

# Capital

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## CHAPTER SIX

# Constant Capital and Variable Capital

THE DIFFERENT COMPONENTS of the labor process play different roles in creating a product's value.

A worker adds new value to the object of his labor by applying a certain amount of labor to that object, whatever the specific content, purpose, or technical character of his labor may be. The value of the used-up means of production simply reappears as part of the new product's value: for example, the cotton's value and the spindle's value reappear in the yarn value. The value of the means of production is thus transferred to the product and thereby preserved in it. This transfer takes place as the means of production are being turned into the product, in other words, during the labor process. It is mediated by labor. How so?

A worker doesn't work twice, first to give the cotton new value by applying his labor to it, and then again to preserve the cotton's old value—i.e., transfer to the yarn the value of the cotton he works on and the value of the spindle he works with. Rather, he preserves the old value simply by adding new value. Adding new value to an object of labor and preserving the old value there are two very different things, yet a worker does both at the same time, in a single act of labor. Clearly, then, only the twofold character of his labor can account for this twofold result. His labor must operate in two capacities at once, in one capacity creating value, in the other capacity preserving or transferring it.

How does a worker add labor-time and thus value? Only by performing a specific type of productive labor. A spinner adds labor-time by spinning, a weaver by weaving, a smith by forging, and so on. However, when workers add labor as such, and therefore new value, in the specific forms of spinning, weaving, and forging, they transform the means of production (cotton, spindles, yarn, looms, iron, anvils) into the elements that consti-

tute a new use-value or product.<sup>1</sup> The old forms of these use-values wear away, but only to be incorporated into new forms of use-value. In examining the process of creating value, we saw that insofar as a use-value is consumed in order to produce a new use-value, the labor-time needed to produce the old use-value being employed makes up part of the labor-time required to produce the new one. That labor-time is transferred from the means of production being consumed to the new product. Hence it isn't by adding labor as such that a worker preserves the value of a used-up means of production, or transfers its value to a new product as an element of the new product's value. Rather, what enables him to preserve the value of the means of production is the particular useful character of his labor: the specific, productive form of the labor he adds. In this form, or as a purposeful, productive activity—as spinning, weaving, or forging—labor needs only to touch the means of production in order to raise those means from the dead. This labor animates the means of production, turning them into factors of the labor process and combining with them to become new products.

If a spinner changed jobs, he would no longer be making yarn from cotton and thus wouldn't be transferring the cotton's value and the spindle's value to the yarn. On the other hand, if he became a carpenter, a day of his labor would still add value to his material, just as before. His labor adds value not because it has the particular form "spinning" or "carpentry," but rather insofar as it is abstract social labor as such, and his labor adds a particular magnitude of value not because it has a particular useful content, but because it is performed for a certain amount of time. It is in its abstract general capacity—or as an expenditure of human labor-power—that the spinner's labor adds new value to the cotton's value and the spindle's value. And it is in its capacity as concrete, particular, useful labor—in other words, as spinning—that his labor transfers the value of the means of production to the product, preserving that value in it. Thus labor performed just once yields a double-sided result.

Simply adding a quantity of labor adds new value, whereas the quality of the added labor is what preserves the old value of the means of production in the product. The double-sided effect that arises from labor's double-sided character becomes palpable in an array of phenomena.

Suppose that, thanks to some new invention, a spinner can spin as much cotton in six hours as he used to spin in thirty-six hours. The power

1. "Labour gives a new creation for one extinguished" (*An Essay on the Polit. Econ. of Nations*. London 1821, p. 13).

of his labor as a purposeful, useful, productive activity has increased sixfold. Its product is six times greater than it was: 36 pounds of yarn instead of six pounds. But now 36 pounds of cotton absorb only as much labor as six pounds used to. Only a sixth of the previous amount of new labor is absorbed by each pound of cotton due to the new method, and so the amount of new value added to each pound is only one-sixth of its former magnitude. However, the product, 36 pounds of yarn, now receives six times as much old value from the cotton as before. Six times as much old value coming from the raw material is preserved in or transferred to the product during the six hours of spinning, while only one-sixth as much new value is added to the same raw material. This shows how labor preserves old value in a fundamentally different capacity from how it creates new value, even though the labor is being performed in a single, indivisible process. The more necessary labor-time that is added to a given quantity of cotton during the spinning process, the greater the amount of new value added will be. The more cotton that is spun in a given amount of labor-time, the greater the amount of old value preserved in the product will be.

Now imagine the opposite scenario. The spinner's productivity remains constant: it takes just as much time as before to turn a pound of cotton into yarn. However, the exchange-value of the cotton varies. The price of a pound of cotton rises or falls sixfold. Whether it rises or falls, the spinner would add the same amount of labor-time, and thus the same amount of value, to a given amount of cotton. Similarly, he would produce the same amount of yarn in the same amount of time. But the value that he transfers from the cotton to the yarn would be six times greater in the one case and only one-sixth as much in the other. The same thing would happen if the means of labor became more expensive or cheaper yet continued to perform the same service in the labor process as before.

If the technological conditions of the spinning process don't change, and the value of the means of production remains constant, too, then with the spinner working the same amount of time, he will consume the same quantities of raw material and machinery, containing the same quantities of value. The old value that the spinner preserves in the product is in this case directly proportional to the new value he adds to it. He adds twice as much labor in two weeks as in one, thus, twice as much value. At the same time, the spinner consumes twice as much material, worth twice as much, while using up twice as much of the machinery as before, also worth twice as much. Thus he preserves in the product of two weeks of labor twice as much value as in the product of one week. If the conditions

of production don't change, then the more new value a worker adds to his product, the more old value he also preserves in it. However, he doesn't preserve more old value because he is adding more new value, but simply because he is adding it under conditions that remain the same and are independent of the labor he performs.

In a way, of course, a worker always preserves old value in direct proportion to the new value he adds. Whether the price of the cotton rises from 1 shilling to 2 or falls to 6 pence, when a worker works for an hour, he always transfers half as much value from the cotton as he would if he worked for two hours instead. If the worker's productivity changes, he will spin either more or less cotton in an hour than before; and, accordingly, he will transfer either more or less value from the cotton to the product of an hour of his labor. But however his productivity varies, he will transfer twice as much value in two hours of labor as he would in one hour.

Value exists only in a use-value, in a thing, with the exception of the purely symbolic representation of value in tokens. (The human being, regarded as the mere existence of labor-power, is itself a natural object, a thing—even if it is a living thing with consciousness—and labor is the physical expression of this power.) If a thing loses its use-value, it will lose its value, too. However, the means of production don't instantly lose their value when they lose their use-value, because they lose the original shape of their use-value in the labor process only in order to take on the shape of a different use-value, that of the product. But while value can only exist in a use-value, it doesn't matter at all which use-value it exists in, as we saw when considering the metamorphosis of commodities. From this it follows that in the labor process value is transferred from the means of production to the product only to the extent that these means lose their exchange-value when they lose their independent use-value. In other words, the means of production give a new product only as much value as they themselves lose when the product is made. Here, however, the objective factors of the labor process don't all behave the same way.

The coal fed to a machine vanishes without a trace; the same is true of the oil used to grease an axle, and so on. Dyes and other auxiliary materials disappear but resurface as the characteristics of the products they go into. Raw material makes up a product's substance, but the raw material's form always changes: raw materials and auxiliary materials lose the independent shapes in which they enter into the labor process as use-values. Not so with the actual means of labor. Machines, factory buildings, and containers serve in the labor process only for as long as they keep their original form and can enter the process each day in the same form as the day before.

And just as these things retain an independent form separate from that of the product during their lives, i.e., during the labor process, they also retain such a form after they die. The corpses of machines, tools, and factory buildings always continue to exist independently of the products they helped make. Let us now consider the entire lifespan of a means of labor, from the day that it enters the workshop to the day that it is tossed onto the junk pile. Its use-value is used up completely during this period, and thus its entire exchange-value is transferred to the product it is employed to make. If a spinning machine's lifespan is a decade, then during the ten years it serves in the labor process, its total value is transferred to the products manufactured during that time. Thus the life of a means of labor encompasses the labor processes, however many, that are carried out with its help again and again. Human beings and means of labor share this fate. For every person loses twenty-four hours of life each day. Furthermore, while it is impossible to know just by looking at someone exactly how many of these daily deaths he has experienced, that doesn't prevent life insurance companies from using the average human life expectancy to come up with precise and also very lucrative projections, and the same thing holds for means of labor. Experience tells us how long, on average, a given means of labor—say, a particular type of machine—will last. If it takes only six days for its use-value to be consumed in the labor process, then each day it will give an average of one-sixth of its value to the day's product. This is how we calculate the rate at which a means of labor wears out, or how much value it loses daily and the corresponding amount of value it gives each day to a new product.

What should be crystal clear is that a means of production never gives more value to a product than it loses when its use-value is destroyed in the labor process. If a means of production had no value to lose, if it weren't itself a product of human labor, then it wouldn't give any value to a new product. It would serve to create use-values without serving to create exchange-value. This is in fact the case with all those means of production that are found ready-made in nature, such as land, wind, water, the iron in the earth, the wood in natural forests, and so on.

Here we encounter another interesting phenomenon. Let's say that a machine is worth £1,000 and wears out in a thousand days. Thus a thousandth of the machine's value is transferred each day to the product it helps make. Meanwhile, the entire machine continues to serve in the labor process, albeit with less and less vitality. So, a factor of the labor process, a means production, enters that process as a whole, but it enters the valorization process piecemeal. The difference between the labor process and

the valorization process is thus reflected in their objective factors. As an element of the labor process, a means of production contributes to the production process only in its (that means's) entirety, but as an element of the process of creating value, the same means contributes to the same production process only piecemeal.<sup>2</sup>

Yet a means of production can also enter the valorization process as a whole even as it enters the labor process only piece by piece. Suppose that for every 115 pounds of cotton spun each day, 15 pounds always wind up destroyed, or turned into "devil's dust" rather than yarn.<sup>1</sup> If losing these 15 pounds of cotton is normal—if that is an unavoidable side effect of spinning the cotton, then the value of these 15 pounds of cotton goes into the yarn just as surely as the 100 pounds that make up the yarn's substance, despite the fact that the 15 pounds aren't actually part of the yarn. The use-value of 15 pounds of cotton has to be turned into dust in order to produce 100 pounds of cotton. Pulverizing this cotton is therefore a condition of production that must be met. Because it is a necessary condition, and for that reason alone, the value of the 15 pounds is transferred to the yarn. This holds for all the unavoidable waste that labor processes produce, at least insofar as the waste can't function as new means of production and thus also as independent use-values, such as the mountains of iron shavings we see in Manchester's large machine-building factories. Thrown off by gargantuan

2. At issue here aren't the repairs that means of labor, machines, and buildings require. A machine that is being repaired functions as the material of labor rather than a means of it. One doesn't work with such a machine; one works on it to restore its use-value. For our purposes, this labor of repairing can always be treated as part of the labor that goes into producing a means of labor. In the body of this text, however, we have dealt with the kind of wear that no doctor can cure and gradually leads to death: "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 state in which the cutler would say of it, it is not worth a new blade." As we saw there, it is as a whole that a machine enters every single labor process, but it is only piecemeal that the same machine enters the process of valorization taking place concurrently. If we keep this in mind, we can appreciate the following conceptual confusion: "Mr. Ricardo speaks of the portion of the labour of the engineer in making stocking machines," as contained, for example, in the value of a pair of stockings. "Yet the total labour that produced each single pair of stockings . . . includes the whole labour of the engineer, not a portion; for one machine makes many pairs, and none of those pairs could have been done without any part of the machine" (*Observations on certain verbal disputes in Pol. Econ.*, particularly relating to Value, and to demand and supply. London 1821, p. 54). The author, an uncommonly smug "wiseacre," is justified in his confusion, and thus in his polemic, only insofar as Ricardo and all other political economists, both before him and after him, have failed to distinguish precisely between the two sides of labor and have therefore done even less to analyze their different roles in creating value. [Editor's note: Marx uses the English term "wiseacre."]

leveling machines, they are carted away to the foundry in the evening, only to be brought back to the factories the next day as solid masses of iron.<sup>3</sup>

As the means of production operate in the shape of old use-value during the labor process, they transfer value to a product's new shape of use-value only to the extent that they lose value. Clearly, the means of production can lose only as much value as they have when they enter the labor process: the value they lose is limited by the labor-time it took to produce them in the first place. Thus they never contribute more value to a new product than they possess independently of the labor process they are serving in. However useful a material of labor, a machine, or some other means of production may be, if it costs £150 (say, 500 days of labor), it can't give more than £150 to the total product or products it is used to make. Its value is determined not by the labor process it enters into as a means of production, but rather by the labor process out of which it issued as a product. A means of production can serve in the labor process only as a use-value—a thing with useful properties. It won't contribute value to a product unless it already has value before it enters that process.

When productive labor transforms the means of production into the elements used to make a new product, a transmigration of souls comes about. The value of these means passes from a consumed body into one that is newly formed. But this transmigration happens behind the back of the actual labor being carried out. A worker can't add new labor—in other words, he can't create new value—without preserving old value. For he

3. From this we gain a sense of the insipid J. B. Say's absurdity. Say wanted to derive surplus-value (interest, profit, rent) from the *services productifs* supplied in the labor process by the use-value of various means of production—land, instruments of labor, leather, and so on. Not one to let the clever apologetic ideas that pop into his head go unpublished, Wilhelm Roscher exclaimed, "J. B. Say correctly remarks (*Traité*, Vol. I. ch. 4) that the value an oil well produces after all costs have been subtracted is something new, something fundamentally different, from the labor that made the well" (*ibid.* p. 82 note). Quite right! The "oil" produced by the well is something very different from the labor required to build the well. And under "value," Mr. Roscher understands such things as "oil," because "oil" has value, although petroleum can be found ready-made "in nature," if also in relatively "small quantities," which is what he seems to have in mind when he remarks, "It [nature!] hardly ever produces exchange-value." Here Mr. Roscher's nature and the exchange-value it yields are like the foolish virgin who confesses that she has a child, but "only a very small one." This same "scholar" ("*savant sérieux*") also uses the occasion mentioned above to say, "Ricardo's school tends to subsume capital as 'accumulated labor' under the heading of labor. This is inept [!] because [!] the owner of capital [!] has done more [!] than simply [?!] create [?] and [??] preserve the same [what?]: namely [?!?], he has refrained from using it for his own pleasure, demanding in return interest, for example [!!!]." This "anatomical-physiological method" of political economy, which takes a mere "demand" and explicates it into "value," is so very "deft"!



has to add new labor in a particular, useful form, and he can't add labor in such a form without making products into a new product's means of production, and thereby transferring the value of the older products to the new product. Activated labor-power—that is, living labor—naturally has the capacity to preserve value as it adds new value. This natural gift, which doesn't cost a worker a thing, is a boon for the capitalist: it preserves his existing capital value.<sup>4</sup> If the capitalist's business is running smoothly, he will be too focused on turning a profit to notice labor's generosity. But if the labor process is disrupted in some dramatic way, if a crisis occurs, he will be painfully aware of it.<sup>5</sup>

The only part of a means of production that is used up is its use-value: labor makes products precisely by doing that. The value of the means of production isn't consumed,<sup>6</sup> and so it can't be reproduced. Instead this value is preserved, not because of something that is done to it during the labor process, but rather because even though the use-value it exists in originally does disappear, it merely disappears into a different use-value. The value of a means of production reappears in the product's value, yet isn't, strictly speaking, reproduced there. What is produced is a new use-value in which the old exchange-value simply reappears.<sup>7</sup>

4. "Of all the instruments of the farmer's trade, the labour of man . . . is that on which he is most to rely for the re-payment of his capital. The other two . . . the working stock of the cattle, and the . . . carts, ploughs, spades, and so forth, without a given portion of the first, are nothing at all (Edmund Burke, "Thoughts and Details on Scarcity, originally presented to the R. Hon. W. Pitt in the month of November 1795, edit. London 1800," p. 10).

5. The 26 November 1862, issue of the Times printed the whinings of a cotton manufacturer whose mill employed 800 workers, while consuming, on average, 150 bales of East Indian cotton per week or 130 bales of American cotton. He wanted to publicly complain about what he had to pay in overhead expenses even when his factory wasn't in use. These he estimated to amount to £6,000 annually. Many of the expenses factored in don't concern us here: rent, taxes, insurance premiums, salaries for employees who are paid by the year, such as the manager, bookkeeper, engineer, and so on. But the owner also included £150 worth of coal used to warm the mill occasionally and start the steam engine. In addition, he listed the wages of the workers employed now and then to keep the machines "in working order" and, finally, £1,200 for the wear and tear suffered by the machines, since "the weather and the natural principle of decay do not suspend their operations because the steam-engine ceases to revolve." He expressly stated that he gave such a low sum, just £1,200, because his machines had already deteriorated a great deal.

6. "Productive Consumption: where the consumption of a commodity is part of the process of production. . . . In these instances there is no consumption of value." S. P. Newman op. cit. p. 296.

7. In a North American compendium (that has gone through perhaps twenty editions), we read, "It matters not in what form capital reappears." After garrulously enumerating every possible ingredient of production whose value reappears in the product, the book finally states, "The various kinds of food, clothing, and shelter, necessary for the existence

Not so with the subjective or human component of the labor process: the activated labor-power. Every instant that labor is in motion, transferring the value of the means of production to new products, thanks to its purposeful form, and preserving their value there, it also creates additional value—new value. Suppose a production process stops at the point where a worker produces the equivalent of the value of his own labor-power: for example, where he has generated value worth 3 shillings in six hours of labor. These 3 shillings are the part of the product's value that doesn't come from the means of production. They are the only part actually generated during the production process, the only new part. Of course, this new value merely replaces the money that the capitalist advances when he buys the labor-power, which is also money that the worker spends on his means of subsistence. So the 3 shillings of new value appear to merely reproduce the 3 shillings that the capitalist advances—in other words, the original value. But this doesn't merely seem to be so, as is the case with the value of the means of production. The original 3 shillings really are reproduced. Here, the production of new value mediates the process whereby one value replaces another.

But we already know that the labor process extends past the point where merely the equivalent of the labor-power's value is reproduced and added to the object of labor. Six hours would suffice to do that; instead, the labor process lasts longer, say, twelve hours. Thus activated labor-power doesn't only reproduce value; it also produces an excess value. This surplus-value is the part of the product's value that exceeds the value of the factors consumed in the production process, namely, means of production and labor-power.

When we described the various roles that the different components of the labor process play in forming product value, we were in fact characterizing the various functions of capital's different components in its own valorization process. The amount by which a product's total value

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and comfort of the human being, are also changed. They are consumed from time to time, and their value re-appears, in that new vigour imparted to his body and mind, forming fresh capital, to be employed again in the work of production" (F. Wayland *op. cit.* p. 32). Setting aside all other oddities, it isn't the price of bread that reappears in a worker's renewed power, but rather its nourishing substances. In contrast, what reappears in the value of his power isn't his means of subsistence but rather their value. The same means of subsistence, even if they cost half as much, would produce just as much muscle, bone, and so on—in other words, the same amount of power, but not power of the same value. This converting of "value" into "power," and also the author's quite pharisaic lack of clarity, obscure a futile attempt to spin surplus-value out of the mere reappearance of the value advanced.

exceeds the combined value of the elements that went into making it is the amount by which the valorized capital exceeds the value of the capital that was originally advanced. The means of production on the one side and labor-power on the other: these are merely the forms of existence that the original capital value took when it shed its money-form and was transformed into the different factors of the labor process.

The value of the part of capital that turns into the means of production—i.e., raw material, auxiliary materials, and means of labor—doesn't increase or decrease during the production process. I will therefore call it the constant part of capital, or more simply, "constant capital."

In contrast, the part of capital's value that turns into labor-power does change during the production process. This part reproduces its own equivalent and produces value in excess of it, surplus-value, which can also vary: surplus-value can be smaller or larger. In other words, this part of capital is continuously transformed from a constant magnitude into a variable one. I will therefore call it the variable part of capital, or more simply, "variable capital." The same components of capital that from the standpoint of the labor process differ as objective factors versus subjective ones differ from the standpoint of the valorization process as constant capital versus variable capital.

Of course, the concept of "constant capital" in no way implies that the value of this capital's component parts can't change. Imagine that a pound of cotton costs 6d. today, but tomorrow its price rises to 1 shilling as a result of a bad harvest. Old cotton that is still being worked on was bought for 6d. Now, however, it adds 1 shilling of value to the product. And the cotton that has already been spun and might already be circulating in the market as yarn also adds twice its original value to the product. It is easy to see that these changes take place independently of the cotton's valorization in the actual spinning process. Old cotton that hasn't even entered the labor process can be resold for 1 shilling instead of 6d. In fact, the fewer labor processes the cotton has gone through, the more certain this result will be. So, as a rule, when such changes of value occur, capitalists speculate on raw material in its rawest forms: they would rather speculate on yarn than cloth; they would rather speculate on cotton than yarn. Here the change of value comes about in the process that produces the cotton, not the process in which cotton functions as a means of production and thus as constant capital. A commodity's value might be determined by the amount of labor the commodity contains, but this quantity itself is socially determined. One and the same quantity of a commodity, for example, cotton, represents more value during bad harvests than during good ones, and if the amount of the

social labor-time it takes to produce a commodity changes, this will affect all existing commodities of the same kind. For a commodity counts for something only as an individual member of a species,<sup>8</sup> and its value is always measured in terms of socially necessary labor—the labor necessary to produce it under the social conditions of the day.

Just as the value of raw material can vary, so too can the value of the means of labor serving in the production process: machinery and so on. Thus the amount of value they contribute to the product can vary as well. Suppose that someone invents a way to produce a new machine using less labor than it took to make the old one. The old machine will be devalued to a great or lesser extent, and it will therefore give less value to a new product. But here, too, the change of value arises outside of the production process in which a thing—in this case, a machine—functions as a means of production. Within that process, as we know, a means of production never contributes more value to new products than it possesses independently of the process.

A means of production remains constant capital even when the magnitude of its value changes after it has already entered the production process. Nor is the functional difference between constant capital and variable capital affected when the ratio between their magnitudes of value varies. It doesn't matter if the technological conditions of the labor process are altered so radically that a single worker using an expensive machine can now do to a large quantity of material what 10 workers wielding 10 inexpensive tools used to do to an amount of raw material 100 times smaller. In such a case, the constant capital—the quantity of value contained in the means of production—would rise sharply, and the capital's variable part, advanced in the form of labor-power, would fall sharply. But this change would affect only the ratio of constant capital to variable capital—i.e., the ratio between the constant capital's and the variable capital's respective shares of the total capital. The essential difference between constant and variable capital would remain unaltered.

8. "All products of the same type properly form but one single mass, the price of which is determined in general and without regard to particular circumstances" (Le Trosne op. cit. p. 893).

# The Rate of Surplus-Value

## I. The Degree to which Labor-Power Is Exploited

The surplus-value generated in the production process by  $C$ , capital that has been advanced—in short,  $C$ 's valorization—is represented, first of all, as the amount by which a product's value exceeds the combined value of all the elements that go into its production.

Capital,  $C$ , breaks down into two parts— $c$ , a sum of money that is spent on the means of production, and  $v$ , a sum spent on labor-power:  $c$  represents the part of capital's value that is turned into constant capital, while  $v$  represents the part that is turned into variable capital. At the beginning of the production process, then,  $C = c + v$ . Let's say that the total capital is £500, and it breaks down as £410 constant + £90 variable. In the end, the production process yields a commodity whose value is  $(c + v) + s$ , where  $s$  represents surplus-value: say (£410 constant + £90 variable) + £90 surplus. The original capital  $C$  has been transformed into  $C'$ ; £500 has been transformed into £590. The difference between the two sums is  $s$ , the surplus-value of £90. Since the value of the elements of production equals the value of the capital advanced in the production process, it is in fact tautological to say that the amount by which the product's value exceeds the value of its elements of production will equal the amount by which the capital has been valorized—in other words, the amount of surplus-value that has been produced.

But we still need to take a closer look at this tautology. What we are comparing is the product's value and the combined value of the elements consumed when the product is made. As we have seen, the part of the constant capital that goes into the means of labor gives only some of its value to the product and otherwise continues to function in its earlier form of existence. Since the part that continues to function in its old form doesn't play a role in forming the product's value, we can disregard it: nothing would

change if we included it in our calculations. Suppose that  $c = £410$ , and it breaks down as follows: £312 goes into raw materials, £44 into auxiliary materials, and £54 into the wear and tear that machines incur during the production process, while the total value of the machines employed amounts to £1,054. Of that £1,054, only the £54 the machines lose during the production process, and thus give to the product, counts as capital—as capital that is advanced to create the product's value. If we counted the £1,000 of value that continues to exist in the old form of, say, a steam engine, we would have to include it on both sides of the equation: the side of the advanced value and the side of the product's value,<sup>1</sup> or £1,500 and £1,590, respectively. The difference—i.e., the surplus-value—would still be £90. And so unless a particular context calls for us to do otherwise, when we speak of “the constant capital that is advanced to produce value,” we are referring only to the value of the means of production that are actually consumed in the production process.

With this in mind, let us look again at the formula  $C = c + v$ , which turned into  $C' = (c + v) + s$ , with  $C$  thereby becoming  $C'$ . We know that the value of the constant capital merely reappears in the product. Thus, contrary to what at first seems to be the case, the value product—the value that is in fact newly created in the production process—isn't the same as the value of the product. The newly created value isn't  $(c + v) + s$ , or £410 constant + £90 variable + £90 surplus, but rather  $v + s$ , or £90 variable + £90 surplus. It is £180, not £590. If the amount of  $c$ , the constant capital, were zero—if there were a branch of industry where a capitalist didn't need to use any means of production produced by labor, whether raw materials or auxiliary materials or instruments of labor, but only materials found ready-made in nature plus labor-power, then there would be no constant part of the advanced value to be transferred to the product. This element of the product's value, £410 in our example, would drop out of the equation. If it did, the magnitude of the £180 of new value, £90 of which is surplus-value, wouldn't change, just as this magnitude wouldn't change if the magnitude of  $c$  were unimaginably large. We would have  $C = (0 + v) = v$ , and  $C'$ , the valorized capital,  $= v + s$ , so that  $C' - C = s$ , as before. However, if the opposite were the case, and  $s = 0$ —that is, if the labor-power advanced as variable capital produced only its own equivalent—then  $C = c + v$ , and  $C'$

1. “If we reckon the value of the fixed capital employed as a part of the advances, we must reckon the remaining value of such capital at the end of the year as a part of the annual returns” (Malthus: “Princ. of Pol. Econ. 2nd ed. London 1836,” p. 269).

(the product's value) =  $(c + v) + o$ , or  $C = C'$ . The capital that was advanced wouldn't have valorized itself.

As we already know, surplus-value results from a change in the value of  $v$ , the part of the capital that is turned into labor-power: thus  $v + s = v + \Delta v$  ( $v$  plus the change in  $v$ ). But the actual change of value that occurs here—and the ratio of change, too—is obscured, since an increase in the variable part of capital causes the total advanced capital to increase. The total capital was £500; it becomes £590. So if we want to carry out a pure analysis of this process, we have to fully abstract from the part of the product's value in which constant capital merely reappears. We have to set  $c$  at 0, which simply means applying a rule of mathematics that is used whenever constant and variable magnitudes are related to one another only by the symbols of addition and subtraction.

A further difficulty arises from the original form of the variable capital. In our example,  $C' = \text{£410 constant capital} + \text{£90 variable capital} + \text{£90 surplus-value}$ . Because £90 is a given (and thus constant) magnitude, it seems wrong to treat it as variable. But here “£90 variable capital” is just a symbol for the process that this value undergoes. The part of the capital that is spent on labor-power is a definite quantity of objectified labor; in other words, a constant magnitude of value, as is the value of the labor-power that the capitalist buys. However, during the labor process itself, activated labor-power replaces the £90 that is advanced; living labor replaces dead labor; a fluid magnitude replaces a fixed one; a variable magnitude replaces a constant one. The result is that  $v$  is reproduced with an increase of  $v$ . Seen from the standpoint of capitalist production, this entire process is the autonomous movement of value that was originally constant and has been transformed into labor-power. Both the process and its result are the work of this value. If the formulations “£90 variable capital” and “£90 self-valorizing value” seem contradictory, this is simply because they express a contradiction that is inherent in capitalist production.

At first, it feels strange to set the constant capital to zero; but people do this all the time in everyday life. If someone wants to calculate the profit England has made from the cotton industry, he starts by subtracting the sums England has paid other countries for cotton: the United States, India, Egypt, and so on. He begins by reducing the value that merely reappears in the product's value to zero.

The ratio of surplus-value to the part of capital that it directly issues from, and whose change of value it thus represents, is economically very significant. But so is its ratio to the total capital advanced. These ratios will therefore be examined at length in volume 3. In order for one part

of capital to be valorized by being transformed into labor-power, another part has to be transformed into means of production. Variable capital can't perform its function, in fact, unless constant capital is advanced in the right proportion, something that depends on the specific technical character of the labor process. But a chemist can need special beakers and other containers to stage a chemical process and still ignore them when he analyzes its results. When we consider the processes of producing and altering value on their own, or in a pure way, the physical forms of constant capital—i.e., of the means of production—merely provide the material in which fluid, value-creating power becomes fixed. Thus the nature of that material—whether it is cotton or iron—doesn't matter. The value of the material also doesn't matter: all that is needed is enough material to absorb the amount of labor to be expended during the production process. If a sufficient quantity of material has been provided, its value can rise or fall; it can also have no value, as with the land and the sea. None of this affects the process of creating and altering value.<sup>2</sup>

We will therefore begin by setting the constant capital's value to zero. The capital advanced can be reduced from  $c + v$  to  $v$ , and the product's value can be reduced from  $(c + v) + s$  to the newly created value or value product  $(v + s)$ . Let's assume that the newly produced value = £180. So, the labor that was fluid during the entire labor process is now represented in this money sum. By subtracting the value of the variable capital, which equals £90, we arrive at the surplus-value: £90. The figure £90 =  $s$  expresses the absolute magnitude of the surplus-value that has been produced. The relative magnitude of the surplus-value—in other words, the ratio in which variable capital has valorized itself—is clearly determined by the ratio of surplus-value to variable capital and expressed as  $s/v$ . In our example, the ratio is  $90/90$ , or 100%. I call this relative valorization of the variable capital, or the surplus-value's relative magnitude, "the rate of surplus-value."<sup>3</sup>

We have seen that during one part of the labor process, a worker produces only the value of his own labor-power, which is the value of his

2. Note added to the second edition: What Lucretius says is self-evident: "*nil posse creari de nihilo*." Nothing comes from nothing. Value is "created" when labor-power is turned into labor. For its part, labor-power is above all natural material that has been converted into a human organism.

3. The English employ the terms "rate of profit" and "rate of interest" to express this ratio. In volume 3 of the present work, we will see that the rate of profit is easy to grasp once one understands the laws of surplus-value. But if we were to proceed the other way around, we would comprehend "*ni l'un, ni l'autre*."



necessary means of subsistence. Since he works in a situation based on the social division of labor, he doesn't produce his means of subsistence directly. Rather, in the form of a particular commodity (for example, yarn), he produces an amount of value equal to the value of those means, or to the money he uses to buy them. Whether the part of the workday when he creates this value is larger or smaller depends on the value of his average daily means of subsistence—on the average labor-time needed to produce them each day. Now suppose the value of the worker's average daily means of subsistence represents six objectified labor-hours. He would have to work six hours a day, on average, to produce that value. If the worker worked just for himself, independently, rather than for a capitalist, then assuming that the other conditions of his labor remained constant, he would still have to work the same fractional part of the day to produce the value of his labor-power, and thereby acquire the means of subsistence he needs to maintain or reproduce himself daily. But during the part of the day when the worker produces the daily value of his labor-power (say, 3 shillings), he merely produces an equivalent of the value already paid by the capitalist. In other words, the worker merely replaces with newly created value the value of the variable capital that the capitalist has advanced, and because this is so, the production of value here appears as reproduction. I will call the part of the day when the worker reproduces value "necessary labor-time" and the labor expended during that time "necessary labor."<sup>4</sup> Necessary for the worker, because it is independent of the social form of his labor, and necessary for capital and its world, because their basic precondition is that workers continue to exist.

In the second part of the labor process, the worker moves beyond the limits of necessary labor. This costs him labor—he is still expending labor-power—but he no longer creates any value for himself. Instead the worker generates surplus-value, which smiles at the capitalist with all the allure of something he gets for free. I call this part of the workday "surplus labor-time" and the labor expended here "surplus-labor." Just as we need to see value as coagulated labor-time—as nothing but objectified labor—in order to understand it, so too do we need to see surplus-value as coagulated surplus labor-time, or as nothing but objectified surplus-labor, in order

4. Up to now, this work has used the term "necessary labor-time" to denote the socially necessary labor-time that goes into producing any given commodity. From now on, however, we will also use it to denote the labor-time needed to produce one particular commodity: labor-power. Using one and the same technical term in different ways is, of course, unfortunate. On the other hand, there is no field of scholarship in which it can be avoided entirely. See, for example, the higher and lower branches of mathematics.

to understand it. All that distinguishes economic social formations from one another, e.g., the slave-owning society and the one where wage labor predominates, is the form in which surplus-labor is squeezed out of the person who directly produces, namely, the worker.<sup>5</sup>

Since the value of variable capital equals the value of the labor-power it buys, and since the value of that labor-power determines the necessary part of the workday, while surplus-value, for its part, is determined by the magnitude of the nonnecessary part of the workday, it follows that surplus-value has the same ratio to variable capital as surplus-labor has to necessary labor. The rate of surplus-value  $s/v$  is equal to  $\frac{\text{surplus-labor}}{\text{necessary labor}}$ . The two ratios express the same thing in two different ways: once using objectified labor, and then using fluid labor.

Thus the rate of surplus-value accurately expresses how far capital has gone in exploiting labor-power, i.e., the degree to which a capitalist has exploited a worker.<sup>6</sup>

We assumed that the product's value = £410 constant + £90 variable + £90 surplus, with the amount of capital advanced thus being £500. Since the surplus-value = £90, and the capital advanced = £500, if we calculated the rate of surplus-value (which is often confused with the rate of profit) in the standard way, we would arrive at 18%—a rate so low that

5. Displaying a brilliance that evokes Gottsched's, Herr Wilhelm "Thucydides" Roscher discovered that if the creation of surplus-value or surplus product, and the accumulation that goes with it, are attributed nowadays to the "thrift" of the capitalist, who "demands interest" in return, things were very different "in the least advanced stage of culture," where "the strong forced the weak to exhibit thrift" (op. cit. pp. 82, 78). Thrift with respect to labor? Or with respect to the surplus products that didn't exist? In addition to actual ignorance, it is an apologetic fear—a fear of the subversive results that a careful analysis of value and surplus-value might yield—that compels Roscher and his ilk to contort the capitalist's more or less plausible justifications for his appropriation of existing surplus-value into explanations of how surplus-value came into being. [Editor's note: Johann Christian Gottsched (1700–1766) enjoyed considerable prominence as a person of letters in eighteenth-century Germany. Known for being well connected and helping to import Enlightenment ideas from France, he wrote without much pithiness or wit and wasn't regarded as a brilliant mind. Wilhelm Roscher (1817–1894) founded the historical school of political economy in Germany and, thus, invoked for himself the title of the "Thucydides" of that discipline.]

6. Note added to the second edition: Although the rate of surplus-value accurately expresses the degree to which labor-power is exploited, it doesn't tell us the absolute magnitude of the exploitation. For example, if the necessary labor = 5 hours and the surplus-labor = 5 hours, the degree of exploitation stands at 100%. Here the magnitude of exploitation is measured by 5 hours. If the necessary labor = 6 hours and the surplus-labor = 6 hours, the 100% rate of exploitation remains unchanged, but the magnitude of exploitation has grown by 20%, from 5 hours to 6.

Mr. Carey and the other harmonizers might be pleasantly surprised.<sup>i</sup> However, the rate of surplus-value doesn't equal  $s/C$  or  $s/c + v$ , but rather  $s/v$ : it isn't  $^{90}/_{500}$ , but rather  $^{90}/_{90} = 100\%$ , more than five times what seems to be the degree of exploitation. Although there is much we don't know in this case, such as the absolute magnitude of the workday, the length of the labor process (days, weeks, and so on), and the number of workers simultaneously set in motion by the variable capital of £90, the rate of surplus-value ( $s/v$ ) still tells us the exact ratio of the workday's two components because it can be converted into  $\frac{\text{surplus-labor}}{\text{necessary labor}}$ . Here that ratio is 100%.

The worker spends half the day working for himself and the other half working for the capitalist.

In short, the way to calculate the rate of surplus-value is as follows. We take a product's full value and set the value of the constant capital, which merely reappears there, to zero. What remains is the new value—the value that is actually created when the commodity is produced. If we know the surplus-value, then we subtract it from the total new value to find the variable capital. If we know the variable capital and want to identify the surplus-value, we do the reverse. If we know both values, all we have to do is perform the final calculation,  $s/v$ , in order to arrive at the ratio of surplus-value to variable capital.

As simple as this method may be, it still seems right to give a few examples so that readers can work their way into the unfamiliar mode of viewing that underlies it.

Say a spinning mill has 10,000 mule spindles, each of which spins No. 32 yarn from American cotton and produces one pound of yarn per week. The waste generated amounts to 6%. So each week, 10,600 pounds of cotton are spun into 10,000 pounds of yarn, creating 600 pounds of waste. In April 1871, this cotton cost  $7\frac{3}{4}$ d. per pound; thus the 10,600 pounds cost about £342. The 10,000 spindles cost £1 per unit, in other words, £10,000, which includes both the steam engine and the machinery that prepares the cotton to be spun. The machines wear down at a rate of 10%, or £1,000 per year, losing roughly £20 of value weekly. It costs £300 a year, or £6 a week, to rent the factory building. The 11 tons of coal consumed weekly cost, at 8 shillings 6d. per ton, about £4 $\frac{1}{2}$  (for one hundred horsepower over a sixty-hour week, with each horsepower requiring four pounds of coal per hour and the heating included in this). Gas costs £1 per week, oil £4 $\frac{1}{2}$ . All the auxiliary materials combined cost £10 per week. In total, £378 is the sum spent each week on the constant

capital. Wages amount to £52 per week. The price of yarn is  $12\frac{1}{4}$ d. per pound, which means that the price of the 10,000 pounds is £510. The surplus-value is therefore £510 - £430 = £80. We now set the constant capital's part of the value (£378) to zero, since it doesn't contribute any new value. If the value produced each week is £132, i.e., £52 variable + £80 surplus, then the rate of surplus-value =  $\frac{80}{52} = 153\frac{11}{13}\%$ . In an average workday of 10 hours, the necessary labor =  $3\frac{31}{33}$  hours, and the surplus-labor =  $6\frac{2}{33}$  hours.<sup>7</sup>

Another example: Jacob provides the following calculation for the year 1815. The price of wheat is 8 shillings per quarter, and an average harvest yields 22 bushels per acre, so each acre brings in on average £11. Because various prices have been adjusted over the years, Jacob's calculation is now badly out of date. Nevertheless, it will suffice for our purposes.

*Amount of Value Produced per Acre*

Wheat	£1 St. 9 shillings	Tithes, Rates, Taxes	£1 St. 1 sh.
Fertilizer	£2 St. 10 shillings	Rents	£1 St. 8 sh.
Wages	£3 St. 10 shillings	Leaseholder's Profits and Interest	£1 St. 2 sh.
Total	£7 St. 9 shillings	Total	£3 St. 11 sh. <sup>ii</sup>

The surplus-value is distributed here under the various headings "profit," "interest," "tithe," and so on, with it always being assumed that a product's price equals its value. The headings don't concern us. We simply add them together and arrive at a surplus-value of £3 11 sh. The £3 19 shillings spent on seed and fertilizer is the constant capital, which we set to zero. What remains is the variable capital, the £3 10 shillings that the capitalist advanced for labor-power. This is replaced by a newly produced value of £3 10 sh. + £3 11 sh. Thus  $\frac{s}{v} = \frac{£3\ 11\ sh.}{£3\ 10\ sh.}$ , or more than 100%.

7. Note added to the second edition: The example offered in the first edition of this book, namely, that of a spinning mill for the year 1860, contained some factual errors. The data given here, which a Manchester manufacturer supplied me with, are quite correct. We should note that in England, the old horsepower of an engine was calculated using the diameter of its cylinders; the new horsepower is taken from a meter that measures the actual power of the machinery.

The worker spends more than half his workday producing surplus-value, which different people claim a share of using different pretexts.<sup>8</sup>

## 2. The Product's Value Represented as Proportional Parts of the Product

Let us now come back to the case of the spinner, which illustrates how a capitalist turns money into capital. The spinner's necessary labor amounts to six hours, as does his surplus-labor. The rate of exploitation is therefore 100%.

The product of a twelve-hour workday is 20 pounds of yarn worth 30 shillings. No less than  $\frac{8}{10}$  of the yarn's value (24 sh.) come from the used-up means of production, whose value merely reappears in the product's value: this part of the yarn's value is made up of constant capital (20 pounds of cotton worth 20 sh. and a part of the spindle worth 4 sh.). The remaining  $\frac{2}{10}$  are new value: the 6 sh. produced during the spinning process. Of these 6 shillings, half replace the labor-power's daily value, i.e., the variable capital, while the other half represent a surplus-value of 3 sh. The total value of the 20 pounds of yarn is thus constituted as follows:

Yarn worth 30 sh. = 24 sh. constant + 3 sh. variable + 3 sh. surplus.

Since this total value is represented in 20 pounds of yarn, it must be possible to represent its different value-elements as proportional parts of the product.

If a yarn value of 30 shillings exists in 20 pounds of yarn, then  $\frac{8}{10}$  of this value, i.e., the constant part of 24 shillings, exist in  $\frac{8}{10}$  of the product, or in 16 pounds of yarn. Of these 16 pounds,  $13\frac{1}{3}$  represent the value of the raw material, namely, the cotton that is spun (worth 20 shillings), and  $2\frac{2}{3}$  pounds represent the value of the auxiliary materials and the used-up part of the means of labor (the 4 shillings' worth of spindle).

Thus  $13\frac{1}{3}$  pounds of yarn can represent all the cotton that was spun into 20 pounds of yarn—in other words, all the raw material in the total product. But if they do represent that, they can't represent anything else. While there are only  $13\frac{1}{3}$  pounds of cotton with a value of  $13\frac{1}{3}$  shillings in  $13\frac{1}{3}$  pounds of yarn, the additional value of  $6\frac{2}{3}$  shillings constitutes an equivalent for the

8. The calculations presented here are meant to serve merely as illustrations. We are assuming that price = value. In volume 3, we will see that it isn't possible to make such an assumption in this simple way, not even when we are dealing with average prices.

other  $6\frac{2}{3}$  pounds of cotton that are spun into the 20 pounds of total product. It is as though all the cotton were torn out of 20 pounds of yarn and stuffed into  $13\frac{1}{3}$  pounds of it. But now these  $13\frac{1}{3}$  pounds of yarn contain not even an atom of the value transferred from the used-up auxiliary materials and the means of labor. Nor do they contain any of the new value created in the actual spinning process.

In just the same way, another  $2\frac{2}{3}$  pounds of yarn, which contain the rest of the constant capital (4 shillings), represent nothing but the value of the used-up auxiliary materials and means of labor in the total product: 20 pounds of yarn.

When viewed as a physical use-value, or as 16 pounds of yarn,  $\frac{8}{10}$  of the product are as much the creation of spinning as the other parts of the product, but in the present context, they don't contain any spinning. They have absorbed none of the labor performed during the actual spinning process. It is as though the 16 pounds were turned into yarn without being spun—as though the form of yarn weren't real, but rather a trickster's illusion. And, in fact, when the capitalist sells these 16 pounds of yarn for 24 shillings, thereby reselling his means of production, we see that they are merely cotton, part of a spindle, and coal in disguise.

The remaining  $\frac{2}{10}$  of the product (or the remaining four pounds of yarn) represent nothing but the 6 shillings of new value created in the twelve-hour spinning process. What they contained by way of the value of the used-up raw material and means of labor has already been extracted and incorporated into the 16 pounds of yarn. The spinning labor embodied in the full 20 pounds of yarn has been concentrated into  $\frac{2}{10}$  of the product, as though the spinner has spun 4 pounds of yarn out of thin air, or with cotton and a spindle that he found ready-made in nature and, thus, that don't contribute to the product's value.

Of the 4 pounds of yarn that contain all the value created by the day's spinning process, half merely represent the value that replaces the money spent on the expended labor-power, i.e., the variable capital of 3 shillings. The other 2 pounds of yarn represent the 3 shillings of surplus-value.

If the spinner's twelve hours of labor are objectified in 6 shillings, then sixty hours of labor are objectified in yarn worth 30 shillings. These hours of labor exist in the 20 pounds of yarn,  $\frac{8}{10}$  (16 pounds) of which are the materialization of forty-eight hours of labor that were expended before the spinning process took place. Thus forty-eight hours of labor are objectified in the yarn's means of production, while  $\frac{2}{10}$  (or 4 pounds) of the product are the materialization of the twelve labor-hours expended in the spinning process itself.

Earlier we saw that the yarn's value equals the new value created when the yarn is produced plus the value preexisting in the means of production used to produce the yarn. Here we have seen that these elements of the product's value, which differ in terms of function or purpose, can be represented as proportional parts of the product.

We divided the product, or the result of the production process, into three parts: one quantity of product that represents only the labor contained in the means of production (i.e., the constant capital); another that represents only the necessary labor added during the production process, or the variable capital; and, finally, a third that represents only the surplus-labor, or surplus-value, added to the product in the same process. This act of division is as important as it is simple, as will become clear when we bring it to bear on complex problems that have remained unsolved.

We have been viewing the total product as the completed product of a twelve-hour workday. But we can also accompany the product through its process of production and still represent the partial products as a series of functionally different parts of the total product.

In twelve hours, the spinner produces 20 pounds of yarn; therefore, he produces  $1\frac{2}{3}$  pounds in one hour and  $13\frac{1}{3}$  pounds in eight hours, a partial product that equals the value of the cotton spun during the whole day. The partial product of the next hour and thirty-six minutes =  $2\frac{2}{3}$  pounds of yarn, which represent the value of the means of production that are consumed during the twelve hours when the yarn is spun. Similarly, in the one hour and twelve minutes after that, the spinner produces 2 pounds of yarn that are worth 3 shillings, an amount of the product's value equal to the value that the spinner produces during his 6 hours of necessary labor. And in the last hour and twelve minutes, he produces another 2 pounds of yarn, whose value equals the surplus-value that his half day of surplus-labor generates. English manufacturers make use of this kind of calculation all the time. They say that during the first eight hours or two-thirds of the workday, they get back the value of their cotton, and so on. Their formula is correct, as we have seen; it is in fact the formula we just employed, only here a spatial way of thinking, in which the finished parts of the product are side by side, has been translated into a temporal one, in which the parts are produced in a sequence. But the formula can also go with the crudest notions, especially in the minds of people whose practical interest in the process of valorization is as great as their motivation for misunderstanding it theoretically. For example, a person might imagine that our spinner produces or replaces the value of the cotton during the first eight hours of his workday, the value of the wear and tear that the means of labor incur during

the next one hour and thirty-six minutes, and the value of his own wages during the one hour and twelve minutes after that, which would mean that he devotes himself to the production of surplus-value for the manufacturer only during the day's famous "last hour." The spinner is tasked with making a double miracle happen: he is supposed to produce all the things he spins with—the cotton, the spindle, the steam engine, the coal, and the oil—even as he spins with them, and he is supposed to turn one day of work at a given level of intensity into five such days. For in the case at hand, it takes four twelve-hour days to produce the raw material and the means of labor, while an additional twelve-hour workday is needed to turn them into yarn. Rapacity believes in miracles of this kind, and it never lacks a doctrinaire sycophant who claims to have proved that such miracles exist. A famous historical example shows that this is so.

### 3. Senior's "Last Hour"

One fine morning in 1836, Nassau W. Senior was summoned from Oxford to Manchester. Well known for his work in political economy and his elegant style (we might say that he was the *Clarendon* of English economists), Senior was supposed to learn political economy in the latter place rather than teach it in the former.<sup>iii</sup> The manufacturers had chosen him to be their man in the ring against both the newly passed Factory Act and the even more ambitious Ten Hours' Agitation. But with their characteristic acumen in practical matters, they had recognized that the professor "wanted a good deal of finishing," and so they sent him to Manchester. The professor, for his part, wrote up the lessons he'd received from the manufacturers, doing so in the pamphlet *Letters on the Factory Act, as it affects the cotton manufacture* (London 1837). Among other things, he offered his readers this edifying nugget:

"Under the present law, no mill in which persons under 18 years of age are employed can be worked more than  $11\frac{1}{2}$  hours a day, that is, 12 hours for five days in the week and 9 on Saturday. Now, the following analysis [!] will show that in a mill so worked, the whole net profit is derived from the last hour. I will suppose a manufacturer to invest £100,000: £80,000 in his mill and machinery, and £20,000 in raw material and wages. The annual return of that mill, supposing the capital to be turned once a year, and gross profits to be 15%, ought to be goods worth £115,000. . . . Of this £115,000 each of the twenty-three half hours of work produces  $\frac{5}{115}$ , or  $\frac{1}{23}$ . Of these  $\frac{23}{23}$  (constituting the whole £115,000),  $\frac{20}{23}$ , that is to say £100,000 out of the £115,000, simply replace the capital;  $\frac{1}{23}$ , or £5,000



out of the £15,000 gross profit [!], makes up for the deterioration of the mill and machinery.<sup>iv</sup> The remaining  $\frac{2}{23}$ , that is, the last two of the twenty-three half-hours of every day, produce the net profit of 10%. If, therefore, (prices remaining the same) the factory could be kept at work 13 hours instead of  $11\frac{1}{2}$ , by an addition of about £2,600 to the circulating capital, the net profit would be more than doubled. On the other hand, if the hours of working were reduced by 1 hour per day (prices remaining the same), net profit would be destroyed—if they were reduced by  $1\frac{1}{2}$  hours, even gross profit would be destroyed.”<sup>9</sup>

And the professor calls that an “analysis”! If he thought the manufacturers were right to complain that workers waste the best part of the day producing—and thus reproducing or replacing—the value of the buildings, machinery, cotton, coal, and so on, he wouldn’t have needed to carry out his own investigation. He could simply have replied, “Gentleman! If you have your workers work for ten hours instead of eleven and a half, then assuming all other conditions remain the same, your workers would reduce the time they spend each day consuming the cotton, the machinery, and so on by ninety minutes. You would gain exactly as much as you would lose. From now on, your workers would waste less time—ninety minutes less—reproducing or replacing the value of the capital you advanced.”

9. Senior op. cit. pp. 12, 13. We won’t get into the *curiosa* that aren’t directly relevant here, such as the claim that manufacturers treat the amount required to cover the machinery’s wear and tear—that is, to replace a part of the capital—as part of their profit, whether gross or net, dirty or pure. Nor will we discuss whether or not Senior’s figures are correct. In “A Letter to Mr. Senior etc. Lond. 1837,” Leonard Horner shows that they are as worthless as Senior’s so-called “analysis.” Horner was one of the Factory Inquiry Commissioners in 1833; he was an Inspector, in fact, Censor of Factories, until 1859, and what he achieved for England’s working class is unforgettable. In addition to waging a lifelong battle against the aggrieved manufacturers, he fought against the Cabinet, whose members cared more about the number of “votes” they received in the House of Commons than the number of hours “hands” had to work in the factories. An addendum to this note: Not only is Senior’s content faulty, he presents it in a confused way. What he actually meant to say is that the manufacturer employs his worker for  $11\frac{1}{2}$  hours or  $\frac{23}{2}$  hours a day, and the worker’s total annual labor is  $11\frac{1}{2}$  multiplied by the number of workdays in the year. Presupposing this, the 23 half hours of daily labor produce a total yearly product of £115,000; each half hour of labor produces  $\frac{1}{23} \times £115,000$ ; 20 half hours of labor produce  $\frac{20}{23} \times £115,000 = £100,000$ , that is, they merely replace the capital that was advanced. What remains are 3 half hours of labor that produce  $\frac{3}{23} \times £115,000 = £15,000$ , which represents the gross profit. Of these 3 half hours of labor, one produces  $\frac{1}{23} \times £115,000 = £5,000$ : it produces value equal to that of the wear and tear that the factory and the machines incur. The last 2 half hours of labor, in other words, the last hour, produce  $\frac{2}{23} \times £115,000 = £10,000$ , which is the net profit. In his text, Senior turns the last  $\frac{2}{23}$  of the product into parts of the workday itself.

However, if the professor didn't think the manufacturers were right, but rather decided that he, the expert, should analyze the situation for himself, then in order to answer a question that turns on the relation between net profit and the length of the workday, he would have to ask the manufacturers for help. Instead of lumping together into one messy heap machinery and factory buildings and raw material and labor, would they kindly record in one column the constant capital that goes into the means of production and, in another, the capital advanced as wages? If it turned out that according to the manufacturers' calculations, a worker reproduced or replaced his day's wages in  $2\frac{1}{2}$  hours, i.e., in one hour of labor, the professor would have to continue as follows:

"The figures you provided tell us that a worker produces his wages in the penultimate hour of labor, and that he produces surplus-value, or your net profit, in the last hour. But let's take a closer look. Since the worker produces equal amounts of value in equal periods of time, he must produce the same amount of value in the penultimate hour as in the last one. Furthermore, he produces value only when he works, and the quantity of labor he expends is measured in terms of his labor-time, which amounts to eleven and a half hours per day, according to your figures. He uses one part of these eleven and a half hours to produce or replace his wages; the other he uses to produce your net profit. He does this and nothing else during the workday. Now since, as you say, the value of his wages equals the surplus-value he generates, it is clear that he spends the first five and three-quarters hours of the day producing his wages and the second half of the day producing your net profit. And since the value of the yarn that he produces in two hours equals the combined value of his wages and your net profit, the yarn's value has to be measured in terms of eleven and a half hours of labor, half of which measures the value of the yarn produced in the penultimate hour of labor, while the other half measures the value of the yarn produced in the very last one. We have arrived at the tricky part. Watch out! The penultimate hour of labor is an ordinary hour of labor, just as the first hour is. *Ni plus, ni moins*. How can the yarn the spinner produces in one ordinary hour have a value that represents five and three-quarters hours of labor? In truth, the spinner performs no such miracle. The use-value he produces in one hour of labor is a definite quantity of yarn. The value of this yarn amounts to five and three-quarters hours of labor, to which he contributes only one hour. The other four and three-quarters hours were expended independently of him. They are embedded in the means of production that are consumed each hour (cotton, machinery, and so on). His wages are produced in five

and three-quarters hours, and the yarn produced in one hour of spinning also contains five and three-quarters hours of labor. There isn't any kind of witch's spell, then, behind the fact that the value product of his five and three-quarters hours of spinning is equal to the product value spun in one hour. So you have it all wrong if you think that a worker wastes even a fraction of a second reproducing or 'replacing' the value of the cotton, the machinery, etc. When his labor turns cotton and spindle into yarn—in other words, when he is working—the value of the cotton and the spindle migrates on its own to the new product. This occurs due to the quality of his labor, not its quantity. Of course, he will transfer more value to yarn in an hour than in thirty minutes, but only because he spins more cotton in an hour than in half that time. You should now see that when you say the worker produces the value of his wages in the penultimate hour, and your net profit in the last hour, all you are really saying is that eleven and a half hours of labor, or as many hours as there are in the whole workday, are embodied in the product of two hours of the worker's labor, whether those hours are the day's first hours or its last. And when I say that he produces his wages in the first five and three-quarters hours of the day and your net profit in the other five and three-quarters hours, all I am really saying is that you pay him for the first half of the day but not for the second half. (This is how you talk, by the way; I would speak of paying for 'labor-power' rather than 'payment for labor.')

Gentlemen, if you were to examine the ratio of the labor-time you pay for to the labor-time you get for free, you would find that it is half a day to half a day: 100%, a tidy percentage. And if you were to squeeze thirteen hours of labor out of the 'hands' you employ rather than eleven and a half, and count the extra ninety minutes of labor as pure surplus-labor (which is definitely something you would do), causing the surplus-labor to go from five and three-quarters hours to seven and a quarter hours, then the rate of surplus-value would increase from 100% to  $126\frac{2}{23}\%$ . You are therefore being wildly optimistic if you think that the rate of surplus-value will rise to 200% and beyond, that it will 'more than double,' because ninety minutes have been added to the workday. On the other hand, the human heart is a marvelous thing, especially when we keep it in our wallet, and it's absurdly pessimistic of you to worry that reducing the workday from eleven and a half hours to ten and a half will wipe out all your profits. Not by a long shot! All other conditions remaining the same, the surplus-labor would fall from five and three-quarters hours to four and three-quarters hours, which would still make for a robust rate of surplus-value:  $82\frac{14}{23}\%$ . The fateful 'last hour,' about which you tell more tales than millenarians

tell about Judgment Day, is 'all bosh.' If you lose this hour, it won't cost you your 'profits,' nor will it cost the boys and girls you work to the bone the 'purity of their souls.'"<sup>10</sup>

10. If Senior proved that the net profit of manufacturers, the very existence of the English cotton industry, and England's position of power in the world market all depend on "the last hour of work," Dr. Andrew Ure demonstrated that when factory children and teens under 18 years old aren't confined for a full 12 hours in the warm and pure moral atmosphere of the factory, but are instead cast out into the heartless and frivolous outside world "an hour" earlier, the salvation of their souls falls prey to indolence and vice. Since 1848, the factory inspectors have been mocking the manufacturers' "fatal" "last hour." The inspectors have done this in their semiannual reports, where they have shown no signs of letting up. Thus Mr. Howell writes in a report dated May 31, 1855, "Had the following ingenious calculation [he quotes Senior] been correct, every cotton mill in the United Kingdom would have been working at a loss since the year 1850" ("Reports of the Insp. of Fact. for the half year ending 30th April, 1855," p. 19). As the Ten Hours' Bill made was making its way through Parliament in 1848, the manufacturers forced some workers in rural flax spinning mills, namely, mills scattered between the counties of Dorset and Somerset, to sign a counterpetition. Here we read, among other things: "Your petitioners, who are parents, conceive that an additional hour of leisure will tend more to demoralise their children than otherwise, believing that idleness is the parent of vice." On this point, the factory report of 31st October, 1848, says, "The atmosphere of the flax mills, in which the children of these virtuous and tender parents are employed, is so loaded with dust and fibre from the raw material that it is extremely disagreeable to remain in one of the rooms; even for ten minutes, for you cannot do so without experiencing a sensation of considerable distress, in consequence of the eyes, ears, nostrils, and mouth being immediately filled with the clouds of flax dust from which there is no escape on any side. The employment, by reason of the rapid motion of the machinery, requires the untiring exercise of great dexterity and activity, under the guidance of incessant vigilance; and it appears somewhat hard that their own parents should apply the term 'idleness' to the condition of children, who kept working for ten good hours (over and above meal times), at such an employment, in such an atmosphere. . . . This uncharitable talk about 'idleness and vice' is deservedly denounced as mere cant and hypocrisy. . . . They who, some twelve years ago, were startled by the confidence with which it was gravely proclaimed to the public, under the sanction of high authority, that the whole net profit of the master was derived from the 'last hour,' and that if the hours of working should be reduced by one hour per day, net profit would be destroyed, will be scarcely less surprised to find that the original discovery of the virtues of 'the last hour' has been so far improved upon as to comprehend morals as well as profit, so that if the duration of children's labour be reduced to ten hours, their morals must be destroyed, together with the net profit of their employer; both depending on the last—the fatal—hour" ("Repts of Insp. of Fact. for 31st Oct. 1848," p. 101). [Editor's note: Passage modified to match Marx's version, which amplifies the parents' faults—he adds the sarcastic phrase about how they are "virtuous and tender" ("tugendhaft-zärtlich"), for example.] The report goes on to provide examples of the "morality" and "virtue" of these same manufacturers, of the tricks, scams, inducements, threats, fraud, and lies they deployed to get a few poor and exhausted workers to sign such petitions and send them to Parliament as petitions coming from a whole branch of industry, or from entire counties. It is quite characteristic of the state of so-called economic "scholarship" that neither Senior, who, to his credit, later vigorously supported the Factory Laws, nor his original and later opponents, cleared away the false

“If your precious ‘little last hour’ actually strikes, think of the professor from Oxford. I hope to meet you honorable gentleman again in a better world. For now, farewell!”<sup>11</sup> On April 15, 1848, the battle cries sounded once more for the “last hour” Senior discovered in 1836, this time in a polemic against the Ten Hours’ Bill that was written by James Wilson, one of the leading mandarin economists, and published in the *London Economist*.

#### 4. Surplus Product

We will use the term “surplus product” (*produit net*) for the part of the product in which surplus-value is represented—in our example,  $\frac{1}{10}$  of 20 pounds of yarn, or 2 pounds. Recall that the rate of surplus-value is determined by the ratio of surplus-value to the capital’s variable part rather than to the capital’s total value. In the same way, the relative amount of the surplus product is determined by the ratio of the surplus product to the part of the product in which necessary labor is represented, rather than its ratio to the remaining part of the total product. Because the defining aim of capitalist production is to produce surplus-value, a given quantity of wealth has to be measured not by the absolute amount produced, but rather by the relative magnitude of the surplus product.<sup>12</sup>

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conclusion drawn from the “original discovery.” They appealed to actual experience; as a result, the why and wherefore of things remained a mystery.

11. Yet the esteemed professor did manage to profit from his trip to Manchester, at least to some extent! In his “Letters on the Factory Act,” Senior makes all net gain, “profit” and “interest,” and even “something more” depend on a single unpaid hour of the worker’s labor! And a year earlier, in his “Outlines of Political Economy,” which he wrote for the benefit of Oxford students and educated philistines, he “discovered” that in contrast to what Ricardo’s labor theory of value holds, profit derives from the capitalist’s labor and his interest derives from his asceticism, i.e., his “abstinence.” The ruse was old, but the word “abstinence” was new. Herr Roscher correctly rendered into it German as “Enthaltung.” Less well versed in Latin, his compatriots Wirth, Schulzen, and Michels translated the term as “Entsagung,” which is the language of the monastery. [Editor’s note: It is also the language of what would later be called German bourgeois realist fiction, which reached its high point around the time *Capital* appeared. Two of its main achievements, Gottfried Keller’s *Der grüne Heinrich* (1855) and Adalbert Stifter’s *Der Nachsommer* (1857), point up the importance of “Entsagung” for successful socialization. Marx doesn’t consistently act on his etymological point and often uses “Entsagung” as a synonym for the term “Abstinenz.” Hence in this translation “Entsagung” is rendered as “absintence” in some places and as “renunciation” in others.]

12. “To an individual with a capital of £20,000, whose profits were £2,000 per annum, it would be a matter quite indifferent whether his capital would employ a hundred or a thousand men, whether the commodity produced sold for £10,000, or for £20,000, provided, in all cases, his profits were not diminished below £2,000. Is not the real interest of the nation similar? Provided its net real income, its rents and profits be the same, it is of no

Necessary labor and surplus-labor taken together—in other words, the periods of time during which a worker produces both the replacement value of his labor-power and surplus-value—constitute the absolute magnitude of his labor-time, or . . . *the working day*.

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importance whether the nation consists of 10 or of 12 millions of inhabitants” (Ricardo op. cit. p. 416). Long before Ricardo, Arthur Young, a surplus product fanatic, and, in addition, a windy, naïve writer whose reputation was inversely proportional to his merits, wrote, “Of what use in a modern kingdom would be a whole province thus divided, in the old Roman way, by small independent peasants, however well cultivated, except for the mere purpose of breeding men, which singly taken, is a most useless purpose?” Arthur Young, “Political Arithmetic etc. London 1774,” p. 47. What is remarkable is “the strong inclination to represent net wealth as beneficial to the labouring class . . . though it is evidently not on account of being net” (T. Hopkins, *On Rent of Land* etc. London, 1828, p. 126).