

TECHNOLOGY: A Note

Labour saving devices in capitalist society

Before the emergence of commercial society during the course of the eighteenth century human technology developed very slowly indeed. Improvements were few and far between; typically they took a very long time to be dispersed within a given society and between different societies. This was not simply an unwillingness to try new things, it probably had much more to do with the anxiety associated with abandoning tried and tested methods for something that might not work, and might simply prove to be a costly mistake, in societies that lived on or near the margin of existence. Consequently, the margin of error was very narrow indeed, a single failed harvest, an outbreak of disease in crops or livestock, or some other occasional misfortune might often result in famine and a large number of deaths. Conservatism in working methods and technique was most likely the result of this vulnerability.

Agricultural techniques and animal husbandry remained unchanged for centuries together. Craft skills employed in manufacture were often closely guarded secrets among groups of artisans who spent many years acquiring the arcane knowledge associated with their trade. This was because in the absence of patent and copyright protection it was necessary for artisans to restrict knowledge of their working methods and techniques in order to preserve their share of whatever trade they were engaged in. This also, of course, would have had the effect of restricting the scope of any improvements and innovations that were attempted; open discussion of working practices or advantageous innovations would be discouraged beyond the confines of an individual workshop, guild or town.

There were, of course, throughout history striking technical innovations and achievements, particularly in metallurgy, ceramics, in buildings and architecture, ship construction, horse bridles, and in ploughs, cloth manufacture, in dyeing, in tanning, in the manufacture of weapons, other tools and implements, in articles made from glass. Indeed, the inventions like the water and windmill, more efficient pumps, the wine press, and by the fourteenth century, clockwork, and by the late fifteenth century, the printing press, all foreshadowed later developments.

However, before the advent of capitalist society the only motive power was human muscle, wind, water, and draught animals like bullocks and horses. Machines like spinning wheels or looms were operated by hand, and relatively inefficient.¹ Apart from grain ground into flour in a water or windmill all manufactured articles were fashioned by hand in long, often laborious, processes which required many years of specialised training.

Consequently, clothes, shoes, hats, bedding, utensils, nails, chains, rope, pins, wooden boards for floors or furniture, tiles, bricks, ironwork, quarried stone, almost anything you can think of, was immensely costly. Everything was the product of hard physical labour, whether laundering linen, scrubbing floors, harvesting root vegetables, or sowing crops. Every productive task or activity inevitably consumed large amounts of human labour and energy.

Despite this laborious reality, until the development of capitalist relations of production the need for the invention of labour saving devices was not urgently felt. In circumstances where most labour was servile in the form of slavery or serfdom, or in freer conditions where the labourers' relationship to their landlord or employer was simply held together by bonds of custom and practice, hiring was not by the minute, by the hour, or even by the day. Agricultural labourers, stockmen and shepherds, ploughmen, dairymaids, and the like, might be hired annually or by the half year. Skilled artisans might be apprenticed for many years at a time. People's productive activities were also often inseparable from their family and domestic arrangements as servants or as independent householders. In any event the value of their work was not calculated in minutes or by the hour.

These time-honoured relationships between master and man, between the mistress and her servants and workpeople, gradually fell away or into disuse as more commercial relations of production took hold. This is because as trade and commerce came to dominate production entirely – the

¹ One need only think of the ingenious devices operated by hand or foot perfected during the 1840s, like the mechanical sewing machine, to acknowledge the extraordinary advances made possible by capitalist development.

profits realised from the trading of commodities became the dominant motive for producing anything – the efficiency of the labourer, and the price of his or her labour, became a critical factor in the intensely competitive relationships that were beginning to emerge. Labour itself began to become a commodity as the manner in which employers began to estimate or calculate a price for each element of labour purchased. Wages began to be calculated by the day and then by the hour.

In these circumstances developing practices and procedures and devices, which would reduce the outlay on wages, reduce the amount of costly and costed labour involved in the manufacture of any particular product, gradually became the abiding concern of all landlords, manufacturers and mine owners.

Improvement (what we would now call “efficiency”), in relation to land use and production techniques developed as a key conceptual element in circumstances in which competitive market relations began to emerge. The struggle to make every acre of land productive, to watch keenly that every hour of paid work was performed in full, and in the most effective manner, resulted in much closer calculation in estate management, and in much greater surveillance in the workshop and manufactory. Attention to detail in the use of all resources, particularly that of human labour gradually came to dominate the production process.

As you may imagine these developments spontaneously produced a great interest in labour saving devices, procedures and techniques. Innovations, which would reduce labour costs, by increasing the productivity of each hour paid for, became matters of great concern to employers. Of course, such innovations involved much trial and error and were intrinsically costly but through the course of the eighteenth century, principally in England, large scale improvements in agriculture, mining, metallurgy and in the organisation of manufacturing, generated sufficient wealth for both colonial expansion and exploitation and for the development of a host of labour saving devices, particularly greatly improved looms, spinning wheels, artificial waterways, and steam engines for pumps and for driving looms and other devices.

Consequently, by the closing decades of the eighteenth century the first revolution in industrial technologies was underway, steam power spread rapidly to many branches of manufacture,

thence to transport, and finally to agriculture. The productivity of human labour was vastly increased by the growing sophistication of machines and by perpetual revolutions in technique. Competition compelled incessant improvement, incessant invention, and an incessant drive to reduce the cost of labour stored within each product.

The sewing machine perfected during the 1840s in America is perhaps one of the most startling devices in this respect. Imagine neatly sewing by hand a hem on a yard of cloth. Then imagine doing the same job with a Singer sewing machine. Inventions like this, when combined with cloth woven rapidly and efficiently on power looms, resulted in huge falls in the price of clothes and footwear. Savings of this sort have continued to characterise capitalist development ever since.

Not many years ago, for example, during in the last quarter of the twentieth century, the determination of discounts available to a company's clients, might take a room full of clerks endlessly working through thousands of invoices making hundreds of thousands, perhaps even millions of separate calculations with cumbersome mechanical calculators. Now, one formula, in one Excel spreadsheet, does the job automatically, leading to astronomical gains in the productivity of labour. Labour saving on this scale has been occurring in more or less all sectors of production across the entire economy.

These kinds of developments are unparalleled in human history. Before the emergence of entire societies dominated by the production of goods specifically for exchange upon regional, national, and world markets, and a labour force typically paid wages in money at a price calculated by the hour, technical improvement was episodic and slow.

The deluge of innovation and the seemingly unceasing revolution in productive techniques, methods, and organisation, are not the product of increased intelligence. We have no reason to suppose that people were not as smart or as capable before the emergence of capitalism. However, the rise of commercial society, by introducing a mode of economic life founded on ceaseless competition, created the kind of social relations that cannot function without perpetual material growth and perpetual innovation.