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DAVID RICARDO

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On the Principles of Political Economy and Taxation

By David Ricardo

Ricardo's book,

On the Principles of Political Economy and Taxation, was first published in 1817 (London: John Murray, Albemarle-Street), with second and third editions in quick succession. We present Ricardo's final revision, the third edition, published in 1821, here. The three different editions encompassed several substantive changes in the development of Ricardo's ideas. A comprehensive, readable comparison of the three editions can be found *Works of David Ricardo*, Vol. 1, ed. by Pierro Sraffa with the collaboration of M. H. Dobb, Cambridge: Cambridge University Press, 1951. We are indebted to this fine work and have relied on it to correct occasional typographical misprints in the 1821 edition. Minor editorial modifications in this edition are: removing periods after the roman numerals designating kings and "per cent." We have also substituted modern £ symbol for the historical £ and added commas in numbers greater than 1,000. Editor

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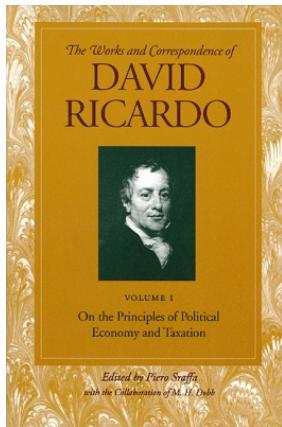
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Table of Contents

« FIRST

◀ 32 / 33 ▶

LAST »

Chapter 31

On Machinery

In the present chapter I shall enter into some enquiry respecting the influence of machinery on the interests of the different classes of society, a subject of great importance, and one which appears never to have been investigated in a manner to lead to any certain or satisfactory results. It is more incumbent on me to declare my opinion on this question, because they have, on further reflection, undergone a considerable change; and although I am not aware that I have ever published any thing respecting machinery which it is necessary for me to retract, yet I have in other ways given my support to doctrines which I now think erroneous; it, therefore, becomes a duty in me to submit my present views to examination, with my reasons for entertaining them.

Ever since I first turned my attention to questions of political economy, I have been of opinion, that such an application of machinery to any branch of production, as should have the effect of saving labour, was a general good, accompanied only with that portion of inconvenience which in most cases attends the removal of capital and labour from one employment to another. It appeared to me, that provided the landlords had the same money rents, they would be benefited by the reduction in the prices of some of the commodities on which those rents were expended, and which reduction of price could not fail to be the consequence of the employment of machinery. The capitalist, I thought, was eventually benefited precisely in the same manner. He, indeed, who made the discovery of the machine, or who first usefully applied it, would enjoy an additional advantage, by making great profits for a time; but, in proportion as the machine came into general use, the price of the commodity produced, would, from the effects of competition, sink to its cost of production, when the capitalist would get the same money profits as before, and he would only participate in the general advantage, as a consumer, by being enabled, with the same money revenue, to command an additional quantity of comforts and enjoyments. The class of labourers also, I thought, was equally benefited by the use of machinery, as they would have the means of buying more commodities with the same money wages, and I thought that no reduction of wages would take place, because the capitalist would have the power of demanding and employing the same quantity of labour as before, although he might be under the necessity of employing it in the production of a new, or at any rate of a

different commodity. If, by improved machinery, with the employment of the same quantity of labour, the quantity of stockings could be quadrupled, and the demand for stockings were only doubled, some labourers would necessarily be discharged from the stocking trade; but as the capital which employed them was still in being, and as it was the interest of those who had it to employ it productively, it appeared to me that it would be employed on the production of some other commodity, useful to the society, for which there could not fail to be a demand; for I was, and am, deeply impressed with the truth of the observation of Adam Smith, that "the desire for food is limited in every man, by the narrow capacity of the human stomach, but the desire of the conveniences, and ornaments of building, dress, equipage and household furniture, seems to have no limit or certain boundary." As, then, it appeared to me that there would be the same demand for labour as before, and that wages would be no lower, I thought that the labouring class would, equally with the other classes, participate in the advantage, from the general cheapness of commodities arising from the use of machinery.

These were my opinions, and they continue unaltered, as far as regards the landlord and the capitalist; but I am convinced, that the substitution of machinery for human labour, is often very injurious to the interests of the class of labourers.

My mistake arose from the supposition, that whenever the net income of a society increased, its gross income would also increase; I now, however, see reason to be satisfied that the one fund, from which landlords and capitalists derive their revenue, may increase, while the other, that upon which the labouring class mainly depend, may diminish, and therefore it follows, if I am right, that the same cause which may increase the net revenue of the country, may at the same time render the population redundant, and deteriorate the condition of the labourer.

A capitalist we will suppose employs a capital of the value of £20,000 and that he carries on the joint business of a farmer, and a manufacturer of necessities. We will further suppose, that £7,000 of this capital is invested in fixed capital, viz. in buildings, implements, &c. &c. and that the remaining £13,000 is employed as circulating capital in the support of labour. Let us suppose, too, that profits are 10 per cent, and consequently that the capitalist's capital is every year put into its original state of efficiency, and yields a profit of £2,000.

Each year the capitalist begins his operations, by having food and necessaries in his possession of the value of £13,000, all of which he sells in the course of the year to his own workmen for that sum of money, and, during the same period, he pays them the like amount of money for wages: at the end of the year they replace in his possession food and necessaries of the value of £15,000, £2,000 of which he consumes himself, or disposes of as may best suit his pleasure and gratification. As far as these products are concerned, the gross produce for that year is £15,000, and the net produce £2,000. Suppose now, that the following year the capitalist employs half his men in constructing a machine, and the other half in producing food and necessaries as usual. During that year he would pay the sum of £13,000 in wages as usual, and would sell food and necessaries to the same amount to his workmen; but what would be the case the following year?

While the machine was being made, only one-half of the usual quantity of food and necessaries would be obtained, and they would be only one-half the value of the quantity which was produced before. The machine would be worth £7,500, and the food and necessaries £7,500, and, therefore, the capital of the capitalist would be as great as before; for he would have besides these two values, his fixed capital worth £7,000, making in the whole £20,000 capital, and £2,000 profit. After deducting this latter sum for his own expenses, he would have a no greater circulating capital than £5,500 with which to carry on his subsequent operations; and, therefore, his means of employing labour, would be reduced in the proportion of £13,000 to £5,500, and, consequently, all the labour which was before employed by £7,500, would become redundant.

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; but if this be done, if the

net income be not diminished, of what importance is it to the capitalist, whether the gross income be of the value of £3,000, of £10,000, or of £15,000?

In this case, then, although the net produce will not be diminished in value, although its power of purchasing commodities may be greatly increased, the gross produce will have fallen from a value of £15,000 to a value of £7,500, and as the power of supporting a population, and employing labour, depends always on the gross produce of a nation, and not on its net produce, there will necessarily be a diminution in the demand for labour, population will become redundant, and the situation of the labouring classes will be that of distress and poverty.

As, however, the power of saving from revenue to add to capital, must depend on the efficiency of the net revenue, to satisfy the wants of the capitalist, it could not fail to follow from the reduction in the price of commodities consequent on the introduction of machinery, that with the same wants he would have increased means of saving—increased facility of transferring revenue into capital. But with every increase of capital he would employ more labourers; and, therefore, a portion of the people thrown out of work in the first instance, would be subsequently employed; and if the increased production, in consequence of the employment of the machine, was so great as to afford, in the shape of net produce, as great a quantity of food and necessaries as existed before in the form of gross produce, there would be the same ability to employ the whole population, and, therefore, there would not necessarily be any redundancy of people.

All I wish to prove, is, that the discovery and use of machinery may be attended with a diminution of gross produce; and whenever that is the case, it will be injurious to the labouring class, as some of their number will be thrown out of employment, and population will become redundant, compared with the funds which are to employ it.

The case which I have supposed, is the most simple that I could select; but it would make no difference in the result, if we supposed that the machinery was applied to the trade of any manufacturer,—that of a clothier, for example, or of a cotton manufacturer. If in the trade of a clothier, less cloth would be produced after the introduction of machinery; for a part of that quantity which is disposed of for the purpose of paying a large body of workmen, would not be required by their employer. In consequence of using the machine, it would be necessary for him to reproduce a value, only equal to the value consumed, together with the profits on the whole capital. £7,500 might do this as effectually as £15,000 did before, the case differing in no respect from the former instance. It may be said, however, that the demand for cloth would be as great as before, and it may be asked from whence would this supply come? But by whom would the cloth be demanded? By the farmers and the other producers of necessaries, who employed their capitals in producing these necessaries as a means of obtaining cloth: they gave corn and necessaries to the clothier for cloth, and he bestowed them on his workmen for the cloth which their work afforded him.

This trade would now cease; the clothier would not want the food and clothing, having fewer men to employ and having less cloth to dispose of. The farmers and others, who only produced necessaries as means to an end, could no longer obtain cloth by such an application of their capitals, and, therefore, they would either themselves employ their capitals in producing cloth, or would lend them to others, in order that the commodity really wanted might be furnished; and that for which no one had the means of paying, or for which there was no demand, might cease to be produced. This, then, leads us to the same result; the demand for labour would diminish, and the commodities necessary to the support of labour would not be produced in the same abundance.

If these views be correct, it follows, 1st: That the discovery, and useful application of machinery, always leads to the increase of the net produce of the country, although it may not, and will not, after an inconsiderable interval, increase the value of that net produce.

2dly. That an increase of the net produce of a country is compatible with a diminution of the gross produce, and that the motives for employing machinery are always sufficient to insure its employment, if it will increase

the net produce, although it may, and frequently must, diminish both the quantity of the gross produce, and its value.

3dly. That the opinion entertained by the labouring class, that the employment of machinery is frequently detrimental to their interests, is not founded on prejudice and error, but is conformable to the correct principles of political economy.

4thly. That if the improved means of production, in consequence of the use of machinery, should increase the net produce of a country in a degree so great as not to diminish the gross produce, (I mean always quantity of commodities and not value,) then the situation of all classes will be improved. The landlord and capitalist will benefit, not by an increase of rent and profit, but by the advantages resulting from the expenditure of the same rent, and profit, on commodities, very considerably reduced in value, while the situation of the labouring classes will also be considerably improved; 1st, from the increased demand for menial servants; 2dly, from the stimulus to savings from revenue, which such an abundant net produce will afford; and 3dly, from the low price of all articles of consumption on which their wages will be expended.

Independently of the consideration of the discovery and use of machinery, to which our attention has been just directed, the labouring class have no small interest in the manner in which the net income of the country is expended, although it should, in all cases, be expended for the gratification and enjoyments of those who are fairly entitled to it.

If a landlord, or a capitalist, expends his revenue in the manner of an ancient baron, in the support of a great number of retainers, or menial servants, he will give employment to much more labour, than if he expended it on fine clothes, or costly furniture; on carriages, on horses, or in the purchase of any other luxuries.

In both cases the net revenue would be the same, and so would be the gross revenue, but the former would be realised in different commodities. If my revenue were £10,000, the same quantity nearly of productive labour would be employed, whether I realised it in fine clothes and costly furniture, &c. &c. or in a quantity of food and clothing of the same value. If, however, I realised my revenue in the first set of commodities, no more labour would be *consequently* employed:—I should enjoy my furniture and my clothes, and there would be an end of them; but if I realised my revenue in food and clothing, and my desire was to employ menial servants, all those whom I could so employ with my revenue of £10,000, or with the food and clothing which it would purchase, would be to be added to the former demand for labourers, and this addition would take place only because I chose this mode of expending my revenue. As the labourers, then, are interested in the demand for labour, they must naturally desire that as much of the revenue as possible should be diverted from expenditure on luxuries, to be expended in the support of menial servants.

In the same manner, a country engaged in war, and which is under the necessity of maintaining large fleets and armies, employs a great many more men than will be employed when the war terminates, and the annual expenses which it brings with it, cease.

If I were not called upon for a tax of £500 during the war, and which is expended on men in the situations of soldiers and sailors, I might probably expend that portion of my income on furniture, clothes, books, &c. &c. and whether it was expended in the one way or in the other, there would be the same quantity of labour employed in production; for the food and clothing of the soldier and sailor would require the same amount of industry to produce it as the more luxurious commodities; but in the case of the war, there would be the additional demand for men as soldiers and sailors; and, consequently, a war which is supported out of the revenue, and not from the capital of a country, is favourable to the increase of population.

At the termination of the war, when part of my revenue reverts to me, and is employed as before in the purchase of wine, furniture, or other luxuries, the population which it before supported, and which the war called into

existence, will become redundant, and by its effect on the rest of the population, and its competition with it for employment, will sink the value of wages, and very materially deteriorate the condition of the labouring classes.

There is one other case that should be noticed of the possibility of an increase in the amount of the net revenue of a country, and even of its gross revenue, with a diminution of demand for labour, and that is, when the labour of horses is substituted for that of man. If I employed one hundred men on my farm, and if I found that the food bestowed on fifty of those men, could be diverted to the support of horses, and afford me a greater return of raw produce, after allowing for the interest of the capital which the purchase of the horses would absorb, it would be advantageous to me to substitute the horses for the men, and I should accordingly do so; but this would not be for the interest of the men, and unless the income I obtained, was so much increased as to enable me to employ the men as well as the horses, it is evident that the population would become redundant, and the labourers' condition would sink in the general scale. It is evident he could not, under any circumstances, be employed in agriculture; but if the produce of the land were increased by the substitution of horses for men, he might be employed in manufactures, or as a menial servant.

The statements which I have made will not, I hope, lead to the inference that machinery should not be encouraged. To elucidate the principle, I have been supposing, that improved machinery is *suddenly* discovered, and extensively used; but the truth is, that these discoveries are gradual, and rather operate in determining the employment of the capital which is saved and accumulated, than in diverting capital from its actual employment.

With every increase of capital and population, food will generally rise, on account of its being more difficult to produce. The consequence of a rise of food will be a rise of wages, and every rise of wages will have a tendency to determine the saved capital in a greater proportion than before to the employment of machinery. Machinery and labour are in constant competition, and the former can frequently not be employed until labour rises.

In America and many other countries, where the food of man is easily provided, there is not nearly such great temptation to employ machinery as in England, where food is high, and costs much labour for its production. The same cause that raises labour, does not raise the value of machines, and, therefore, with every augmentation of capital, a greater proportion of it is employed on machinery. The demand for labour will continue to increase with an increase of capital, but not in proportion to its increase; the ratio will necessarily be a diminishing ratio.

68*

I have before observed, too, that the increase of net incomes, estimated in commodities, which is always the consequence of improved machinery, will lead to new savings and accumulations. These savings, it must be remembered are annual, and must soon create a fund, much greater than the gross revenue, originally lost by the discovery of the machine, when the demand for labour will be as great as before, and the situation of the people will be still further improved by the increased savings which the increased net revenue will still enable them to make.

The employment of machinery could never be safely discouraged in a State, for if a capital is not allowed to get the greatest net revenue that the use of machinery will afford here, it will be carried abroad, and this must be a much more serious discouragement to the demand for labour, than the most extensive employment of machinery; for, while a capital is employed in this country, it must create a demand for some labour; machinery cannot be worked without the assistance of men, it cannot be made but with the contribution of their labour. By investing part of a capital in improved machinery, there will be a diminution in the progressive demand for labour; by exporting it to another country, the demand will be wholly annihilated.

The prices of commodities, too, are regulated by their cost of production. By employing improved machinery, the cost of production of commodities is reduced, and, consequently, you can afford to sell them in foreign markets at a cheaper price. If, however, you were to reject the use of machinery, while all other countries encouraged it, you would be obliged to export your

money, in exchange for foreign goods, till you sunk the natural prices of your goods to the prices of other countries. In making your exchanges with those countries, you might give a commodity which cost two days labour, here, for a commodity which cost one, abroad, and this disadvantageous exchange would be the consequence of your own act, for the commodity which you export, and which cost you two days labour, would have cost you only one if you had not rejected the use of machinery, the services of which your neighbours had more wisely appropriated to themselves.

66.

"If, with the quantity of gold and silver which actually exists, these metals only served for the manufacture of utensils and ornaments, they would be abundant, and would be much cheaper than they are at present; in other words, in exchanging them for any other species of goods, we should be obliged to give proportionally a greater quantity of them. But as a large quantity of these metals is used for money, and as this portion is used for no other purpose, there remains less to be employed in furniture and jewellery; now this scarcity adds to their value."—

Say, vol. i. p. 316. See also note to page 78.

67.

An Inquiry into the Nature and Origin of Public Wealth, page 13.

68.

"The demand for labour depends on the increasing of circulating, and not of fixed capital. Were it true that the proportion between these two sorts of capital is the same at all times, and in all countries, then, indeed, it follows that the number of labourers employed is in proportion to the wealth of the State. But such a position has not the semblance of probability. As arts are cultivated, and civilization is extended, fixed capital bears a larger and larger proportion to circulating capital. The amount of fixed capital employed in the production of a piece of British muslin is at least a hundred, probably a thousand times greater than that employed in the production of a similar piece of Indian muslin. And the proportion of circulating capital employed is a hundred or a thousand times less. It is easy to conceive that, under certain circumstances, the whole of the annual savings of an industrious people might be added to fixed capital, in which case they would have no effect in increasing the demand for labour."

Barton, "On the Condition of the Labouring Classes of Society," p. 16.

It is not easy, I think, to conceive that under any circumstance, an increase in capital should not be followed by an increased demand for labour; the most that can be said is, that the demand will be in a diminishing ratio. Mr. Barton, in the above publication, has, I think, taken a correct view of some of the effects of an increasing amount of fixed capital on the condition of the labouring classes. His Essay contains much valuable information.

69.

An Inquiry into the Nature and Progress of Rent. p. 15.

70.

See

[Chapter 6, paragraphs 16-18], where I have endeavoured to shew, that whatever facility or difficulty there may be in the production of corn; wages and profits together will be of the same value. When wages rise, it is always at the expense of profits, and when they fall, profits always rise.

71.

Mr. Malthus has observed in a late publication, that I have misunderstood him in this passage, as he did not mean to say, that rent immediately and necessarily rises and falls with the increased or diminished fertility of the land. If so, I certainly did misunderstand him. Mr. Malthus's words are, "Diminish this plenty, diminish the fertility of the soil, and the excess (rent) will diminish; diminish it still further, and it will disappear." Mr. Malthus does not state his proposition conditionally, but absolutely. I contended against what I understood him to maintain, that a diminution of the fertility of the soil was incompatible with an increase of rent.

72.

Of what increased quantity does Mr. Malthus speak? Who is to produce it? Who can have any motive to produce it, before any demand exists for an additional quantity?

73.

Inquiry, &c. "In all progressive countries, the average price of corn is never higher than what is necessary to continue the average increase of produce." Observations, p. 21.

"In the employment of fresh capital upon the land, to provide for the wants of an increasing population, whether this fresh capital is employed in bringing more land under the plough, or improving land already in cultivation, the main question always depends upon the expected returns of this capital; and no part of the gross profits can be diminished, without diminishing the motive to this mode of employing it. Every diminution of price, not fully and immediately balanced by a proportionate fall in all the necessary expenses of a farm, every tax on the land, every tax on farming stock, every tax on the necessary of farmers, will tell in the computation; and if, after all these outgoings are allowed for, the price of the produce will not leave a fair remuneration for the capital employed, according to the general rate of profits, and a rent at least equal to the rent of the land in its former state, no sufficient motive can exist to undertake the projected improvement."

Observations, p. 22.

74.

See See
[Chapter 6, paragraphs 16-18].

75.

See
[Chapter 2, paragraphs 21-23], &c.

76.

It is not necessary to state, on every occasion, but it must be always understood, that the same result will follow, as far as regards the price of raw produce and the rise of rent, whether an additional capital of a given amount, be employed on new land, for which no rent is paid, or on land already in cultivation, if the produce obtained from both be precisely the same in quantity. See

[Chapter 2, paragraphs 8-11].

M. Say, in his note to the French translation of this work, has endeavoured to shew that there is not at any time land in cultivation which does not pay rent, and having satisfied himself on this point, he concludes that he has overturned all the conclusions which result from that doctrine. He infers, for example, that I am not correct in saying that taxes on corn, and other raw produce, by elevating their price, fall on the consumer, and do not fall on rent. He contends that such taxes must fall on rent. But before M. Say can establish the correctness of this inference, he must also shew that there is not any capital employed on the land for which no rent is paid (see the beginning of this note, and

[Chapter 2, paragraphs 1-2] and

[Chapter 2, paragraphs 14-15] of the present work); now this he has not attempted to do. In no part of his notes has he refuted, or even noticed that important doctrine. By his note to page 182 of the second volume of the French edition, he does not appear to be aware that it has even been advanced.

77.

Observations on the Corn Laws, p. 4.

78.

Upon shewing this passage to Mr. Malthus, at the time when these papers were going to press, he observed, "that in these two instances he had inadvertently used the term *real price*, instead of *cost of production*." It will be seen, from what I have already said, that to me it appears, that in these two instances he has used the term *real price* in its true and just acceptation, and that in the former case only it is incorrectly applied.

79.

[Chapter 1, paragraph 69].

80.

Manufactures, indeed, could not fall in any such proportion, because, under the circumstances supposed, there would be a new distribution of the precious metals among the different countries. Our cheap commodities

would be exported in exchange for corn and gold, till the accumulation of gold should lower its value, and raise the money price of commodities.

81.
The Grounds of an Opinion, &c. page 36.

82.
Mr. Malthus, in another part of the same work, supposes commodities to vary 25 or 20 per cent when corn varies 33 1/3.

83.
Of net produce and gross produce, M. Say speaks as follows: "The whole value produced is the gross produce; this value, after deducting from it the cost of production, is the net produce." Vol II. p. 491. There can then be no net produce, because the cost of production, according to M. Say, consists of rent, wages, and profits. In page 508, he says, "The value of a product, the value of a productive service, the value of the cost of production, are all then similar values, whenever things are left to their natural course." Take a whole from a whole, and nothing remains.

84.
Mr. M'Culloch, in an able publication, has very strongly contended for the justice of making the dividends on the national debt conform to the reduced value of corn. He is in favour of a free trade in corn, but he thinks it should be accompanied by a reduction of interest to the national creditor.

« FIRST

← 32 →

LAST »

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