



## Issues and opinions

Humans, robots and values<sup>☆</sup>Paul Cockshott<sup>\*</sup>, Karen Renaud

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## ABSTRACT

From the 1950s onwards the threat automation posed to human labour became a persistent theme in popular science fiction [26,1]. Authors explored what it meant to be human, by contrasting us with hypothetical robots. Such robots were generally seen as coming into existence centuries into the future. In the last decade the rate of progress in robotics has accelerated way beyond popular expectation. The timescales of Asimov and Dick look generous, whereas the dystopian near future of 'Player Piano' [71] seems grimly real. This anxiety is not limited to novelists. Even Stephen Hawkins told the BBC:

"The development of full artificial intelligence could spell the end of the human race." [11].

Robotics is made possible by advances in mechanical engineering but, above all, by informatics. In this essay we look at how ideas derived from informatics allow us a more precise view of what differentiates us from robots and, on the other hand, how information science can give us a deeper insight into the nature of human labour. Having gained this understanding, we can go on to examine what sort of threat robots really pose to us, as humans.

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## 1. Ideas of work and power

Marx famously made a distinction between labour and labour-power [43]. We will explain what he meant by this distinction.

Marx had a problem explaining the apparent dichotomy between these terms. On the one hand all market sales can be seen as fair and equal exchanges. On the other, the end result of these fair and equal exchanges was the production of something whereby one group of people became immensely wealthy at the expense of another group. How did this state of affairs result from a fair and equal exchange? One explanation could be that workers are cheated of the value of the labour: they are only paid part of the value of their labour because the market is rigged in such a way that they can never sell it for the full value.

Marx pondered how you could have a situation where it appears that the labourer is paid a fair price for his labour, which is the price, according to Ricardo [53], that is necessary to maintain and reproduce the labouring class, and at the same time there is profit and exploitation. And he, in effect, concludes: "Well, what is

actually happening is that people are not being paid for their work, they are actually being paid for their ability to work."

A self-employed craftsman who makes something and, sells it on the market, sells the product of his labour directly. Similarly with a roofer who comes and repairs your roof. They are paid directly for their actual work. If somebody is employed in a cotton mill to spin cotton, they don't sell the product of their labour; what they are selling is their *ability to labour*. The amount of labour that the employer can get out of a worker per day is a variable quantity. Its duration and intensity are variable. Characteristically of the time Marx was writing, working hours were extremely long, and had been progressively extended by the factory system. The intensity was, with mechanisation, tied to the speed at which the machinery in the mill operated. When the water was high in the river, the work was more intense:

*O, dear me, the mill is running fast  
And we poor shifters canna get  
nae rest  
Shifting bobbins coarse and fine  
They fairly make you work  
for your ten and nine*

*O, dear me, I wish this day were done*

*Running up and doon the Pass is nae fun  
Shiftin', piecin', spinning  
warp, weft and twine  
To feed and clothe ma bairnie  
offa ten and nine*

<sup>☆</sup> This is developed from an audio interview between one of the authors and Tom O'Brien for a podcast in his "From  $\alpha$  to  $\Omega$ " series.

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*The Jute Mill Song of the Dundee weavers, first recorded by Ewan MacColl, published by Mary Brooksbank [7].*

What was being sold was the *ability to do labour*. The amount of labour that the employer got out of that could be quite a lot more, according to the conditions of labour. This distinction between *labour* itself and *the ability to do labour* must have some origin. Society must have prepared us for this distinction. So, where did these concepts actually come from?

There is reason to believe that this distinction originated at the start of the industrial revolution when Watt was producing steam engines. Watt didn't actually invent the steam engine. He was set the task of repairing a model Newcomb Engine, when he was a technician at Glasgow University. These engines were used for pumping: they had no rotary motion, because they were purely pumping engines. Watt looked at this, and because he had been working along with Black on the nature of heat [9], he realised that, in fact, these Newcomb engines were very inefficient because they threw away heat. They repeatedly cooled the piston down by condensing the steam in the piston by spraying water into it, and therefore a lot of the heat was wasted. What Watt actually did was to invent the separate condenser, whereby the heat was removed from the steam in a separate vessel and he invented a series of automatic valves, which let the steam through from the piston into the condenser, or let steam into the other side of the piston, and this led to a great improvement in the efficiency of steam engines.

These steam engines were hired out by Watts' company, and he promised to hire them out for less than the saving in coal people would have made if they used a Newcomb Engine. In order to do that, he needed to have some way of measuring how much work these engines were doing and rating their power. Since the alternative to using an engine was to use horses, he became the first person systematically to study the amount of work a horse could do and thus introduce the concept of horsepower. In doing this he was the first person to make the distinction between the *ability to do work*, which was the power of the horse, and the *actual work*. For Watt, work was purely labour, pure effort: the effort of a horse or the effort of a person hauling up weights, physical exertion of effort. When you think of society in the late 18th century that is a very reasonable assessment of what work was, because most work entailed physical exertion of human muscle. That was primarily what people were being paid to do. Most of it was heavy, physical work.

In Adam Smith's writings this marrying of physical effort with labour is such that Smith can talk with ease about a farmer having his labouring servants and his labouring cattle, because they are both seen as doing the same thing.<sup>1</sup> What Watt promises people is power, the ability to do work with his machines. Matthew Boulton, his partner, proudly announced to George II: "*Your Majesty, I have at my disposal what the whole world demands; something which will uplift civilization more than ever by relieving man of undignified drudgery. I have steam power*". By this means he is going to transform the wealth of society. In a real sense he does this, because the power of his machines, within a few decades, are turning out more effort than all the muscle power of the human beings and horses in the kingdom. From that perspective he seems to have caught a key aspect of labour and of power, and that conceptualisation is still

very much present in the classical political economists.

Smith says that labour is the original currency by which we win things from nature<sup>2</sup> and he also talks of labour as something that both humans and animals do. Both are seen, in that society, as labour. He knows that animals aren't skilled and that there is a limit to the labour they can do — they can't participate in the division of labour, for example. Smith is also interested in why things are valuable, and he quickly disposes of the idea that it is because they are useful. He points out that there are lots of valuable things that aren't particularly useful. The only constant is that things which *are* valuable require a lot of work to produce. At that point in time, at the dawn of the industrial age, when most labour was physical, the distinction between the kinds of labour that Watt and Smith were researching at Glasgow University, was not clear. They were both dealing with work: Smith was dealing with how work could be made more efficient by sub-dividing and specialising labour, and Watt was looking at how work could be replaced by artificial sources of power.

What is striking in Smith's 'Wealth of Nations' is that he does not discuss the use of powered machinery. All his economic improvements come from the sub-division of labour so that people can complete their tasks more quickly. By doing the same task again and again, they become more skilled at it, their movements become more automatic, and they don't lose time switching between tasks, and thereby more is produced. This vision of production is still pre-industrial, because powered industry didn't exist at that point. One stand-out exception was the water mills, but, apart from the production of flour, mass production wasn't generally based on powered machinery.

Marx takes the labour theory of value over from Smith and he makes it more precise in some ways because Smith confuses how much labour you can purchase with how much labour is required to make something, and he treats these as much the same thing. In a pre-industrial society of handicrafts and farmers they *are* essentially the same thing. When a Scottish farmer puts his grain on sale and buys, in return, some produce from the blacksmith, the value of his corn can be expressed in terms of how much of other people's labour he could command with it. He was indirectly commanding the labour of other tradesmen.

So, the idea that value equals the amount of labour you can command has an intuitive appeal in a pre-capitalist, or only partially capitalist, society. Once capitalism becomes widespread it is not the same thing at all because wages only make up a part of the value of what is sold. Although something may require a certain amount of labour, the employer hasn't had to pay that much to his workers, so the item actually commands more labour than it requires to produce.

This distinction between labour *commanded* and labour *embodied* was pointed out by Ricardo, writing after the introduction of capitalist machinery in the late 19th Century [53]. These distinctions which were not apparent in the mid-18th century, started becoming apparent in the early 19th Century, and Marx bases his distinction on the one Ricardo makes. He tries to explain how it is still possible that everything sells for its value and yet exploitation still results. His explanation is based on the distinction between power and work done, which we are arguing that he essentially derives from Watt.

<sup>1</sup> "That part of the capital of the farmer which is employed in the instruments of agriculture is a fixed, that which is employed in the wages and maintenance of his labouring servants, is a circulating capital. He makes a profit of the one by keeping it in his own possession, and of the other by parting with it. The price or value of his labouring cattle is a fixed capital in the same manner as that of the instruments of husbandry. Their maintenance is a circulating capital in the same manner as that of the labouring servants" ([58] II.1.10).

<sup>2</sup> The annual labour of every nation is the fund which originally supplies it with all the necessities and conveniences of life which it annually consumes, and which consist always either in the immediate produce of that labour, or in what is purchased with that produce from other nations ([58]II.1).

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