of the Registrar-General, and dated 28th October 1857, contains the following paragraph:

*“Mr. Leigh, of the Deansgate subdistrict, makes the following judicious remarks, which deserve the careful consideration of the people of Manchester. Very sad there is the life of a child. Births 266; deaths 254. The total numbers of deaths, 

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exclusive of coroner's cases, is 224, and of this number 156 were of children under 5 years of age, leaving a total adult mortality of only 68. So large a proportion I have never known. It is evident that whilst the ordinary circumstances affecting adult life have been to a considerable extent in abeyance, those militating against the very young have been in great activity. Of the children, not less than 76 were carried off by diarrhoea, 14 by hooping cough, 6 by scarlatina, 6 by measles, and one by small-pox. 87 of the children died under the age of one year. Neglected diarrhoea, close confinement to ill-ventilated rooms during hooping cough, want of proper nutrition, and free administration of laudanum, producing marasmus and convulsions, as well as hydrocephalus and congestion of brain, these must explain why, with a diminution of the causes producing disease in adults, the mortality as a total is still so high" (Registrar-General's Quarterly Return, No. 35, p. 6).*

[XIX-1235] The aim in investigating relative surplus value is to find how necessary labour time is reduced by the growth in the productivity of labour, and thereby surplus labour time, hence the surplus value which falls to the share of capital, is increased. An increase in the productivity of labour = a cheapening of the commodities which enter into the worker's consumption, and the value of labour capacity is determined by the value of those commodities. With machinery there is the additional element that cheap means of labour are replaced by expensive ones. Constant capital must therefore be investigated here—it must be taken into account—since a new element now enters into it (and also into the valorisation process). The forces of nature cost nothing; they enter into the labour process without entering into the valorisation process; but the prime motors on which they act, or through which [they] are appropriated for the labour process, do cost something. The past labour contained in the constant capital forms a value component of the commodity, just as does the living labour obtained in exchange for the variable capital. If on the one hand the necessary (living) labour time were to fall, through an increase in the productivity of living labour, while on the other hand the value component of the commodity added by machinery were to rise in the same, or a higher, ratio, the commodity would become dearer instead of cheaper, and thus—despite the greater productivity of the living labour—no additional surplus value would be created; the surplus value would rather be lessened. For this reason, it is necessary to discuss already at this point, to a certain degree, the share which the value component added by the value of the machinery to the commodity, to the product, accounts for in the total value of the commodity.

On the other hand, it is clear in the case of the increase in the

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productive forces of labour brought about by simple cooperation and division of labour, d'abord, that the constant capital does not increase in proportion to the commodity; it is clear, secondly, that, even disregarding the higher productivity of living labour and therefore the lesser magnitude of value of the individual products, a cheapening of the commodity also takes place on account of economy in constant capital (particularly in the communal use of constant capital, parts of which, such as buildings, heating facilities, lighting, etc., do not increase in mass in the same proportion as the living labour they serve at the same time as general objective conditions of labour). In so far as the commodity is thereby cheapened—even disregarding the greater productivity of the living labour considered for itself—this circumstance can be mentioned, although we shall not examine it in more detail until the section on capital and profit.

It is precisely the characteristic feature of capitalist production that while even the social characteristics of labour which raise its productive power appear as a force alien to labour itself, as conditions lying outside it, as qualities and conditions not belonging to labour itself—for the worker always continues to confront capital as an isolated individual, standing outside the social connection with his fellow-workers—this is still more the case, prima facie, with the objective conditions of that social labour. The examination of these conditions therefore appears from the capitalist point of view as the examination of circumstances which concern capital alone, proceed from it and are enclosed within it, and have absolutely nothing to do with the worker. This is so even though it is only this social form of labour itself that converts these external conditions from such as exist in isolation for the individual worker into social conditions, concentrated conditions, which can be employed more economically through concentration in space and time and common employment by the cooperating workers; can be employed in such a manner that the workers' greater efficiency in the labour process is accompanied by lesser costs, i.e. a smaller consumption of value by the workers, so that they enter to a lesser degree into the valorisation process.

We shall find, in connection with machinery in particular, how the alienation between these conditions of labour and the way in which the labour itself is carried on is held fast in the consciousness of the capitalist and asserted in his dealings with the worker.

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a Firstly.—Ed.
b Cf. present edition, Vol. 28, pp. 504-05.—Ed.
This is, however, only a further consequence and carrying through of the antagonism which forms the essence [XIX-1236] of capitalist production, and was therefore already delineated in our discussion of absolute surplus value.\(^a\)

It is, in general, a characteristic of capitalist production that the conditions of labour confront living labour as independent, as personified, that it is not the worker that employs the conditions of labour, but the conditions of labour that employ the worker. It is precisely through this that the latter become capital, and the commodity owner who possesses them becomes a capitalist vis-à-vis the worker. This independence naturally ceases in the actual labour process, but the total labour process is a process of capital, it is incorporated in capital. To the extent that the worker figures in the process as labour, he is himself a moment of capital.

\[V-175a/A\] The vitalising natural power of labour—the fact that by using and expending material and instrument it preserves them in this or that form, hence also preserves the labour objectified in them, their exchange value—becomes a power, not of labour, but of capital, as does every natural or social power of labour which is not the product of earlier labour or not the product of such earlier labour as must be repeated (e.g. the historical development of the worker, etc.). Therefore, this vitalising power is not paid for by capital. Just as the worker is not paid for his capacity to think.

Labour's specific quality of preserving already objectified labour as objectified labour by adding a new quantity of labour does not receive any remuneration; nor does it cost the worker anything, as it is a natural property of labour. In the process of production the separation of labour from the objective moments of its existence—material and instrument—is superseded. The existence of capital and wage labour depends on this separation. Its supersession which actually takes place in the actual production process, is not paid for by the capitalist. Nor does the supersession occur through the exchange between capitalist and worker, but through labour itself in the production process. And as such present labour it is itself already incorporated into capital, it is a moment of capital. This preserving power of labour therefore appears as ca-

\(^a\) Ibid., Vol. 30, pp. 190-92.— Ed.
Relative Surplus Value

pital's power of self-preservation. The worker has merely added new labour; past labour—in which capital exists—has an eternal existence as value quite independently of its material existence. This is how the matter appears to capital and to the worker.

[XIX-1236] With the formal subsumption of labour under capital, these conditions of labour undergo no further modification; they remain, physically, material and means of labour. But with the new mode of production, with the revolution in the mode of production created by capitalist production, these conditions of labour change their shape. They receive new determinations from the fact that they serve the socially cooperating workers as conditions. With simple cooperation and manufacture based on the division of labour, this modification affects merely the general conditions of labour, which can be utilised commonly, such as buildings, etc. But with the mechanical workshop based on machinery, the modification extends to the actual instrument of labour. As with the formal subsumption of labour under capital, these conditions, and therefore also their altered shape—a shape which has been altered by the social form of the labour itself—remain an alien circumstance to the workers. Indeed, in the case of machinery, as we shall see further on, the antithesis or alienation develops further, into an antagonistic contradiction.

A further question to be dealt with here is this: If we examine these conditions of labour, to the extent that they are cheapened in the social form of labour, this happens in relation to the cheapening of the commodities which enter into the worker's consumption, and this is identical with the relative devaluation of labour capacity. What is important here is that the total amount of labour which enters into the individual product—the sum total of the past and present labour entering into it—is lessen. With cooperation and the division of labour it is evident that the living labour becomes more productive, performs the same work in a shorter time, while it goes without saying that the part of the value of the commodity which derives from the constant capital is not increased. With machinery this needs to be demonstrated, and will be demonstrated. But the characteristic feature of all 3 cases, in so far as relative surplus value is being considered, is that the living labour needs less time to produce the same commodity.

In the section on capital and profit, on the other hand, what is involved is neither the increase of surplus value, surplus labour time,
which is rather presupposed as given; nor is it the reduction in the total amount of past and living labour which enters into the commodity; it is instead the way in which the ratio of the surplus value to the value of the total capital advanced, and in particular the quantitative proportion between the living labour employed and the past labour employed, is affected by the economy in constant capital which is first made possible by the social forms taken on by labour in the capitalist mode of production, but excluded, in contrast, in the case of the dispersed labour of independent handicraftsmen or small-scale agriculturists. *Such is the difference in the consideration of the same circumstances from different points of view.*

If we now return to machinery, it is evident that the mode of production corresponding to it finds its purest and most classical expression in the automatic workshop, in which the application of the machine takes the form of the application of a connected system of machinery, of a totality—falling into a number of different phases—of mechanical processes which have as their common motor a prime motor driven mechanically, with the drive provided by natural forces. The single machine makes its appearance in many spheres of production, replacing either earlier individual trades of the handicraft type, or kinds of work previously performed through cooperation, such as, in the latter case, building machines, [or] e.g. sowing, mowing, threshing machines, etc. There is, particularly in the first case, a re-emergence of handicraft production, based now on machinery, such as with the original spinning machine, many kinds of loom, the sewing machine, etc. But this handicraft production based on the machine now appears as nothing more than a transition to large-scale industry. Or, in manufacture (and agriculture) based on the division of labour, the machines intervene in specific processes, while other processes, which are admittedly connected with the former processes, but still interrupt mechanical production, require human labour, not for the supervision of a mechanical process, but for the production itself. This is the way in which manufacture and large-scale agriculture reappear, in changed shape, in the period of machine production.

The automatic workshop, however, is a perfected mode of production, corresponding to machinery, and it is the more

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a See this volume, p. 477.— Ed.
b See present edition, Vol. 29, pp. 82-85.— Ed.
perfect, the more it forms a complete mechanical system, and the less individual processes still require (as do mechanical spinning mills not employing self factors) to be mediated through human labour.

Machinery has a negative impact on the mode of production resting on the division of labour in manufacture and on the specialised skills of labour capacity produced on the basis of that division of labour. It devalues the labour capacity specialised in this way, in part reducing it to simple, abstract labour capacity, and in part producing on its own basis a new specialisation of labour capacity, the characteristic feature of which is its passive subordination to the movement of the mechanism itself; its complete annexation to the needs and requirements of the mechanism.

//The Ricardian example (Principles of Political Economy, 3rd ed., [p.] 469 sqq.):

Let the capitalist have £20,000. 7,000 of this is invested in fixed capital; 13,000 as circulating capital employed in the support of labour. Now machinery to the amount of 7,500 is added to the fixed capital of 7,000. Hence the total fixed capital now = 7,000 + 7,500 = 14,500. There therefore remains a circulating capital of 20,000 – 14,500, i.e. 5,500. Previously the gross produce was 15,000, hence a profit of £2,000. Or \( \frac{1}{10} \) on 20,000, = 10%.

The extra labour previously employed by "7,500" "would become redundant" [p. 471].

Ricardo now continues:

*"The reduced quantity of labour which the capitalist can employ, must, indeed, with the assistance of the machine, and after deductions for its repairs, produce a value equal to £7,500, it must replace the circulating capital with a profit of £2,000 on the whole capital"*[ (p.] 471).

I.e. the amount of surplus value and therefore the rate of profit (10%) on the £20,000 remains exactly the same, although now less than half the quantity of labour is employed, compared with previously. Previously the variable capital was 13,000, now it is only 5,500. The phrase, "with the assistance of the machine" means nothing here, since Ricardo himself argues, as against Say, that the machine only adds its own value (as included in its annual wear and tear) to the product; but no surplus value. Ricardo does not investigate how this "fact" can be reconciled with the theory of value, which it contradicts prima facie.\(^a\)//

\(^a\) See D. Ricardo, On the Principles of Political Economy, and Taxation, p. 335 (note), pp. 336-37.— Ed.
"Machine, or engine, is any mechanical instrument contrived to move bodies. And it is composed of the mechanical powers. Mechanical powers are certain simple instruments, commonly employed for raising greater weights, or overcoming greater resistances, than could be effected by the natural strength without them. These are usually accounted 6 in number, viz. the lever, the wheel and axle, the pulley, the inclined plane, the wedge, and the screw"* (Hutton, A Course of Mathematics, [pp.] 174-75).223

The mechanical workshop takes the place of 1) manufacture based on the division of labour; 2) the independent handicraft enterprise.

Although the mechanical workshop 1) negates simple cooperation, in so far as it puts the machine in the place of power created through cooperation; and 2) negates the division of labour, in so far as it abolishes cooperation or manufacture resting on the division of labour, there does nevertheless occur within the mechanical workshop itself both cooperation and division of labour. Point 1 needs no further discussion here. It should however be remarked that, given machinery as the material basis of the mechanical workshop, simple cooperation plays a much more important role in it than the division of labour.

[XIX-1238] But what is above all involved here is this question: what kind of division of labour is it which predominates in the mechanical workshop, as opposed to the kind which characterises manufacture?

There are two points to distinguish here.

Either, a), machinery develops into a system of machines, which perform different processes, each of which forms a phase for the next one, as in spinning, paper manufacturing, etc. Here there naturally emerges a new division of labour, which belongs to the mechanical workshop, and which must be examined specifically.a

Or, b), a system of this kind does not result; for we do not understand by this system merely the link between motive power, transmitting machinery, and working machinery. This link can be found in all mechanical factories without distinction. Two things are, in turn, possible here.

α) Either a handicraft is replaced by a machine,b as e.g. the handloom is replaced by the mechanical loom, or the turner’s bench is replaced by a mechanical lathe. Here the mechanical workshop directly replaces handicraft work, and machines of this kind can also bring into existence a new kind of handicraft work. Once they have developed into a mechanical workshop, what

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*a See this volume, p. 486.—Ed.

*b Ibid., p. 481.—Ed.
characterises this workshop is cooperation. Many such machines (set in motion by the same motor and the transmission apparatus connected to it) work together at the same place and the same time, and there is therefore added to them a large number of human machine assistants, working alongside each other simultaneously. Whether a machine of this kind is operated in isolation by a small master with a pair of assistants, or a number of them work together, the handicraftsman, who performed various operations and whose labour represented a larger or smaller totality of pieces of work, is replaced by a single machine, which performs these operations simultaneously. This handicraftsman is replaced by a mere assistant to the machine. The same thing takes place in the mechanical workshop composed of many such machines. Only there is the difference that in the first case power was still developed in so far as man still remained the prime motor with this machine too, whereas in the workshop man is replaced with an automaton, a mechanical driving force. No division of labour in our sense took place here. It is therefore not abolished. What is abolished is a more complex kind of labour, comprising various activities, which is replaced by simple machine labour. By simple machine labour we understand the assistance man has to render to the working machine.

β) But if a machine of this kind replaces a manufacture based on the division of labour, examples of which we have just given, this rests directly on a negation of the division of labour. The specialisation achieved by labour capacity through the division of labour is destroyed, and labour capacity is therewith depreciated, in so far as the system of manufacture required a hierarchy of labour capacities, so that there was simple labour at one point and, corresponding to it, more complex labour at another. Simpler labour now replaces simple labour; though simple, the latter was still specific, and had therefore developed into a specialised skill, however lousy the work might be. Here the system of manufacture can turn back into handicrafts, i.e. the work can be carried on by independent small masters with a pair of assistants; but this is always to be regarded as no more than a transitional stage to the mechanical workshop.

In so far as a division of labour takes place here, it proceeds solely from the general structure of the mechanical workshop; hence from the distinction, d'abord, between prime motor and working machine. The former may require stokers, feeders of the prime motor with coal, water, etc., or also the clearing out of ashes, etc. Workers employed in this way, whose numbers are limited by
the small number of prime motors in operation in a workshop, are mere menials. The principle of the division of labour here is not that a particular specialism is developed, but that certain simple functions can be performed by one person for many, just as well on a large as on a small scale. E.g., a furnace can be heated for many just as it can for a few. Secondly, there are services performed for the machine as such, in order to keep it in constant repair. Thus there are workers charged with the sharpening e.g. [XIX-1239] of carding machines, or mechanics and engineers attached to the workshop. Individual persons can only be attached in this way because there is a large quantity of machines working simultaneously, hence there is constantly something to be patched up, etc., friction to be removed, so that the whole of the time of such a man can be usefully employed. There are naturally only a small number of these people, who do no "machine labour", but are attached to the workshop after being selected from the circle of those accessory workers required to set up the workshop (machine producers, handicraftsmen, etc.).

Finally, menials are needed to sweep up the waste, remove the debris of the workshop, etc. This is one of the main tasks of the children (in the sense of the English Factory Acts). This kind of labour has nothing to do with machine labour as such; it is merely a menial function. One cannot speak here of the development of a particular specialism, but only of menial tasks, which do not demand power or presuppose the development of any sort of specialised skill. //In the case of the lace machine women and children have to perform machine labour.//

These categories are to be found in every workshop (mechanical), as also in manufacture, in part.

But the workers who really supervise the operation of the machines, or the main body of workers properly so called, are people who all do the same thing, so that here there is no actual division of labour, but instead simple cooperation; the economic basis of its effect here is not cooperation among human beings, but the circumstance that economy is demanded where a common motor and transmission machinery are used for many similar machines (leaving aside buildings, etc., which is also characteristic of manufacture resting on simple cooperation).

But finally, in so far as firstly children are required here for wholly simple menial services, and on the other hand young people of both sexes and women are required for the actual machine labour, a new division of labour emerges, found already in handicrafts, and in slave labour resting on cooperation, namely
between *overlookers* and *actual* workers. This division of labour arises from the need for discipline and supervision in the armies of workers, as in other armies, and has nothing to do with the development of specialisation, unless it be specialisation in checking, giving orders, and cavilling. These *overlookers* in fact represent the capitalist towards the workers. In the case of the small handicraft master, who works with a few journeymen, this work of supervision and command, the disciplinary power, is bound up with his cooperation in the work. With the industrial capitalist, this *labour of superintendence*, which is "his", is performed by workers delegated by him. These are the NCO's of the workshop. It is in fact the *overlookers* and not the capitalists who perform the real *labour of superintendence*. The mechanical workshop is altogether characterised by these relations of subordination, regimentation, just as under the system of slavery the ruling mode of cooperation is slave-driving Negro slaves and working Negro slaves. It is labour for the exploitation of labour.

With both the kind of mechanical workshop just examined and the one that rests on a system of machinery—whether these two kinds of workshop replace independent handicrafts or manufacture—very skilled labour is often replaced by simple machine labour, as in the mechanical workshop, and special skills are always destroyed.

a) We come now to the mechanical workshop based on a *system of machinery*. Here a division of labour naturally takes place. //It is not necessary to repeat here the characteristics this kind of mechanical workshop has in common with the one considered above, characteristics which therefore apply to *the mechanical workshop in general*// This division of labour has its material basis in the differences between the specialised machines which perform specific phases of the production process, and for the service of which there are therefore allotted parties of workers trained and assigned exclusively to that purpose. Here too the main body of workers is always formed by those employed in the final operation, not by those employed in preliminary or subsequent work. There is added here a new kind of menial service, which falls to the children to perform, namely when the transfer of the object of labour from one machine to another is accomplished not by the machine [XIX-1240] itself but by human vehicles, who in

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*Note: The text contains references to previous editions and volumes, which are not included in the natural text representation.*
fact form here only the porters, the arms and legs, who act as intermediaries in the transfer of the material from one machine to another. Differences of age and sex play a major role here, in so far as certain manipulations require somewhat more strength, physical size, etc., and, according to the nature of the material to be worked on, more dexterity, agility, or, particularly with hard materials, a greater power of resistance.

In manufacture the tasks are divided into a hierarchy of abilities and strength, depending on what is required to make use of the instruments, and on whether the skills demanded for this are easier or harder to achieve. Certain physical and mental qualities of the individuals are here seized upon, in order through their one-sided development to create in manufacture a total mechanism formed out of human beings themselves. Here, in the mechanical workshop, the body of this total mechanism consists of the differentiated machines themselves, each of which performs the particular special processes, following one upon the other in succession, which are required for the process as a whole. Here it is not a specially developed labour capacity which puts into service a particular instrument in a skilled fashion, it is instead the self-acting instrument which needs special and constantly attached servants. There the worker puts into service a particular instrument; here particular groups of workers serve various machines, which perform particular processes. The hierarchy of abilities which more or less characterises manufacture disappears here.

What distinguishes this mechanical workshop is rather a general equalisation of services, so that for those really employed in machine labour the transition from one machine to another is entirely possible, within a short period of time, and without great preparations. In manufacture, the division of labour proceeds from the fact that the particular tasks to be performed can only be performed by particular specialised labour capacities, hence that not only distribution but real division of the labour into groups of specialisations must take place. With the mechanical workshop, in contrast, it is the machines which are specialised, and their simultaneous functioning, although they perform successive phases of the same total process, requires the distribution among them of particular groups of workers, who are always entrusted with the same services—which are all equally simple. It is a distribution of the workers among specialised machines rather than a division of labour among specialised labour capacities. In the one case, the labour capacity which puts into service the particular instruments is specialised; in the other case, the machine served by particular
groups of workers is specialised. Leaving aside the mere menials mentioned previously and newly occurring here, the main distinction is between strength and agility. In so far as strength is to be employed, this is merely the average strength possessed by every adult male as distinct from females and children. This can therefore be reduced to a simple difference of sex and age. But the agility and dexterity which is demanded, and similarly the quickness of observation, and altogether the highly strained attentiveness required, have to do with the fact that the rapidity of functions at the machine runs parallel with the speed of the machine itself, and that a number of these machines, each of which has many functions, have simultaneously to be served, e.g. in the connecting up of threads. In large part this kind of agility—leaving aside the fact that practice, habit, is the main thing here—requires in turn no particular special skill, but a degree of application peculiar to e.g. certain ages, more characteristic of the undeveloped (youthful) body than the developed one. All these services are distinguished by their passivity, their adaptation and subordination to the operations and motions of the machine itself. This specialisation in passivity, i.e. the abolition of specialisation itself as specialisation, is what characterises machine labour. Improvements within the mechanical workshop itself are aimed at removing as far as possible all the skills which have again grown up on its own basis. It is therefore completely simple labour, i.e. [labour characterised by] uniformity, emptiness and subordination to the machine. Deadening labour, as labour which [XIX-1241] requires the complete subsumption of the individual under it, just as with the division of labour in manufacture. It prevents the development of specialisation, but is itself in turn specialised in this lack of specialisation. Here the last remnant of the worker's satisfaction in his own labour disappears, to be replaced by absolute indifference, which is itself conditioned by the labour's lack of real content.

In manufacture, labour is continuous. In the mechanical workshop, attentiveness to the work of the machine is continuous, and so is the movement of the worker, conditioned by the movements of the machine (where the worker must move backwards and forwards with the machine). His real interventions, in contrast, are incidental, according to whether the machine has made an error or not. Here, therefore, the worker is in constant servitude to the machine, whereas in manufacture the instrument always remains the servant.

In manufacture—considered as a whole—the individual worker forms a living part of the machine as a whole, i.e. the workshop,
which is itself a mechanism consisting of human beings. In the mechanical workshop, on the other hand (i.e. the workshop considered here, which has developed into a system of machinery), man is a living accessory to its aggregate body, which exists outside him in the shape of the machine, and to the automatic machinery. Yet the machinery as a whole consists of machines, which form parts of that whole. Here human beings are merely the living accessories, the conscious appendages, of the unconscious but uniformly operating machinery.

The mechanical workshop is characterised by cooperation (simple) and the distribution of the cooperating agents among the various parts of the whole of the big automaton, as its mobile accessories and servants; by subordination to the movements and operations of the machine, to which the worker is chained as to his fate; by the equivalence of all kinds of work and by passivity; and by the absence of specialisation or at most the development of mere differences of age and sex into specialisations. Discipline and subordination arise here not merely from cooperation but from subordination to the system of machinery as a whole.

Ure, who is notorious even in England as the shameless apologist of the factory system, nevertheless performed a service in being the first to grasp its spirit correctly, and sharply to characterise the distinction and the antithesis between the automatic workshop and the system of manufacture based on the division of labour, which was treated by Adam Smith as the most important thing. (This to be brought in later.) The removal of the hierarchy of skills; the destruction of the specialisations entrenched behind "the division of labour", and therewith the introduction of a passive subordination—with its accompaniment of absolute discipline, regimentation, subjection to the clock and the rules of the factory—these things are very properly picked out by Ure, as we shall now see from certain extracts. The regained universality of the worker in this system exists only in itself, in so far as he is indifferent towards his labour, the content of which lies outside him, and in so far as he develops no specialisation. In reality, however, this is the development of a specialisation without content.

[XX-1242] Whereas under handicrafts, and even in manufacture, the movements of a human being direct those of the instrument, the reverse is the case in the mechanical workshop: the movements of the machinery direct those of the human being.

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a See this volume, p. 496 ff.—Ed.
Sir David Barry:

"The indispensible necessity" (for the workers) "of forcing both their mental and bodily exertions to keep exact pace with the motions of machinery propelled by an unvarying, unceasing power. 2) The continuance of an erect posture for periods unnaturally prolonged and too quickly repeated. To these causes are often added dusty rooms; impure air, heated atmospheres, constant perspiration" (Engels, [Die Lage der arbeitenden Klasse in England], p. 193).a

"The slavery in which the bourgeoisie holds the proletariat chained, is nowhere more conspicuous than in the factory system. Here ends all freedom in law and in fact. The operative must be in the mill at half-past five in the morning; if he comes a couple of minutes too late, he is fined; if he comes ten minutes too late, he is not let in until breakfast is over, and a quarter of the day's wages is withheld. He must eat, drink, and sleep at command... The despotic bell calls him from his bed, his breakfast, his dinner.

"What a time he has of it, too, inside the factory! Here the employer is absolute law-giver; he makes regulations at will, changes and adds to his codex at pleasure, and even if he inserts the craziest stuff, the courts say to the working man: Now, when you have freely entered into this contract, you must be bound by it" (Engels, pp. 217-18 [p. 467]).

The whole of this lawmaking boils down to fines or deductions from wages.

Engels quotes this from a regulation:

"(6) Every operative detected speaking to another, singing or whistling, will be fined 6d.; for leaving his place during working hours, 6d.'

"It may be said that such rules are necessary in a great, complicated factory, in order to insure the harmonious working of the different parts; it may be asserted that such a severe discipline is as necessary here as in an army. This may be so, but what sort of a social order is it which cannot be maintained without such shameful tyranny?... Every one who has served as a soldier knows what it is to be subjected even for a short time to military discipline. But these operatives are condemned from their ninth year to their death to live under the sword, physically and mentally" (l.c., [p. 219 [p. 468]).

"But it is far more shameful yet, that according to the universal testimony of the operatives, numbers of manufacturers collect the fines imposed upon the operatives with the most heartless severity, and for the purpose of piling up extra profits out of the farthings thus extorted from the impoverished proletarians" (l.p.] 220 [p. 469]).

This is the only legislation in the world—these are the only codes of law in the world (the slaveholder at least dispenses with this mock legislation)—the confessed purpose of which is nothing else than to "enrich" the legislator as far as possible at the expense of his subjects; a legislator who only aims at the extortion of money for his private advantage.

And it is precisely the apologists of the factory system, such as Ure,
the apologists of this complete de-individualisation of labour, confinement in barrack-like factories, military discipline, subjugation to the machinery, regulation by the stroke of the clock, surveillance by overseers, complete destruction of any development in mental or physical activity, who vociferate against infringements of individual freedom and the free movement of labour at the slightest sign of state intervention.

"Overwork and forced work" (Engels, [p.] 151 [p. 416]).

"As voluntary, productive activity is the highest enjoyment known to us, so is compulsory toil the most cruel, degrading punishment" (l.c., [p.] 149 [p. 415]).

The machines "work against the workers, not for them" (l.c., [p.] 173 [p. 433]).

"The collecting" of both sexes and all ages in a single work-room, the inevitable contact between them, the crowding into a small space of people, to whom neither mental nor moral education has been given [XX-1243] and the accumulation of a number of relatively "raw" people in a workroom, are all characteristic of the mechanical workshop [p. 441].

_Full-timers—half-timers_—this way of describing workers who work full time and children who work only half time, which is not only used by the English manufacturers, but occurs officially in the Factory Reports, is much more characteristic of the factory system than the distinction between Masters and Hands. Here the workers are purely and simply personified labour time, and the character of capitalist production emerges in its pure form. Age differences are reduced to full-timers and half-timers, 10½ hours and 6 hours. The workers are merely personified hours.

"The time of children, which should be devoted solely to their physical and mental development," is sacrificed to "the greed of an unfeeling bourgeoisie. The children are withdrawn from school and the fresh air so that they can be exploited for the benefit of the manufacturers" (l.c., [p.] 187 [p. 443]).

There can be no doubt that the factory system sacrifices women and children more than any other system. Moreover, the preponderance of women and children in the mechanical workshops breaks the resistance [of the workers] and adds a passive element which also condemns the adults to slavery, to passive subordination.

"Let us hear how they ('the humane bourgeoisie') acted before the factory inspector was at their heels. Their own admitted testimony shall convict them in the Report of the Factories' Inquiry Commission of 1833" (l.c., p. 187 sqq. [ibid.]).

1817: petitions from Owen (then a manufacturer in New Lanark), calling for legislative guarantees for the health of the operatives, and especially of children. [Factory] Acts of 1818, 1825 and 1831
"of which the first two were never enforced, and the last only here and there. The Act of 1831 (Sir J. C. Hobhouse) provided that in cotton mills no one under 21 should be employed between half-past seven at night and half-past five in the morning; and that in all factories young persons under 18 should work no longer than twelve hours daily, and nine hours on Saturday" ([p.] 208 [pp. 459-60]).

The introduction of child labour brought the worker to the point of selling, instead of his own labour, that of his children, therefore selling his children and conducting a slave trade with them. This brought about an essential change in the relation between capitalist and worker, for the buyers of labour capacity are no longer faced with sellers of their own labour, but with sellers of alien labour, of labour capacities which are capable neither of taking responsibility, nor of entering into a contract. The married worker endeavours to recover by the sale of his children what the adult worker loses through the competition of child labour. Here, then, there is not even the form of the contract, which characterises the relation between capital and labour, the formal freedom of the two contracting parties, for it is not children who make contracts, but their parents who make them on their behalf. An English Tory writer says on this subject:

*"Infant labour has been called in to aid them"* (the adult workers) *"and even to work for their own daily bread. Without strength to endure such disproportionate toil, without instruction to guide their future life, they have been thrown into a situation morally and physically polluted!... The Jewish historian has remarked upon the overthrow of Jerusalem, by Titus, that it was no wonder it should have been destroyed, with such a signal destruction, when one inhuman mother sacrificed her offspring to satisfy the cravings of absolute hunger"* (Public Economy Concentrated etc., Carlisle, 1833, [p.] 66).

[XX-1244] The factory system includes the sale of children by their parents, and at the same time the annihilation of the physical and mental development of the workers in embryo, i.e. in the years of their childhood.

We always proceed here from the assumption that labour capacity is paid at its value, and we therefore do not have to consider the real movement of wages here. It nevertheless results from the factors determining the average value of wages that the value of labour capacity includes a wage sufficient to support the family of the worker. Since the factory system converts women and children into wage labourers who have to earn their own subsistence, the value of labour capacity is thereby depreciated, not only because women and children emerge as competitors of the other workers, but also because the average value is now paid, and this value is divided among all members of the family. A Ricardian, De Quincey, remarks correctly on this:
"The numerical increase of labourers has been great, through the growing substitution of female for male and above all of childish for adult, labour. Three girls of 13, at wages of 6 to 8s. a week",* //much too high!// "in their myriads displaced *the one man of mature age, at wages varying from 18s. to 45"* (Thomas de Quincey, The Logic of Political Economy, Edinburgh, 1844, [p.] 147, note).a

There is therefore no doubt at all that the average value of labour capacity is thereby brought down, devalued, or that this is a direct consequence of the mechanical workshop, which requires neither muscle power, nor skilled labour, the learning of which can only be begun at a more mature age, and then can only be brought to the required level of virtuosity through long years of apprenticeship. One of the first results of the factory system was the abolition of apprenticeship.

"The result of the Commission set up by the English bourgeois themselves was the Factory Act of 1833, which forbade the employment of children under nine years of age (except in silk mills), limited the working-hours of children between 9-13 years to 48 per week, or 9 hours in any one day at the utmost; that of young persons from 14-18 years of age to 69 per week, or 12 on any one day as the maximum, provided for an hour and a half as the minimum interval for meals, and repeated the total prohibition of night-work for persons under 18 years of age. Compulsory school attendance two hours daily was prescribed for all children under 14 years, and the manufacturer declared punishable in case of employing children without a certificate of age from the factory surgeon, and a certificate of school attendance from the teacher... Further, surgeons and inspectors were appointed" ([p.] 211 [F. Engels, The Condition of the Working-Class in England, pp. 461-62]).

How much this system is based on the devaluation of labour capacity is shown by its immanent polemic against education, of which there are examples above. It requires as a conditio [sine qua non] the non-development of these production machines!

In 1844, under Peel's ministry, 6½ hours' labour for children between 8 and 13, 12 (from 6 o'clock in the morning until the evening, including mealtimes) for workers over 13.

"Surplus value" can only be extracted through

"the barbarous treatment of the operatives, the destruction of their health, the social, physical, and mental decay of whole generations" (Engels, p. 215 [p. 466]).

What distinguishes the factory system is the fact that in it the true nature of surplus value emerges. Surplus labour, and therefore the question of labour time, becomes decisive here. But time is in fact the active existence of the human being. It is not only the measure of human life. It is the space for its development. And the encroachment of capital over the time of labour is the appropriation of the life, the mental and physical life, of the worker.

Machine labour does away with the all-round exertion of the muscles, it offers no opportunity for physical activity. Nor does it allow any mental activity. It prevents "the worker from occupying his mind with other things" (l.c., [p.] 216 [ibid.]), and in addition it takes control of this mind and body when it is still in an immature state.

It is, "properly speaking, not work, but tedium, the most deadening, wearing process conceivable" (l.c., [p.] 216 [ibid.]).

"The engine moves unceasingly; the wheels, the straps, the spindles hum and rattle in his ears without a pause, and if he tries to snatch one instant, there is the overlooker at his back with the book of fines. This condemnation to be buried alive, to give constant attention to the tireless machine is felt as the keenest torture" ([p.] 216 [ibid.]).

"The dull routine of a ceaseless drudgery, in which the same mechanical process is incessantly repeated, resembles the labour* of Sisyphus—the toil, like the rock, recoils perpetually on the wearied operative. The mind gathers neither stores nor strength from the constant work of the same muscles" (Dr. J. P. Kay) (Engels, l.c. [p.] 217, note [p. 467]).

The two books by Dr. Ure and Frederick Engels are absolutely the best on the factory system, and are identical in the field they cover; the difference being that what Ure expresses as the servant of the system, a servant whose horizons are confined within the system, is expressed by Engels as a free critic.

Engels remarks, in relation to the small masters in Birmingham, that the worker is in an even worse position here.

"The many small employers cannot well subsist on the profit divided amongst them, determined by competition, a profit under other circumstances absorbed by a single manufacturer" ([p.] 241 [pp. 488-89]).

This is true in general with the fall in the rate of profit which is inseparable from the coming of large-scale industry. The small masters, who have to divide among themselves the profit otherwise absorbed by a single employer, are in such a lousy situation that they themselves have to force down the workers' wages to an abnormal degree.

In the London dress-making establishments there is a mass of young girls, 15,000 of them, who work 15 to 18 hours a day for 4 months of the year, during the season. In most of these establishments the girls never sleep more than 6 hours, often only 3 or 4, occasionally only 2 hours in 24, when they don't have to work through the whole night. The only limit set to their work is the absolute physical inability to hold the needle another minute.

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* Engels has "torment".—*Ed.
"Cases have occurred in which these helpless creatures did not undress during 9 consecutive days and nights, and could only rest a moment or two here and there upon a mattress, where food was served them ready cut up in order to require the least possible time for swallowing. In short, these unfortunate girls are kept by means of the moral slave-driver's whip, the threat of discharge, to such long and unbroken toil as no strong man, much less a delicate girl of 14 to 20 years, can endure" ([p.] 253 [p. 498]).

The same can be said of the needlewomen of London.

[XX-1246] The large-scale industrial system has been put into effect:
1) in factories proper;
2) in manufactories, which all now employ machines to some degree;
3) in agriculture.

In all these one finds a system of production on a large scale. The number of workers is relatively small in proportion to the product produced by them in all these spheres together. Hence the large number of workers and particularly children and women workers who are simply exploited in attic rooms; where, without any real development in the productivity of labour, both the amount of surplus value created and the quantity of products depend exclusively on surplus labour and on paying only what is absolutely essential. This applies to the human material set free by the great system and therefore obliged to subject itself to every condition, even such in which the frightful consequences of this system emerge still more clearly than directly in the system itself—above all of course in those handicraft enterprises related to the factory, into which the whole of the surplus population is thrown, but then in all those spheres of labour which capital exploits formally, without giving rise to a capitalist mode of production in them, although the latter must ultimately take over, as in the cases of tailoring, sewing, baking, fancy weaving, lace making, etc., and then in fact even appears as an advance and an alleviation of the situation! Apologists of the system, such as Ure, therefore point to the atrocities of the system of labour produced outside the factory system by the factory system itself—whether under the small masters or under an enterprise only formally capitalist—in order to prove the relative beauties and advantages of the system itself! They only forget that those branches of labour are so to speak only the foreign department of the system, being still its direct offspring and logical consequence!

"The working class first manifested opposition to the bourgeoisie when they forcibly resisted the introduction of machinery at the very beginning of the industrial period" [p. 503].
"The manufacturer is Capital, the operative Labour" (l.c., [p.] 329 [p. 563]).

There are according to The Daily News (1862) an average of roughly 15 deaths by starvation every month in London.a

Let us now see what Mr. Ure (PHILOSOPHY OF MANUFACTURES), the Pindar of the factory system, has to tell us about the essential character of the mechanical workshop.b

Vol. I. Difference between the handicraftsman, who employs the instrument of labour, and the machinery, which employs the worker:

"It has been said, for example, that the steam engine now drives the powerlooms with such velocity as to urge on their attendant weavers at the same rapid pace; but that the handweaver, not being subjected to this restless agent, can throw his shuttle and move his treadles at his convenience" ([pp.] 10-11 [The Philosophy of Manufactures..., London 1835, p. 7]).

It was Sir Robert Peel who made the comment Ure refers to. After all, he still thought he was living in the good old days of his weaving father, since he went on to say

"the handloom weavers are mostly small farmers" [Fr. ed., p. 11, Engl., ed., p. 7].

Ure counters this, on pp. 11 and 12 [pp. 7-8], with the evidence of Dr. Carbott of Manchester:

"Nothing can be a greater mistake; they live, or rather they just keep life together, in the most miserable manner, in the cellars and garrets of the town, working sixteen to eighteen hours for the merest pittance."

But what was it that threw them into the cellars and garrets and condemned them to work for 16 to 18 hours a day, if not competition from machinery?

[XX-1247] "This class of operatives, who, though inmates of factories, are not, properly speaking, factory workers, being independent of the moving power, have been the principal source of the obloquy so unsparingly cast on the cotton and other factories" ([p.] 13 [pp. 8-9]).

This group of factory workers is composed in part of the menials mentioned earlier (of whom Ure is speaking here), in part of the NCO's (OVERLOOKERS) and in part of the engineers and mechanics who are associated with the factory.

What then does the classical FACTORY or mechanical workshop consist in?

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a The source for this statement has not been found.—Ed.
b Marx gives the English title, but quotes in French, from a French edition (Philosophie des manufactures..., Paris, 1836). This applies both to longer passages and to separate words and phrases. The page numbers he gives refer to the French edition. Those in square brackets, supplied by the Editors, refer to the English edition (unless otherwise stated).—Ed.
The term "designates ... the combined operation of many orders of work-people, adult and young, in tending with assiduous skill a system of productive machines continuously impelled by a central power... It excludes" all factories "in which the mechanisms do not form a connected series, nor are dependent on one prime mover... This title" (FACTORY) "in its strictest sense, involves the idea of a vast automaton, composed of various mechanical and intellectual organs, acting in uninterrupted concert for the production of a common object, all of them being subordinated to a self-regulated moving force" ([pp.] 19-20 [pp. 13-14]).

Here are the main characteristics of the mechanical workshop.

A vast automaton, i.e. a system of connected productive mechanisms, receiving their motive power from a self-acting central motor. This system of machinery, with its automatic prime motor, forms the body, the articulated body of the mechanical workshop. The cooperation of various classes of worker, distinguished mainly by whether they are adult or not, differences of age and gender. These workers themselves appear as merely the intellectual organs of the machinery (the machinery does not appear as their organ) who are distinguished from the inanimate organs by consciousness, and who work "in concert" with the latter, acting, like the inanimate machinery, in subordination to its moving force and equally "uninterruptedly".

The raw material has to pass through various metamorphoses, to which in the factory system there correspond various machines.

The main difficulty with the mechanical workshop lay in producing

"the discipline necessary to induce human beings to renounce their desultory habits of work, and to identify themselves with the unvarying regularity of the complex automaton. To devise and administer a successful code of factory discipline, tied to the necessities of factory diligence, was the Herculean enterprise, the noble achievement of Arkwright" ([p.] 22 [p. 15]).

Ure continues:

"Even at the present day, when the system is perfectly organised, and its labour lightened to the utmost" (!) "it is found nearly impossible to convert persons past the age of puberty, whether drawn from rural or from handicraft occupations, into useful factory hands" ([pp.] 22-23 [p. 15]).

Here Ure admits that, although no apprenticeship, etc., is needed, one must work in these mitigated jails, as Fourier calls them,224 from one's youth in order to be able to subject oneself to the "discipline" and to obey the "unvarying regularity of the complex automaton" throughout the whole of the day. This automaton is the autocrat here.

"When Adam Smith wrote his immortal elements of economics, automatic machinery being hardly known, he was properly led to regard the division of labour as the grand principle of manufacturing improvement. In each branch of manufacture he saw that some parts ... were, on that principle, of easy execution
and [XX-1248] some ... were comparatively difficult; and therefore he concluded that to each a workman of appropriate value and cost was naturally assigned" ([p.] 28 [p. 19]).

"But what was in Dr. Smith's time a topic of useful illustration, cannot now be used without risk of misleading the public mind as to the right principle of manufacturing industry. In fact, the division, or rather adaptation of labour to the different talents of men, is little thought of in factory employment. On the contrary, wherever 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 may superintend it" [p. 20].

//And Ure is still surprised that the workers are not grateful to the "peculiar mechanism" which devalues their labour capacity and deprives their specialism of any monetary value!// ([p.] 29 [p. 20]).

(Ure also speaks of the "menials" of his autocrat or automaton:

"In those spacious halls the benignant power of steam summons around him his myriads of ... menials" ([p.] 26 [p. 18]).

"The principle of the factory system, then, is to substitute mechanical science for hand skill, and the partition of a process into its essential constituents, for the division or graduation of labour among artisans. On the handicraft plan, labour was usually the most expensive element of a production: materiem superabat opus; but on the automatic plan, skilled labour gets progressively superseded, and will, eventually, be replaced by mere overseers of machines" ([p.] 30 [p. 20]).

(And the worker is supposed to be grateful for being converted like this from a skilled man to a mere overseer!)

"By the infirmity of human nature it happens, that the more skilful the workman, the more self-willed and intractable he is apt to become, and, of course, the less fit a component of a mechanical system" (where he must himself be an automaton) "in which, by occasional irregularities, he may do great damage to the whole. The grand object, therefore, of the modern manufacturer is, through the union of capital and science, to reduce the task of his work-people to the exercise of vigilance and dexterity—faculties, when concentrated to one process, speedily brought to perfection in the young" ([pp.] 20-21).

(Here Mr. Ure admits that the automatic system, like the division of labour, fixes the worker's activity on a single point—only the undeveloped human being must be broken in from childhood onwards to be an "organ of the automaton") ([pp.] 30, 31 [pp. 20-21]).

"In the infancy of mechanical engineering, a machine-factory displayed the division of labour in manifold gradations: the file, the drill, the lathe, having each its different workmen in the order of skill: but the dexterous hands of the filer and driller are now superseded by machines, etc., and those of the iron and brass turners by the self-acting slide-lathe. Mr. Anthony Strutt, who conducts the mechanical

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a The work excelled the material (Ovid, Metamorphoses, II, 5).— Ed.
department of the great cotton factories of Belper and Milford, has so thoroughly
departed from the old routine of the schools, that he will employ no man who has
learned his craft by regular apprenticeship” ([p. 31 [p. 21]).

(And indeed the laws on apprenticeship were to be repealed soon
after the emergence of machinery.)

The characteristic feature of the automatic system is, instead of
the gradation and specifying of labour,

“the equalisation of labour, or automatic plan. On the gradation system, a man must
serve an apprenticeship of many years before his hand and eye become skilled enough
for certain mechanical feats; [XX-1249] but on the system of decomposing a
process into its constituents, and embodying each part in an automatic machine, a
person of common care and capacity may be entrusted with any of the said
elementary parts after a short probation, and may be transferred from one to
another, in any emergency, at the discretion of the master. Such translations are
utterly at variance with the old practice of the division of labour, which fixed one
man to shaping the head of a pin, and another to sharpening its point” (pp. 32-33
[pp. 21-22]).

The great Ure speaks proudly of

“that cramping of the faculties, that narrowing of the mind, that stunting of the
frame, which were ascribed, and not unjustly, by moral writers, to the division of
labour” ([p.] 34 [pp. 22-23]).

“It is in fact the constant aim and tendency of every improvement in machinery,
to supersede human labour altogether, or to diminish its cost, by substituting the industry
of women and children for that of men; or that of ordinary labourers, for trained
artisans. In most of the water-twist, or THROSTLE cotton MILLS, the spinning is
entirely managed by females of sixteen years and upwards. 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. The proprietor of
a factory near Stockport states, in evidence to the commissioners, that by such
substitution, he would save £50 a week in wages, in consequence of dispensing with
nearly 40 male spinners, at about 25s. of wages each. This tendency to employ
merely children with watchful eyes and nimble fingers”

//these watchful eyes and nimble fingers must be used up in the nick of
time for the pockets of the manufacturers//

“instead of journeymen of long experience, shows how the scholastic dogma of the
division of labour into degrees of skill has been exploited”

(the English text has “exploded” here: the French translation brings
out a fine double meaning)

“by our enlightened manufacturers” ([pp.] 34-35 [p. 23]).

After Ure has thus correctly described the “tendency” and the
“constant aim” to drive out labour, to subject the worker to the
“automaton-autocrat”, to reduce the price of labour by substituting
the labour of women and children for that of adults, and
unskilled for skilled labour, after he has described this as the
essence of the automatic workshop, he goes on to reproach the
workers because by their *strikes* they—hasten!—the development of this beautiful system. As the system is the best thing for them, what could be more intelligent on their part than to "force" its development!

The predominance of women and children in the automatic workshop is, to be sure, the best proof of how fundamentally it differs from manufacture based on the division of labour, which requires "journeymen of long experience".

*Ure* says of the application of "*physics*" in the *factory system* that one would see there

"*many theorems bearing golden fruit*, which had been long barren in college ground" ([p.] 37 [p. 24]).

"A horse can work at its full efficiency only 8 hours out of the 24" ([p.] 43 [p. 28]).

(And children [can work] 12?)

For the steam engine there are no such limits.

The expense per annum of a machine of 60 horsepower, worked 8 hours every day, is £1,565, which is *about* 1/5 of the amount needed to maintain living horses for that period [Fr. ed., p. 43, Engl. ed., p. 28].

"There are many engines" (steam engines) "made by Bolton and Watt, 40 years ago, which have continued in constant work all that time with very slight repairs" ([p.] 44 [p. 29]).

[XX-1250] "Steam engines furnish the means not only of their support but of their multiplication. They create a vast demand for fuel; and, while they lend their powerful arms to drain the pits and to raise the coals, they call into employment multitudes of miners, engineers, shipbuilders, and sailors, and cause the construction of canals and railways" ([p.] 45 [p. 29]).

*Ure* says of the advantages of machines:

"They enable an operative to turn out a greater quantity of work than he could before—'time', 'labour'" (??) "and quality of work remaining constant" ([p.] 46 [p. 30]).

This leaves out, *d'abord*, the absolute lengthening of labour time; and secondly the greater intensity of labour, *as far as its continuity is concerned*. The statement as it stands in *Ure* is to be taken as the norm in so far as the value of the greater amount of the product likewise remains *constant*, in contrast to the growth in the intensity of labour we have considered elsewhere.

"A steam engine needs no period of repose" ([p.] 43 [p. 28]).


"Almost every *tool* is now more or less automatic, and performs its work more cheaply and with greater precision than the hand could possibly do" ([p.] 58 [p. 37]).
"The facilities resulting from the employment of self-acting tools have not only improved the accuracy, and accelerated the construction, of the machinery of a factory, but have also lowered its cost and increased its mobility in a remarkable degree" ([p.] 62 [p. 40] sqq.).

Mr. Ure himself admits that

"however well-informed the mill proprietors of Great Britain may be" they by no means understand "the operative part of their business as clearly as the commercial"a ([p.] 66 [p. 42]).

On p. 67 he speaks of the "ignorance" of the manufacturers as to the "structure of a good machine" [p. 42]. (So that they depend on the "MANAGERS".) In any case, these "MANAGERS", unlike the "PROPRIETORS" of the factories, are, Ure tells us,

"the soul of our factory system" ([p.] 68 [p. 43]).

Having told us previously that the factory workers gain a deep insight into the nature of the mechanics and physics employed, Ure now admits, with regard to the PROPRIETORS:

"It may be supposed that this species of education can be most easily acquired in the midst of the machinery itself. But this is a mistake which experience speedily proves" ([p.] 68 [p. 43]).

He speaks quite correctly of

"the commercial views of the proprietor" ([p.] 67 [p. 43]) (as opposed to mechanical views) ([p.] 67 [p. 42]).

The automatic machine for dressing warps (see Engels [The Condition of the Working-Class in England, p. 511]) was a consequence of strikes:

"This example affords an instructive warning to workmen to beware of strikes, by proving how surely science, at the call of capital, will defeat every unjustifiable union which the labourers may form" ([pp.] 63-64 [pp. 40-41]).

[XX-1251] Any further citations from Part 2 of Ure's book can be entered subsequently.225

Now we want first of all to examine the question of the REPLACING OF LABOUR by machinery.

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a Marx quotes partly in French, partly in German and partly in English.—Ed.
NOTES
AND
INDEXES
NOTES

1 Having completed the economic manuscript of 1857-58 (see present edition, vols 28 and 29), Marx embarked on a substantial economic work which, as he planned, was to encompass all aspects of life in capitalist society. The first step was the publication, in 1859, of *A Contribution to the Critique of Political Economy*, Part One. In the preface to this work, Marx sets out the plan of his ambitious project: “I examine the system of bourgeois economy in the following order: *capital, landed property, wage-labour; the State, foreign trade, world market*... The first part of the first book, dealing with Capital, comprises the following chapters: 1. The commodity; 2. Money or simple circulation; 3. Capital in general. The present part consists of the first two chapters” (see present edition, Vol. 29, p. 261).

The extant correspondence (see present edition, Vol. 40) shows that after the publication of Part One Marx intended to start immediately on the second part, dealing with capital in general. However, certain circumstances, his preoccupation with Herr Vogt among them, prevented him from immediately carrying out this intention. Preparatory work (drafting plans, reviewing the 1857-58 manuscript and excerpts dealing with capital—see present edition, Vol. 29—as well as making new excerpts, etc.), continued up to the summer of 1861, and in August 1861 Marx began writing. Viewed as the second part of *A Contribution to the Critique of Political Economy*, the new manuscript originally bore the same title, and on the covers of the first two notebooks he wrote the subtitle “Third Chapter. Capital in General” (see present edition, Vol. 30, p. 6). But soon the size of the manuscript grew considerably and reached 23 notebooks, 1,472 large pages in all. In the present edition it is published in vols 30-34.—5

2 The section on Ravenstone begins on p. XIV—861 of the manuscript (see present edition, Vol. 32, p. 392). Preceding it in Notebook XIV and numbered “1)” is a section devoted to the anonymous pamphlet *The Source and Remedy of the National Difficulties*.—7

3 An analysis of vulgar political economy is to be found in Notebook XV, where revenue and its sources are examined (see present edition, Vol. 32, pp. 449-541). On p. XV—935, Marx refers to the “section on the vulgarians” in which he will “return” to the polemic between Proudhon and Bastiat mentioned here
only in passing (ibid., p. 526). Further evidence of his intention to write a chapter specifically devoted to vulgar political economy is provided by the plan for the third part of Capital, which he drew up in January 1863; the eleventh, and penultimate, chapter was to have the title "Vulgar Economy" (see this volume, p. 347).—7, 255

4 By the "third chapter" or "third section" Marx means the entire third part of the investigation of "capital in general" (see Note 1). The title "Third Chapter. Capital and Profit", and also the draft plan of this chapter, are to be found on the inside front cover of Notebook XVI (originally Marx called this notebook, dated December 1861-January 1862, "Notebook Ultimum"). This title is also reproduced on p. XVI—973. A slightly changed and extended version of the plan for this section of his study is given by Marx on p. XVIII—1139 (see this volume, pp. 346-47).

In mid-1863, when embarking on a new, third, version of the work which was later to become Capital, Marx concluded that the chapters, or sections, in his study of "capital in general" would actually represent separate books that would be comprised in Capital. From this time on, the third chapter began to figure as Book III (later Volume III) of Capital.—7, 346, 380, 478

5 Marx drew attention to the need for a special examination of the relation between surplus value and profit on p. III—98 of the manuscript (see present edition, Vol. 30, p. 178).—7

6 Marx evidently meant the ratio between the rate of profit and the rate of surplus value, which is in inverse proportion to the ratio of variable to total capital. On the importance of distinguishing between the rate of surplus value and the rate of profit see p. III—124e of the manuscript (see present edition, Vol. 30, p. 229).—7, 77

7 From p. 1029 on, Notebook XVII continues the text begun in Notebook XV (see Note 53).—8

8 The "Episode" is to be found on pp. XVII—1038-1065a and XVIII—1068-1074 (see this volume, pp. 171-222 and 226-38). In the draft plan for the third section (the future Volume III) of Capital it has a somewhat different title, namely "Reflux Movements of Money in the Process of Capitalist Production as a Whole" (see this volume, pp. 346-47).—8

9 The cover of Notebook XVIII has not survived. The notes given below were made on the inside front cover of Notebook XIX of the manuscript of 1861-63. Besides the table of contents there are references here to Factories. Returns for various years.

The front cover of Notebook XIX is dated: "Jan. 1863".—8, 387

10 In March 1862 Marx interrupted his successive analysis of relative surplus value and embarked on a detailed examination of bourgeois theories of surplus value. As a result, part of Notebook V was not filled in. In late 1862-early 1863 Marx returned to his analysis of the use of machinery in capitalist production and made records in notebooks V, XIX and XX, as is testified by his letters to Engels of January 24 and 28, 1863 (see present edition, Vol. 41, pp. 446 and 449-51). Part of Notebook V has therefore been included in this volume in accordance with the time it was written. The text on pp. 372-501 of this volume thus represents the continuation of subsection "γ) Machinery. Utilisation of the Forces of Nature and of Science" of section "3) Relative Surplus Value", the beginning of which is published in Volume 30 of the present edition.
Marx did not write the table of contents for Notebook V on the inside front cover, which he did for other notebooks of the manuscript of 1861-63 beginning with Notebook VI.—8, 372, 489

11 The notes given below were made on the inside front cover of Notebook XX of the manuscript of 1861-63.

On the front cover of Notebook XX Marx wrote: "März. April. Mai. 1863", the last two months being inserted in retrospect.—8

12 In the economic manuscript of 1857-58 (see present edition, Vol. 28), and also in notebooks I, II and XI of the present manuscript (see present edition, vols 30 and 31), Marx described mercantile and money-dealing capitals as being, on the one hand, the first historical forms of capital and, on the other hand, derivative forms of capital in bourgeois society. Marx drew attention to the need to go into greater detail on the role of trade in the development of capitalist production on p. II—71 of the manuscript (see present edition, Vol. 30, p. 136).—9

13 The text on pp. 9-25 of this volume reproduces in part and with some alterations a number of passages from Marx’s economic manuscript of 1857-58 (see present edition, Vol. 29, pp. 226-36).—9

14 The term “auxiliary capital” was used by Richard Jones, who, in Marx's words, understood it to mean “the part of constant capital which is not made up of raw material” (see this volume, p. 357). Cf. p. V—196 of the manuscript, where Marx also uses the said term (present edition, Vol. 30, p. 327).—9

15 Above, on p. XV—939 of the manuscript, Marx writes on this score: “The usurer in all pre-capitalist modes of production has a revolutionary impact only in the political sense, in that he destroys and wrecks the forms of property whose constant reproduction in the same form constitutes the stable basis of the political structure” (see present edition, Vol. 32, p. 535).—10

16 Page XV—941 of the manuscript has the note, “England, 17th century. The polemics are no longer directed against usury as such, but against the amount of interest” (see present edition, Vol. 32, p. 537).—11

17 “Profit upon expropriation” (or “profit upon alienation”) is a term which was used in writings on political economy before Marx. On p. VI—221 he writes that “profit upon alienation ... arises ... from the goods being sold above their value” (see present edition, Vol. 30, p. 351).—11, 35, 67, 241, 351

18 There follows the end of the sentence crossed out by Marx: “before it takes on its other functions, before capitalist production, and therefore before capital itself comes to be the all-dominant relation of production, before its fundamental form is developed in which it constitutes the basis of modern society”.—12


20 In the original there follows the sentence crossed out by Marx: “What he receives for his money therefore depends neither on its value nor on the value of the commodities, since the general measure of valorisation and thus profit, the average rate of profit, come into being only on the foundation of capitalist production itself.”—12
The dialectics of alienation and appropriation in the process by which the bourgeois mode of production emerges and develops were discussed in detail by Marx back in Outlines of the Critique of Political Economy (Rough Draft of 1857-58) notably in the section headed “Forms Preceding Capitalist Production” (see present edition, Vol. 28, pp. 399-439).—13

Cf. the exposition below on pp. 17-18 and the corresponding passages in Capital, Vol. III, Chapter XXXVI (present edition, Vol. 37).—17

In the manuscript, the word “principalities” (Provinzen) was crossed out and “lands” (Ländern) written above it. On the exploitation of peasants in the “Romanian principalities” see Capital, Vol. I, Chapter X (present edition, Vol. 35).—17

Here Marx quotes from Recherches sur la nature et les causes de la richesse des nations, Paris, 1802, Garnier’s translation of Adam Smith’s work. Marx made excerpts from it in Paris in the spring of 1844. In the present volume all quotations from Garnier’s translation are given according to the English edition (A. Smith, An Inquiry into the Nature and Causes of the Wealth of Nations, by J. R. MacCulloch. In four volumes. Edinburgh, London, 1828), with the pages indicated in brackets, and Marx’s wording respected. Marx widely used the 1828 edition when working on the manuscript of 1861-63.—19

Marx apparently had in mind this passage when he mentioned Steuart on p. IV—174 of the manuscript (see present edition, Vol. 30, p. 298).—20


Marx is not quite accurate here. Thomas Manley was the author not of the tract Interest of Money Mistaken, published anonymously in London in 1668, but of another tract which appeared in London in 1669, under the heading Usury at 6 per cent Examined and Found Unjustly Charged by Sir Thos. Culpeper and J. C. Since below Marx quotes Child from the French edition indicated, which includes several of his works, the present volume has the titles and page numbers of the English originals in square brackets.—22

Below in the original mistakes were made when converting pence into shillings.—23

There follows an incomplete sentence which concludes p. 950b: “If wages fell to 1/3, say from 2/5s....”—24

The magnitude 2/5, or 40 per cent, does not reflect the ratio between the amount of profit and the price of the product, but the approximate ratio between the profit and the outlay on the product’s manufacture. In actual fact the former ratio is 4/15, or 26 2/3 per cent.—26

The price of the product in this case is the same as in II, but not in I a).—26

Marx is referring to the value added by living labour.—29, 128

Marx is referring to case I a).—30

The reference is to the value added by living labour, both paid and unpaid.—30

In the table below, several figures which Marx gives twice are reproduced only once.—30
Marx means the value of labour power, or of labour capacity. He deliberately
drew a distinction between labour and labour power (labour capacity) back in
the economic manuscript of 1857-58 (see present edition, vols 28 and 29).
However, in this manuscript, which was not intended for publication, the term
"value of labour" is often used for the sake of brevity in the sense of "value of
labour capacity". — 32

Up to here, according to Marx's supposition, 100s. represented 5 M and not
10 M, so that 50s. represent not 5 M, but 2½ M. — 33

1821, chapters I, V, VI, and XXI. This thesis of Ricardo's is examined by Marx
in greater detail in notebooks XII and XIII of the manuscript (see present
edition, vols 31 and 32). — 33

In the previous exposition Marx assumed throughout that £100 commanded 5
men. — 34

Marx examines case III. — 35

Page 957 is the direct continuation of page 955. — 36

In this manuscript Marx often refers to "wage labour" or "labour" pure and
simple when he means hired labour power (see also Note 36). — 39, 50, 175, 176,
179, 198, 204, 206, 234, 262

The concept "capital in general" is central to the economic manuscript of
1857-58 (see present edition, vols 28 and 29) and is used repeatedly in Marx's
correspondence (see present edition, Vol. 40, pp. 287, 298-303). On the whole,
Marx viewed this manuscript as representing a stage in his efforts to work out the
substance of the said concept (see Note 1). — 41

Cf. Matthew 6:19: "Lay not up for yourselves treasures upon earth, where
moth and rust doth corrupt, and where thieves break through and steal." — 44

These questions are examined in detail by Marx in *Capital*, Volume III, Chapter
XXXV (see present edition, Vol. 37). — 46

Marx means the case when the cotton manufacturer's capital amounts to £1,000
and turns over four times a year. — 52

In the manuscript the annual production of each manufacturer is given as
40,000 yards. This implies that their capitals turn over several times a year,
whereas all the other figures in this example show that each capital turns over
just once a year, producing 4,000 yards. If we assume that the manufacturer's
capital (£900) turns over four times a year, in a year it will produce 36,000
yards. In this case each merchant could buy and sell the commodities produced
by four manufacturers. — 53

See notebooks IX and X of the manuscript (present edition, Vol. 31,
pp. 130-200, 204-40). — 61


Marx dwelled on this question on pp. X — 450-454, 470-473, XI — 529-560,
XIV — 788-789 of the manuscript of 1861-63 (see present edition, Vol. 31,
This is the end of Notebook XV of the manuscript of 1861-63. There follows a note by Marx: "Continued in Notebook XVII." The single front cover of notebooks XVII and XVIII (p. 1066) carries the note: "Beginning on page 1029 continuation of Notebook XV" (see also Note 127).—68

Chapter, or Section, II of Marx's work was to have been devoted to examining the circulation process of capital (see the draft plan of 1861, Section II, "Circulation Process of Capital", present edition, Vol. 29, pp. 514-16). The content of this section was largely expounded back in Outlines of the Critique of Political Economy (Rough Draft of 1857-58) (see present edition, Vol. 28, pp. 329-537, Vol. 29, pp. 7-128).—69, 89

On the place accorded to an examination of landed property in the plan for Marx's economic studies see Note 1 and also present edition, Vol. 40, p. 270.—69

Marx is referring to the proposition: "Profits, indeed, imply proportions; and the rate of profits had always justly been estimated by a per-centange upon the value of the advances" (Th. R. Malthus, Definitions in Political Economy..., London, 1827, p. 30).—70, 100

In his examination of usury in De re republica (Politica), I, 8-10, Aristotle concludes that the generation of money by money, or interest, is the sphere of acquisition most offensive to human nature. Marx refers to this statement by Aristotle in the original text of A Contribution to the Critique of Political Economy (see present edition, Vol. 29, p. 488) and also in Capital, Volume I, Chapter V (see present edition, Vol. 35).—71

Marx is referring to the following statement: "Wealth like labour and through labour bears fruit annually... This fruit is the revenue flowing out of capital" (J. C. L. Simonde de Sismondi, Nouveaux principes d'économie politique, Vol. I, Paris, 1827, pp. 81-82). He subsequently quoted it in Capital, Volume I, Chapter XXIII (see present edition, Vol. 35).—71

Marx wrote about the greed for alien labour time, which determines the behaviour of the capitalist, and about other questions connected with this when he examined absolute surplus value in Notebook III of this manuscript (see present edition, Vol. 30).—71

Marx criticised the erroneous arguments on interest and compound interest in Richard Price's works An Appeal to the Public..., London, 1772, and Observations on Reversionary Payments..., London, 1772, and also William Pitt's fantasy engendered by Price's ideas, back in the manuscript of 1857-58 (see present edition, Vol. 29, pp. 218-19). When examining the question of compound interest on p. XIV—853 of the manuscript he noted: "We shall return to Price's fantasy in the section on revenue and its sources" (see present edition, Vol. 32, p. 376). However, in Notebook XV, which contains a summary of the views of vulgar bourgeois political economists on revenue and its sources (see ibid.) there is no mention of "Price's fantasy". Marx did not resume his criticism of Price on this question until p. XVIII—1066 of the manuscript of 1861-63 (see this volume, pp. 222-24).

Subsequently a critical analysis of Price's views was given in Capital, Vol. III, Chapter XXIV (see present edition, Vol. 37).—71, 222

In Notebook XV of the manuscript (see present edition, Vol. 32, pp. 531-40) Marx examines in detail Luther's views on interest as expounded in the latter's
book *An die Pfarrherrn wider den Wucher zu predigen. Vermanung, Wittenberg, 1540.*—72


63 Cf. the draft plan for the section on the production process of capital, p. XVIII—1140 of the manuscript (see this volume, p. 347), where under point “6) Reconstruction of surplus value into capital...” Marx notes the need to examine Wakefield's theory of colonisation. He later devoted Chapter XXXIII of Volume I of *Capital* to an analysis of the theory (see present edition, Vol. 35).—72

64 Ramsay's views are examined in detail in notebooks I and III of the manuscript of 1861-63 (see present edition, Vol. 30), those of Malthus in Notebook III (ibid., Vol. 32), of Senior in notebooks III and XX (ibid., vols 30, 34) and of Torrens in notebooks I and XIV (ibid., vols 30, 32).—73

65 On Torrens see Note 64.—74

66 In Notebook III of this manuscript Marx examined Senior's views as an “example illustrating the political economists' failure to understand surplus labour and surplus value” (see present edition, Vol. 30, pp. 179, 199-203).—74

67 When working on this manuscript, Marx was guided in his study of capital by the plan he had devised when writing the manuscript of 1857-58 and which he set out in a letter to Engels of April 2, 1858: “Capital falls into 4 sections. a) Capital *en général*... b) *Compétition*, or the interaction of many capitals. c) *Credit*, where capital, as against individual capitals, is shown to be a universal element. d) *Share capital* as the most perfected form (turning into communism) together with all its contradictions” (see present edition, Vol. 40, p. 298).—75, 88, 94, 101, 111, 113, 170, 179, 184, 212, 280

68 Marx deals with Malthus' polemic against Ricardo on this issue on pp. XIII—761-762 of the manuscript of 1861-63 (see present edition, Vol. 32, pp. 222-25).—76

69 Marx traced the main directions in which Ricardo's theory of value was vulgarised in the works of James Mill and MacCulloch in Notebook XIV of the manuscript; see especially pp. XIV—844-848 (present edition, Vol. 32, pp. 359-67).—76

70 Marx deals with Say's views on value on pp. XIV—847-850 of the manuscript (see present edition, Vol. 32, pp. 365-69).—76

71 In the draft plan for the chapter “Capital and Profit” which Marx drew up on p. XVIII—1139, the eleventh (penultimate) item reads “Vulgar economy” (see this volume, p. 347).—76

72 Marx is referring to a notebook which is not extant and in which between 1844 and 1847 he made excerpts from Antoine Cherbuliez's work *Richesse ou pauvreté*, Paris, 1841 (see also Note 201). Marx deals with Cherbuliez's views on this question on pp. XVIII—1106-1112 (see this volume, pp. 292-304).—78

73 Marx notes the need for a detailed analysis of the costs of production on p. II—88 of the manuscript (see present edition, Vol. 30, p. 163).—78

34*
Marx is referring to pp. I—1-13 of the manuscript of 1861-63 (see present edition, Vol. 30, pp. 9-32).—78

Say's and Jones' views on this question were not discussed in the manuscript; Torrens' position is analysed on pp. XIII—783-788 (see present edition, Vol. 32, pp. 262-70).—82


In all probability, Marx was referring to what follows under point d) when he wrote on p. II—90: "We have investigated the changes in constant capital elsewhere (in dealing with profit)" (see present edition, Vol. 30, p. 165). See also p. II—93 (present edition, Vol. 30, pp. 168-69). Evidently, the final pages of Notebook II were filled in by Marx after he had completed Notebook XVI, which is dated December 1861-January 1862.—84

The part of the sentence enclosed in square brackets was crossed out by Marx, probably by mistake.—88

The example to which Marx refers is given on p. V—205 of the manuscript of 1861-63 (see present edition, Vol. 30, p. 339).—89

The original has "6a", which is evidently a mistake.—91

In this connection Marx referred to William Blake's *Observations on the Effects Produced by the Expenditure of Government...* also on p. XII—688 of the manuscript (see present edition, Vol. 32, p. 93). He reproduced the pertinent passages from the said work back in the manuscript of 1857-58 (see present edition, Vol. 29, pp. 168-69).—92

On p. XI—555 of the manuscript Marx quoted a number of pages from Adam Smith's *Inquiry...* (according to the French edition, *Recherches sur la nature et les causes de la richesse des nations*, Vol. I, Paris, 1802) dealing with the causes of the fall in the rate of profit; he went into greater detail abour Smith's position on this issue on pp. XIII—673, 693 (see present edition, Vol. 32, pp. 72-73, 101-02).—92

Cf. this statement by Marx on competition and its reflection in bourgeois political economy with the similar passage on p. IV—21 of the manuscript of 1857-58 (present edition, Vol. 28, pp. 340-41).—102

Marx comments on this statement by Smith on p. VI—260 of the manuscript of 1861-63 (see present edition, Vol. 30, pp. 395-96).—103

The text on p. 999 is the direct continuation of that on p. 994. The sheet which makes up pp. 995-998 (they are twice the size of the other pages in Notebook XVI) was evidently inserted into the notebook at a later date, following which Marx numbered all the pages. The text on the inserted pages is published immediately before the text marked in the margins as "Continuation of the last page of the inserted sheet", and begins on p. XVI—1009 (see this volume, p. 129).—103

Marx deals in detail with the views of Malthus, Torrens and Ramsay on the said questions on pp. XIII—753-758, 760-764, XIV—782-788, and XVIII—1087-1090, of the manuscript respectively (see present edition, Vol. 32, pp. 209-18, 221-27, 258-71, and also this volume, pp. 256-60).—103

Smith's statement is quoted by Richard Jones in *An Essay on the Distribution of
Notes 513

Wealth..., London, 1831, p. 238. Marx quotes this passage from Jones' book on p. XVIII—1128 of the manuscript of 1861-63 (see this volume, p. 330).—104

88 Marx gives the pertinent excerpt from Dombasle's work Annales agricoles..., Vol. 4, Paris, 1828, on p. X—449 of the manuscript (see present edition, Vol. 31, pp. 259-60).—104

89 In the original, instead of Jones, Marx—apparently by mistake—names here the English agricultural chemist James Johnston whom he subsequently quotes in chapters XXXVII and XXXIX of Volume III of Capital. In Chapter XLV he refers to Dombasle and Jones in connection with the progress of capitalist agriculture and the growth in the organic composition of capital deriving from it (see present edition, Vol. 37).

Marx analyses in detail Richard Jones' theory of rent on pp. XVIII—1121-1130 of the manuscript (see this volume, pp. 320-32).—104


91 Marx is referring to the section dealing with relative surplus value, which constitutes part of Notebook III and notebooks IV and V of the economic manuscript of 1861-63 (see present edition, Vol. 30).—107

92 According to the example given, the expenditure of living labour in India equals 400+80=480. The proportion of surplus labour time in the total labour time equals 80/480=1/6; this therefore represents the possible proportion of the non-productive population.

The expenditure of living labour in England is equal to 100+50=150. The proportion of surplus labour time, and thus the possible proportion of the non-productive population, is 50/150=1/3, or twice as much as in India.—107

93 Cf. the text below on pp. 108-10 with the proposition formulated by Marx on pp. IV—138-139 (present edition, Vol. 30, p. 247) on the proportion in which a reduction of necessary labour time causes an increase in surplus labour time and its tendencies towards change (see present edition, Vol. 30, Note 185).—108

94 In his manuscript of 1857-58 Marx quoted the pertinent passages from Sismondi as found in Nouveaux principes d'économie politique..., Vol. 1, Paris, 1827, pp. 94, 95, 97-98 (see present edition, Vol. 29, pp. 35-36).—108

95 Cf. the corresponding passage in the manuscript of 1857-58 (present edition, Vol. 29, pp. 92-93).—108

96 Marx analyses Smith's views on the ratio of profit to wages on pp. XI—555-557 (see present edition, Vol. 31, pp. 449-52).—108

97 Marx analyses Ricardo's views on the ratio of wages to profit in notebooks XII and XIII, pp. 661-694 (see present edition, Vol. 32, pp. 51-103).—108

98 Marx criticised Carey's position on this question back in the manuscript of 1857-58, pp. III—2, IV—1, VI—1, VI—27, VII—18 (see present edition, Vol. 28, pp. 6-8, 296-98, 478, Vol. 29, pp. 29, 138-39).—109

99 Marx quotes the pertinent statement by Ricardo on p. XIII—670 of the manuscript (see present edition, Vol. 32, pp. 67-68).—109
Marx is referring to the sections "Relative Surplus Value" and "Capital and Profit" of the manuscript contained in notebooks III-V and XVI (see present edition, Vol. 30, and this volume, pp. 69-153).—109

Cf. pp. XIII—731-732 of the manuscript (present edition, Vol. 32, pp. 172-73).—112, 113

Cf. pp. XIII—775-776 of the manuscript of 1861-63 (present edition, Vol. 32, pp. 249).—114


What follows in the manuscript is crossed out: 

$$= \frac{1}{2}; \frac{3}{4} = \frac{2}{3}; \frac{3}{4} = \frac{2}{3}, \text{ by } \frac{2}{9}.$$ 

Consequently the surplus value should grow only by \(\frac{2}{3}\) and not treble. 

\[\frac{120}{2} = 40, \frac{2}{3} \text{ of } 120 = 80, 120 + \frac{2}{3} \times 120 + 80 = 200. \]

\[\frac{260}{600} = \frac{1}{3} = 33\frac{1}{3}\% \text{ Ss'}. \]

But 

\[\frac{200}{1,200} = \frac{2}{12} = \frac{1}{6}, \frac{3}{4} \text{ of } 200C.\]—116

Marx is referring to section "3) Relative Surplus Value", subsection "y) Machinery, Utilisation of the Forces of Nature and of Science" of the manuscript, notably pp. V—201-208 (see present edition, Vol. 30, pp. 334-43).—123

Here and below Marx assumes that the annual wear and tear of the machinery amounts to 50, not to 37, thalers. Then, the not-consumed part of the advanced capital is equal at the end of the first year to 370−50=320 (not 370−37=333), and neither is it 300 thalers, as Marx assumes here.—126

What follows in the manuscript is crossed out: 

"or 80 on 200. The total capital advanced—280, of which 80 go on wages. Previously 200 went on constant capital and 400 on wages—600 in total. In the first case, the proportion of capital expended on labour to the total capital is \(\frac{80}{280}\). In the second, \(\frac{400}{600}\). In the first [case]—\(\frac{2}{7}\), in the second—\(\frac{2}{5}\); consequently, not as it appeared originally, \(\frac{2}{15}\) in the first case and \(\frac{2}{5}\) in the second; then the difference was between \(\frac{6}{15}\) and \(\frac{30}{45}\), or 5 times greater in the second case than in the first; [in actual fact] in the second [the change is] from \(\frac{2}{7}\) to \(\frac{2}{3}\), or from \(\frac{6}{21}\) to \(\frac{14}{21}\), i.e. only \(\frac{2}{3}\) times greater [than in the first].

"Two things follow from this."—126


In the margins of p. XVI—998, Marx made the following addition, which has only survived in part and cannot therefore be placed with certainty at a definite point in the text: 

"... that the sum of surplus value not only does not fall, but rises [...] to the actual rate [of surplus value] depends on the number of workers employed, that with the use of machinery, due to the action of the laws inherent in machine production, the more productive application [...] the better division and combination of labour due to fixed capital, grows."—129

With the aid of the new means of production, the workers produce in one hour of labour not \(\frac{8}{10}\) of a thaler, as previously, but \(\frac{3}{5}\) greater than this amount, i.e. \(\frac{8}{10} + \frac{3}{5} \times \frac{8}{10} = \frac{17}{25}\) thalers; in 6 hours of labour, therefore, \(\frac{717}{25}\) thalers, which is a little different from the amount of 8 thalers given by Marx.—130
Marx cites and analyses these statements by Smith on pp. VI—261, 262 of the manuscript (see present edition, Vol. 30, pp. 397-98).—130

Marx cites and comments on the pertinent statement by Wayland on pp. IV—167, 168 of the manuscript (see present edition, Vol. 30, p. 290).—130

Marx means that in the consumption of a worker the proportion of agricultural products (the organic composition of capital in agriculture being lower than in industry) is greater than that of industrial products.—131

The calculations below contain arithmetical errors which do not, however, affect the course of Marx's reasoning.—132

In the original there follow collateral calculations which take about a quarter of p. 1012.—133

In Notebook V of the manuscript of 1861-63, examining the process of production of relative surplus value, Marx gives numerous examples of various ways of increasing productive power (see in particular p. 200 of the manuscript, present edition, Vol. 30, pp. 332-33).—139

Cf. p. IV—166 of the manuscript of 1861-63 (present edition, Vol. 30, p. 288).—140

Cf. pp. XIII—726, 727 of the manuscript (present edition, Vol. 32, p. 165).—144

The lower half of p. 1021 of the manuscript (last page of Notebook XVI) was not filled in. Its reverse (p. 1021a) carries a short draft of a table of contents for several pages of this notebook:

"Ricardo and school p. 977
Wakefield p. 975.
Tendency of the rate of profit to fall.
Average profit. 982.
Competition 976.
Capitalist production. 979."—145

Marx is referring to subsection "γ) Exchange with Labour. Labour Process. Valorisation Process" of section "1) Transformation of Money into Capital" as expounded in notebooks I-II of the manuscript (see present edition, Vol. 30, pp. 33-42).—146

Marx provides a critique of Carey on this question in Outlines of the Critique of Political Economy (Rough Draft of 1857-58) (see present edition, Vol. 28, pp. 499-502).—151

The heading for this part of the manuscript had been preceded by another which was deleted: "Increase in Absolute Surplus Labour Time by Means of Machinery and Fixed Capital."—151

Marx gives an example of this on p. II—92 of the manuscript of 1861-63 (see present edition, Vol. 30, p. 168). Later, in Volume I of Capital, Chapter XV, Section 9, these problems were examined in detail (see present edition, Vol. 35).

By the "battle bulletins" Marx means Reports of the Inspectors of Factories to Her Majesty's Principal Secretary...—153

Cf. pp. III—124f and V—201 of the manuscript, where Marx gives pertinent examples from Babbage (present edition, Vol. 30, pp. 229, 334).—153
Marx made an arithmetical error in his calculation. Cf. Volume III of *Capital*, where the example in question is reproduced, in a corrected form, in Chapter V, point I (see present edition, Vol. 37).—153

On p. XVII—1029 there is a note by Marx: “Continuation of Notebook XV.” At the end of p. XV—973, the final one of this notebook, Marx wrote: “Continued in Notebook XVII.” See Note 53.—154


Cf. the paragraph below with *Capital*, Volume III, Chapter XIX (present edition, Vol. 37).—170

Marx means labour capacity, labour power. See Note 36.—172

Cf. Marx’s analysis of Tooke’s views on this question in *Capital*, Volume III, Chapter XXVIII (present edition, Vol. 37).—172

The reference is to the section “Digression. Tableau économique, according to Quesnay” in Notebook X of the manuscript (see present edition, Vol. 31).—173

Marx gives the nearest whole. More exactly, at an annual rate of accumulation of 5 per cent, the retailer’s capital will amount to 100, 105, 110\(^{1/4}\), 115\(61/80\), etc.—179, 181

In the margins opposite this paragraph Marx wrote “NB” and below “This calculation is wrong”. He made similar calculations on p. 1047 (see this volume, p. 186), following which he apparently crossed out the words “This calculation is wrong” and added “See p. 1047”.—181


Sphere I in the present manuscript refers to the production of means of subsistence (objects of consumption), and sphere II to the production of means of production, or elements of constant capital. Accordingly, the capitalists in sphere I are denoted as class I and those in sphere II as class II. Later, in Volume II of *Capital* (see present edition, Vol. 36), Engels, basing himself on the final draft of Volume II, denoted the production of means of production as sphere I and the production of means of subsistence as sphere II.—200

In his previous calculations, Marx assumed that the ratio of variable to constant capital in this sphere was 1:5, and not 1:6, as he now assumes.—201

On the events which Marx describes here as “Manchester distress”, see also his articles “Workers’ Distress in England” and “Garibaldi Meetings.—The Distressed Condition of Cotton Workers”, written around September 20 and 30, 1862, respectively (present edition, Vol. 19, pp. 259-42, 245-47); they are also mentioned in his letter to Engels of November 17, 1862 (ibid., Vol. 41, p. 490).—209

Marx quotes the pertinent excerpt from *The Morning Star* on pp. XII—611, 612 of the manuscript of 1861-63 (see present edition, Vol. 31, p. 538).—209

Marx reproduces the explanation of the term “dealer” as given by Germain Garnier, who translated Smith’s work into French.—214

A critique of Smith’s views of natural price is given on pp. VI—263-265 of the manuscript of 1861-63 (see present edition, Vol. 30, pp. 399-403).—214
The currency principle—one of the varieties of the quantitative theory of money, which emerged in England in the 1840s. Marx deals with the theoretical views of the Currency School in Capital, Vol. III, Chapter XXXIV (see present edition, Vol. 37).—215

What Marx means by sphere A or class A hereinafter is class I of social production, the production of means of subsistence.—219

There follows an incomplete calculation which Marx crossed out with three vertical lines: “And this is the entire capital he needs in this line during the year. 10% of 510 makes £51 a year and £10 1/5 for 1/5 year. For £510 the shop therefore receives goods to the tune of £520 1/5. And for 1,020 it receives goods to the tune of 1,040 2/5. With this sum it makes purchases from the wholesaler every fifth of a year. For the 20 shopkeepers which exist for every wholesale dealer this makes 20 × £520 1/5 = £10,404, and for 100 shopkeepers per year 1/5 year = 52,020. This means that for 5/5, or 1 year, =.”—221

Page 1066 opens Notebook XVIII, which Marx filled in in January 1863.—222

In order to prevent a growth in the national debt, William Pitt the Younger, then British Prime Minister, introduced in 1786 a sinking fund, i.e., a scheme whereby a certain proportion of public revenues was used every year to purchase state promissory notes. However, the war with France (1793-1802) was accompanied by a sharp increase in the national debt. The imbalance between revenues and expenditure led first to a limit on the issue of banknotes, and in 1797 to the enactment of a law relieving the Bank of England of the obligation to accept banknotes. Marx dealt in detail with the laws on the sinking fund enacted under Pitt in the article “Mr. Disraeli’s Budget” published in the New-York Daily Tribune, No. 5318, May 7, 1858 (see present edition, Vol. 15, pp. 512-14).—222

The reference is to Pitt’s speech of February 17, 1792. It was reproduced in part in James Maitland Lauderdale’s book Recherches sur la nature et l’origine de la richesse publique..., Paris, 1808, pp. 176-79, which Marx quotes below.—223

The reference is to Lauderdale’s book from which Marx familiarised himself with Pitt’s speech of February 17, 1792 (see Note 147).—223

Marx planned to devote one of the books of his economic work specifically to foreign trade (see Note 1).—229

Ricardo advanced this hypothesis in chapters XIII and XXVIII of his book On the Principles of Political Economy, and Taxation. Here Marx, too, adheres to this hypothesis (see, for example, this volume, p. 193), considering it to be correct (see its substantiation in Capital, Volume II, Chapter XX, point XII, “The Reproduction of the Money Material”—present edition, Vol. 36). At the same time, Marx noted Ricardo’s extreme inconsistency on this issue back in his work A Contribution to the Critique of Political Economy. Part One (see present edition, Vol. 29, pp. 401-02).—231

In the manuscript of 1861-63 Marx uses the term “cost price” (“Kostenpreis” or “Kostpreis”) in three different meanings: 1) in the sense of the price of production, as here; 2) in the sense of the “immanent cost of production” of the commodity, which is identical to the value of the commodity (see present edition, Vol. 30, p. 401); and 3) in the sense of the cost of production.—232

The excerpts from Newman which Marx gives below contain minor digressions.
from the original. Marx quotes Newman according to notebooks XVI and XVII of excerpts compiled in London in 1851-52.—239

153 In this manuscript Marx holds that the “real movement of capital” (it can be observed in competition, credit, share capital and other more concrete forms of interaction between numerous capitals) should be examined following a clarification of what is meant by the general nature of capital as expressed by the concept “capital in general” (see also notes 1 and 44).—242

154 Below Marx reproduces some of Corbet’s propositions, partly verbatim and partly in his own summarised rendering, according to Notebook XVI of excerpts compiled in London in 1851.—242

155 The American Civil War (1861-65) led, among other things, to a blockade of US cotton exports to Britain, bringing about a crisis in the country’s textile industry. Many factories were closed down and their workers sacked. The price of cotton rose, bringing with it unbridled speculation on the Liverpool cotton market. Marx later returned to this in Capital, Volume III, Chapter VI, point III (see present edition, Vol. 37).—249

156 The text on pp. XVIII—1084-1157 belongs mainly to the Theories of Surplus Value (see present edition, vols 30-32).—253

157 The passages from Hodgskin’s work which Marx gives below are presented partly in a summarised form according to Notebook IX of excerpts compiled in London in 1851.—253

158 Below Marx partly quotes and partly interprets the pertinent passages from Hodgskin’s anonymously published work Labour Defended..., London, 1825, according to Notebook XI of excerpts compiled in London in 1851.—253

159 Marx is referring to Notebook IX of excerpts which he compiled in London in 1851. Page 47 of this notebook carries the pertinent excerpts from pp. 252-56 of Hodgskin’s book Popular Political Economy.—255

160 Here Marx returns to an analysis of Ramsay’s thesis which he criticised earlier, on pp. II—72-74 of the manuscript (see present edition, Vol. 30, pp. 137-42). The passages from Ramsay below are given by Marx partly in a summarised form according to Notebook IX of excerpts compiled in London in 1851.—256

161 The term “average price” (Durchschnittspreis) is used here by Marx in the sense of price of production, i.e., the costs of production plus average profit, since he is referring to the “average market price over a long period, or the central point towards which the market price gravitates”, as he explains on p. XI—605 (present edition, Vol. 31, p. 530). Marx first used this term on p. VI—264 (ibid., Vol. 30, p. 400). In the present manuscript, the said term is used as a synonym for the terms “cost price” and “price of production”. See also Note 151.—259

162 Marx expands on Mill’s example of the “wine in the cellar” on p. VIII—341 and also on pp. XIV—792, 845 of the manuscript (see present edition, Vol. 31, pp. 70-71, Vol. 32, pp. 277, 362).—259

163 The reference is to the “exceptions” formulated by Ricardo on the basis of the law which stipulates that value is determined by labour time. Marx goes into greater detail on this on pp. XI—528-542 and also pp. XIV—782-783 of the manuscript (see present edition, Vol. 31, pp. 400-26, Vol. 32, pp. 258-62).—261

164 Marx is referring to the third chapter (or section—see Note 4) on “Capital
and Profit”, which he began in Notebook XVI and in point 2 of which he proposed to discuss the question of the “transformation of values into prices of production”—cf. his draft plan on p. XVIII—1139 (this volume, p. 346).

Subsequently this question was examined in Capital, Volume III, chapters VIII-XII (see present edition, Vol. 37).—261

In the original calculation it was assumed that in the second case the cost of production of instruments of labour and labour capacity would be reckoned against the halved value of a quarter of corn resulting from the doubling in the size of the harvest. Now Marx points out that this fall in value occurred only in the autumn of the second year, whilst up to that autumn the value of a quarter was twice as high. Thus, whilst in the original calculation the costs of production in the second case amount to $20c+40c+40v=100$ quarters, it now turns out that they are expressed by the first sum, i.e., the sum in the first case: $20c+20c+20v=60$ quarters. Since the harvest in the second case amounts to 200 quarters, the share of profit equals 140 quarters.—267

Marx is apparently referring to the conversion of part of profit and part of capital into rent, which he examined on pp. XIII—684-687, when analysing Ricardo’s theory of profit (see present edition, Vol. 32, pp. 87-92).—272

On p. III—126 of the manuscript, Marx, examining the influence of a rise in labour productivity on a fall in the value of constant and variable capital, noted: “see Ramsay” (see present edition, Vol. 30, p. 236).—273

On workers’ cooperative factories in Britain see also p. XV—919 of the manuscript (present edition, Vol. 32, p. 497).—280

The summary of contents for the Theories of Surplus Value written on the inside front cover of Notebook XIV of the manuscript includes point “n) Cherbuliez” (see present edition, Vol. 32, p. 8). Marx intended to examine Sismondi’s views, not in the Theories of Surplus Value, but in the subsequent part of his work where he planned to analyse the “real movement of capital (competition and credit)” (ibid., p. 245). See also Note 67.—285

In the manuscript Marx crossed out the following here: “Although now, in view of the fivefold turnover, this individual capitalist has to lay out only £2,500 on cotton, the capital spent on cotton is, if we consider the overall product, 5 times that contained in labour.”—290

Cherbuliez gave the name “commercial profit” (profit mercantile) to the profit of the individual capitalist.—292

Apart from the extraction of minerals, the production of timber, fishing and hunting, Cherbuliez included among the “extractive industries (industries extractives) all types of farming which produce agricultural raw materials.—292

What Marx means when he refers to the need to “reduce the first proposition to its correct formulation” is that the original lacks the word “value” (see also next page) given here in italics, since Cherbuliez makes no distinction between the value of products and their material form, or use value.—294

Marx is referring to the examination of mercantile capital in notebooks XV and XVII of the manuscript, notably pp. 964 and 1030 (see this volume, pp. 48-50, 155-57).—317

Marx is summarising James Mill’s arguments as contained in Elements of Political Economy, London, 1821, Chapter 4, Section 5, “Taxes on Rent”.—319
Cherbuliez describes the inequality between the rich and the poor who depend on them as the first result of the present distribution of wealth.—320

The reference is to the anonymous review of this book by Jones published in the issue of August-September 1831 (Vol. LIV), pp. 84-99.—320

Ryot—an Indian peasant. Jones applies this term to the peasants in India and other Asian countries who paid rent—a tax in kind—to the sovereign, who was the supreme owner of all the land.—321

The cottiers—a category of the rural population consisting of poor or landless peasants. In Ireland, the cottiers rented small plots of land and cottages from the landlords or real estate agents on extremely onerous terms. Their position resembled that of farmhands.—322

When examining Ricardo's views on the question of rent, Marx referred to this fact on pp. XI—492, 504, as well as on p. XII—605 of the manuscript (see present edition, Vol. 31, pp. 338-39, 358-60, 529-30).—323


Marx is referring to Roscher's book *System der Volkswirthschaft*, Vol. 1: *Die Grundlagen der Nationalökonomie*, Stuttgart and Augsburg, 1858, p. 385, where Roscher, discussing the division of profit into profit of enterprise and interest, refers to *An Outline...* by Senior, who, along with George Read, was among the first to draw attention to this fact. In Notebook VII of excerpts compiled in London in 1859-63, p. 229, Marx remarks that this division was discernible back in the anonymous pamphlet *An Inquiry into those Principles, respecting the Nature of Demand and the Necessity of Consumption*, London, 1821, pp. 52-53, and also in Thomas Hopkins' *Economical Enquiries Relative to the Laws Which Regulate Rent, Profit, Wages, and the Value of Money*, London, 1822, pp. 43-44.—333

What Jones calls the "labour fund" figures in Malthus as "funds for the maintenance of labour". This term was used repeatedly in the first edition of Malthus' *Essay on the Principle of Population...*, London, 1798, pp. 303, 305, 306, 307, 312, 313, et seq. It also occurs in his *Principles of Political Economy...*—333

In his *Text-book of Lectures on the Political Economy of Nations*, Hertford, 1852, p. 71, Jones recalls that the Earl of Warwick, the "king-maker", alone fed daily, in his various castles, 40,000 men.—335

Marx made a detailed conspectus of this work by Jones in Notebook VII of excerpts compiled in London in 1859-63, pp. 119-23, from where the quotations below are taken.—337

The supporters of this viewpoint included Nassau William Senior (Principes fondamentaux de l'économie politique..., Paris, 1836, pp. 342-43); Alonzo Potter (Politiccal Economy, New York, 1841, p. 133); Gustave de Molinari (*Etudes économiques*, Paris, 1846, p. 36) and other economists.—338

Marx discusses revenue and its sources on pp. XV—891-944 of the manuscript (see present edition, Vol. 32, pp. 449-541). This "Episode", as Marx describes it on the inside front cover of Notebook XIV, is a supplement to the main text
of the *Theories of Surplus Value*. It may be seen from the plan for the third section (see Note 4) of *Capital* drawn up on p. XVIII—1139 that he intended it to be subsequently included as point 9 in this third chapter (see this volume, p. 346).—340

188 Only Jones was a clergyman.—345

189 See article "Connection between the Rate of Interest and the Abundance or Scarcity of the Precious Metals" in the indicated issue of *The Economist*. This quotation had previously been given by Marx in the economic manuscript of 1857-58 (see present edition, Vol. 29, p. 236).—348

190 Cf. the corresponding passage in the economic manuscript of 1857-58 (present edition, Vol. 29, p. 227).—348

191 The quotation from the book by J. D. Tuckett is taken from the economic manuscript of 1857-58 (see present edition, Vol. 29, p. 230).—349

192 Marx gave a detailed examination of commercial capital in notebooks XV, XVII and XVIII of the manuscript (see present edition, Vol. 32, pp. 464-69 and also this volume, pp. 9-68, 154-70, 239-52).—351

193 The reference is evidently to the latter's book *System der Volkswirtschaft*, Vol. 1: *Die Grundlagen der Nationalökonomie*, Stuttgart and Augsburg, 1858, p. 384 et seq.—351

194 Here Jones quotes from the Physiocrats' monthly calendar *Ephémérides du Citoyen*, 1767, Part III, p. 56.—355

195 Cf. p. 1—23 of the manuscript (present edition, Vol. 30, p. 46).—355

196 Cf. also the descriptions of Indian towns in Bernier's book which Marx cites in his letter to Engels of June 2, 1853 (present edition, Vol. 39, pp. 332-33).—357

197 Marx refers to "depreciation" here because organic fertilisers applied to the soil function as fixed capital and transfer their value to the product only gradually, one part after another.—359

198 Cf. the analysis of Ricardo's example on pp. XIII—735-736 of the manuscript (present edition, Vol. 32, pp. 179-81).—363

199 The report in question was delivered on December 7, 1859, and published in *The Journal of the Society of Arts, and of the Institutions in Union*, December 9, 1859, pp. 53-61. Here Marx quotes from the account of this report, "Agricultural Progress and Wages", published in *The Economist*, January 21, 1860, p. 64, in the "Agriculture" column.—365

200 Marx quoted this passage back in the manuscript of 1857-58 (see present edition, Vol. 28, p. 522).—366


202 See Th. Hodgskin, *Popular Political Economy...*, London, 1827, p. 72. Notebook IX of excerpts, compiled in London in 1851, contains the following: "In 1826, the various machinery used in manufacturing cotton enabled 1 man to perform the work of 150. Now 280,000 men are supposed to be employed in it, whereas half a century ago 42,000,000 were required."—374
Marx is referring to the following passage from Ravenstone's book *Thoughts on the Funding System, and Its Effects*, London, 1824, p. 45: "Machinery can seldom be applied with success to abridge the labours 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 labours of thousands." Marx also quotes this passage in the manuscript of 1857-58 (see present edition, Vol. 28, p. 325). See Note 2.—381

Marx came to this conclusion as a result of analysing the half-yearly reports of the English factory inspectors. See, for example, *Reports of the Inspectors of Factories ... for the Half Year ending 31st October 1859*, London, 1860, pp. 47-48, 52. See also present edition, Vol. 30, pp. 170, 224, Vol. 20, p. 10.—386

Excerpts on this subject are to be found in Notebook VII (p. 193), compiled in London in 1859-63, in which Marx copied out passages from the *Irish Census for 1861*. The census indicated that, between 1851 and 1861, 1,230,986 Irishmen emigrated. This was partly due to the famine of 1846-47 caused by the potato blight, which claimed a million lives. In 1861 the total population of Ireland was 5,764,543, having fallen by 787,842 since 1851.—387

See Marx's letter to Engels of January 28, 1863 (present edition, Vol. 41, pp. 449-51). This letter sets out in generalised form what Marx wrote on the first thirty pages of Notebook XIX. The most probable direct reason for this description of the essential differences between a tool and a machine was his study of Richard Jones' views.—387

Marx is most likely referring to the statements made by Charles Hutton in his book *A Course of Mathematics*, London, 1841, p. 810, and also by Francis Wayland in *The Elements of Political Economy*, Boston, 1843, p. 61 et seq.—389


Adam Smith gives this example in "Division of Labour", the first chapter of *An Inquiry into the Nature and Causes of the Wealth of Nations*, Edinburgh, London, 1814.—404

The *Nuremberg egg* was the name given to the first pocket watch with a steel spiral spring made by the Nuremberg craftsman Peter Henlein at the very beginning of the 16th century. It owed this name to its oval shape.—404

In this paragraph Marx gives a short summary of the entry "Baumwollspinnerei" in Ure's *Technisches Wörterbuch*, revised by K. Kramarsch and Dr. F. Heeren, Vol. 1, Prague, 1843, pp. 105-30.—410

The anonymous work *The Industry of Nations* contained descriptions of the items on display at the Great Exhibition. The exhibition, which Marx visited, was held in London from May to October 1851. The above work may have been written by Robert Ellis.—411

Marx borrowed the term "philosophical instruments" from *The Industry of Nations*, Part II, London, 1855, which devoted an entire chapter to this subject (Chapter VII, pp. 286-349). What the anonymous author understood this term to mean were such scientific instruments as high-precision scales, thermometers, barometers, hydrometers, theodolites, telescopes, microscopes, etc. The term "philosophical instruments" appeared in connection with "natural philosophy", which was used for a long time in Britain to denote physics and other natural sciences.—421, 456
The manuscript continues with notes later crossed out by Marx:

"VII) SILK FACTORIES

"a) SPINNING AND WEAVING."

There follow a number of figures. Adjacent to "Silk Factories" is the reference "(on the next page)". It is on this basis that the text has been rearranged.—432

On the right of this page in the manuscript, there are auxiliary calculations, which are separated from the remaining text by a vertical line.—434

Marx is referring here to the Crimean War of 1853-56, waged by Russia against Turkey, from 1854 also against Britain and France, and from 1855 against Sardinia for domination in the Middle East.—439

Marx is quoting below from "Agricultural Progress and Wages", published in The Economist, January 21, 1860 (p. 64). This article contained excerpts from the lecture delivered by J. C. Morton on December 7, 1859, to the Society of Arts and entitled "On the Forces Used in Agriculture". It was published in the Society's weekly The Journal of the Society of Arts, December 9, 1859. Marx made a conspectus of the said article in his Notebook VII of excerpts compiled in London between 1859 and 1863.

The Society of Arts was an educational and philanthropic association founded in London in 1754.—443

Acta Lipsiensia (Leipzig Chronicles) was the unofficial name of the Acta Eruditorum (Scholars' Chronicles), the first German scientific journal, which was published in Leipzig between 1682 and 1782 (in Latin).—445

This and the following quotations are taken almost entirely from Notebook XV of excerpts, which Marx compiled in London in 1851. They are given by Marx in a very generalised form, since his interest focussed on the purely technical aspect of the development of machines. Digressions from the original are ignored below.—446

Marx expresses the gist of Tuckett's statement. Tuckett has: "Henry Bell, a Scotchman, for many years a house carpenter ... was ... determined to establish a regular steam passage boat between Glasgow and Helensburgh, which is a watering place on the Clyde, opposite to Greenock... This vessel ... began to be propelled regularly between Glasgow and Helensburgh, in January 1812 ... it is remarkable, that Bell lived to see the general adoption of the grand invention, which he was the first in Europe to apply to practical use, and not only to be distanced by his rivals, but to be ruined in the competition, and reduced to indigence..."—449

Marx gives the gist of the passage from The Industry of Nations. The original reads: "In fine, all the commercial enterprises for the establishment of lines of steamers, where the voyages are of considerable length, have been supported by government."—449

The excerpts from the economic manuscript of 1857-58 written by Marx on the inside front cover of Notebook V relate directly to the problems examined here in Notebook XIX, which explains the arrangement of the text in the economic manuscript of 1861-63. Also on the inside front cover of Notebook V there was a quotation from Ramsay's book An Essay on the Distribution of Wealth, Edinburgh, London, 1836, p. 205, which Marx apparently crossed out at a later date. He had already made use of this quotation in the economic manuscript of 1861-63 (see this volume, pp. 259-60).—479
The edition Marx used has not been identified. The first edition of Hutton's book came out in 1798-1801. Marx referred to the elements of machines named by Hutton on the front cover of Notebook I of his manuscript of 1861-63.—483

Mitigated jails (Les bagnes mitigés) is the name Fourier gives to factories in his book *La fausse industrie morcelée, répugnante, mensongère, et l'antidote, l'industrie naturelle, combinée, attrayante, véridique, donnant quadruple produit*, Paris, 1835, p. 59.—497

Marx is referring to Volume 2 of Ure's book quoted above (see also present edition, Vol. 34).—501
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Anne (1665-1714)—Queen of Great Britain and Ireland (1702-14).—21

Appold, John George (1800-1865)—English engineer and inventor.—455, 456

Archimedes (c. 287-212 B.C.)—Greek mathematician and mechanical engineer.—399, 402, 457

Aristotle (384-322 B.C.)—Greek philosopher.—71

Arkwright, Sir Richard (1732-1792)—English industrialist, invented the cotton-spinning machine named after him.—350, 352

Augustus (Gaius Julius Caesar Octavianus) (63 B.C.-A.D. 14)—Roman Emperor (27 B.C.-A.D. 14).—394, 395

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Barlee—founder of a seamstresses’ association in London.—350

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Barry, Sir David (1780-1835)—English physician and physiologist.—489

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Belisarius (Belisar) (c. 505-565)—a general of the Byzantine emperor Justinian I.—396

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Bernoulli, Johann (1667-1748)—Swiss mathematician and physicist.—398, 401

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Caesar, Gaius Julius (c. 100-44 B.C.)—Roman general and statesman.—394

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Chalmers, Thomas (1780-1847)—Scottish Protestant theologian, economist, follower of Malthus.—114

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Cicero (Marcus Tullius Cicero) (106-43 B.C.)—Roman statesman, orator and philosopher.—394

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Fullarton, John (1780-1849)—British economist, wrote on money circulation and credit, opposed the quantitative theory of money.—105, 112

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Horner, Leonard (1785-1864)—English geologist and public figure, factory inspector (1833-56), member of the Factories Inquiry Commission in 1833 and of the Children's Employment Commission in 1841; took the side of the workers.—470-73

Hutton, Charles (1737-1823)—English mathematician.—483

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—Zur Kritik der politischen Oekonomie. Erstes Heft. Berlin, 1859.—11, 18, 42, 43, 45, 46, 193


WORKS BY DIFFERENT AUTHORS


Babbage, Ch. On the Economy of Machinery and Manufactures. London, 1832.—350-52


Bernier, F. Voyages ... Contenant la description des états du Grand Mogol, de l'Indoustan, du Royaume de Cachemire, etc. T. 1-2. Paris, 1830.—357

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Blake, W. Observations on the Effects Produced by the Expenditure of Government during the Restriction of Cash Payments. London, 1823.—92

Bossut, [Ch.] Traité élémentaire d'hydrodynamique. T. 1, 2. Paris, 1775.—398

— The Past, the Present, and the Future. Philadelphia, 1848.—151

Chalmers, Th. On Political Economy in Connexion with the Moral State and Moral Prospects of Society. 2nd ed. Glasgow, 1832. The first edition appeared in the same 1832.—114


Child, J. Traités sur le commerce et sur les avantages qui résultent de la réduction de l'intérêt de l'argent. Avec un petit traité contre l'usure; par Thomas Culpeper. Amsterdam et Berlin, 1754.—22, 224

Corbet, Th. An Inquiry into the Causes and Modes of the Wealth of Individuals; or the Principles of Trade and Speculation Explained. Parts 1, 2. London, 1841.—240-44, 250-52

Darwin, Ch. On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life. London, 1859.—387

De Quincey, Th. The Logic of Political Economy. Edinburgh, London, 1844.—492-93


Dombasle, Ch. J. A. M. de. Annales agricoles de Roville, ou mélanges d'agriculture, d'économie rurale et de législation agricole. Livre 4. Paris, 1828.—104


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Fullarton, J. On the Regulation of Currencies; Being an Examination of the Principles, on which it Is Proposed to Restrict, within Certain Fixed Limits, the Future Issues on Credit of the Bank of England, and of the Other Banking Establishments throughout the Country. London, 1844.—105, 112

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Haller, C. L. von. *Restauration des Staats—Wissenschaft oder Theorie des natürlich
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*The Industry of Nations.* Part II. *A Survey of the Existing State of Arts, Machines, and
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*Interest of Money Mistaken, or a Treatise, Proving, that the Abatement of Interest Is the
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Jones, R. *An Essay on the Distribution of Wealth, and on the Sources of Taxation.*
London, 1831.—104, 320-21
— *An Introductory Lecture on Political Economy, Delivered at King's College, London,
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Lauderdale, [J. M.] *Recherches sur la nature et l'origine de la richesse publique, et sur les
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Grande-Bretagne. 1760 à 1792.* Paris, 1841.—350

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Macaulay, Th. B. *The History of England from the Accession of James the Second.* Tenth
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Macnab, H. G. *Examen impartial des nouvelles vues de M. Robert Owen, et de ses
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Paris, 1821.—352

Malthus, Th. R. *Definitions in Political Economy, Preceded by an Inquiry into the Rules
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—(anon.) An Essay on the Principle of Population, as it Affects the Future Improvement of Society, with Remarks on the Speculations of Mr. Godwin, M. Condorcet, and other Writers. London, 1798.—223

—Principles of Political Economy Considered with a View to their Practical Application. 2nd Edition with Considerable Additions from the Author's Own Manuscript and an Original Memoir. London, 1836. The first edition appeared in 1820.—71, 73, 100, 103, 113-14, 128, 333

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— *Recherches sur la nature et les causes de la richesse des nations*. Traduction nouvelle, avec des notes et observations; par Germain Garnier. Tomes I-V. Paris, 1802.—19-20, 92, 103, 130


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—The Philosophy of Manufactures: or, an Exposition of the Scientific, Moral, and Commercial Economy of the Factory System of Great Britain. London, 1835.—496

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Factories. Return to an Address of the Honourable the House of Commons, dated 24 April 1861. Ordered, by the House of Commons, to be Printed, 11 February 1862.—425-26, 430-33, 439, 458

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