2016-07-25 From the preparatory notes for Class 14 of the introductory course on political economy: 'The evolution of property and how it rules the world'.

By way of recap:

The class divided into 3 groups. Each group was provided with one question (with a short explanatory introduction), arising from paras 43-54 of *The German Ideology* extracts. The groups spent about 30 minutes working out the answers to their respective questions. We then gathered together again to hear the questions and the answers from the groups. *Here are the questions:*

Group 1: Why the guild system began to break down

We read last week that 'handicraft' production (work with one's hands) particularly the weaving of wool, was done by peasants in the European countryside. Much of the production of goods in the towns and their trade was controlled through the guild system. As the guild system began to break down many serfs found themselves dispossessed of their land, having to become small producers of a 'non-guild type' in the countryside or alternatively, vagabonds. Considering this:

Why might a feudal landlord decide to stop demanding rent in goods or service through unpaid labour and start demanding payment in money?

Group 2: The rise of 'manufactures' and changes in the character of labour

We have read about changes that took place in the working population of Europe as the feudal system declined. We saw that a powerful merchant class began to emerge and production began to be organised in new ways:

What effect did the new organisation of 'manufactures' have on worker-employer relations as compared with the guilds? Did this improve conditions for workers?

Group 3: Merchants, money and exchange

Considering what Marx and Engels tell us in paragraphs 43 to 54 in The German Ideology:

What role did the sea trade, the emergence of colonisation and the slave trade have on local production in Europe?

<u>After the break:</u>

We continued the general discussion of themes and concepts from paras 43-54 of the extracts from *The German Ideology*, as follows:

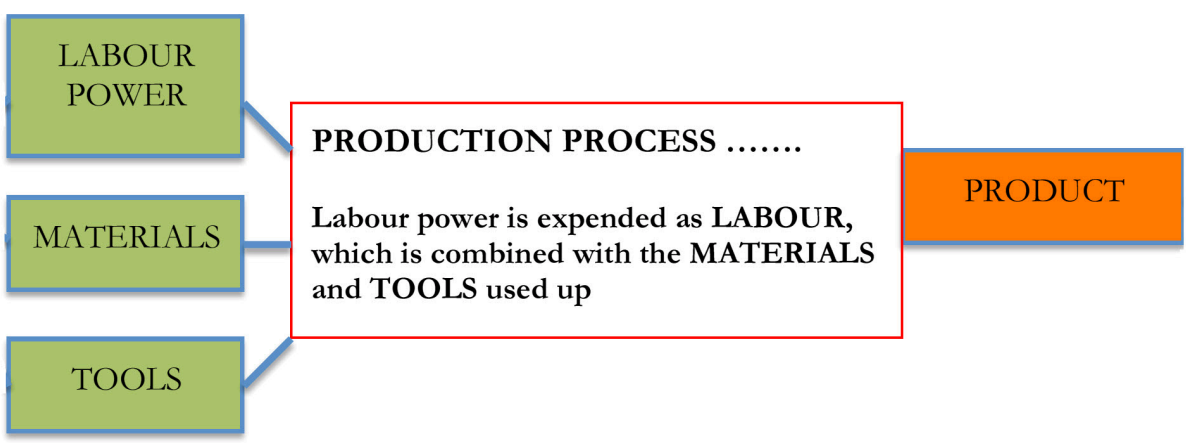
Here is a summary table of topics (which will take several classes to complete). The topics are combined in the table here to show where we are going.

Last time we talked about **'natural capital'** and what it means, and we raised the question whether it is correct to work with a concept of **'capital'** before the emergence of '**capitalism**'. We'll return to that subject after we've dealt with some other themes and concepts. Here is an outline of where we are going in that regard:

Paras 43, 44	**'Manufactures'** — meaning of the term when used by Marx and Engels; — the concepts of '**handicraft**', '**manufacture**', '**machinofacture**', and (additionally today) what we might call 'computer-facture' or '**robofacture**'.
Paras 43, 47 **Paras 44, 45**	**'Division of labour'** — meaning of the term — division between various towns; then e.g. weaving 'splitting up into countless branches'. Development of the division of labour and the further progress of mechanisation depends on **scale of the market**. Division between operations and division between enterprises. **Adam Smith; Allyn Young** - the **technical implications** of the development of the division of labour and the expansion of the market. Later: Discuss also the **social implications** of the development of the division of labour and generalised exchange. **Marx**... **Durkheim**...

Paras 43, 44 **Para 52**	The rise of manufacturing presupposed **concentrations of population** (especially in **towns**) and the **expansion of trade beyond the local population.** **Increased competition between nations:** in the next part of the extracts from *The German Ideology*, Marx and Engels deal with **colonisation** in this context. (We shall leave the discussion of this until paras 55-74 have been read.)
Paras 45, 48 **Para 53**	Return to the discussion of **'capital'** and what it means. 'Natural capital' having provided the initial basis, there is a development in **property relations** from immovable to movable property — linked to the declining power of the landlords and the rising power of the urban bourgeoisie. Simultaneously, a transition from patriarchal relations to monetary relations between employer and worker.
Para 54	Impetus from **gold and silver** (Spanish conquest of central and south America), and sea-trade with East Indies. **MONEY**, its origins, meaning and effects.

Here is a simple diagram of production:



This applies to all the successive stages in the development of the productive forces.

The change from 'handicraft' to 'manufacture'. What does **'handicraft'** mean?

In the case of guild handicrafts, says Rubin, 'each master owned the simple tools and instruments necessary for his trade, and worked personally in his own shop with the help of a small number of assistants and apprentices.'[1] From the technical point of view, **simple tools and instruments, powered by hand**, were the characteristic features of handicraft production.

Today we refer to industrial production generally as 'manufacture'. (It is distinct from 'mining' in that it involves working up materials which have already been extracted from the earth, in order to produce products.) When Marx and Engels refer to **'manufacture'**, however, they are speaking more narrowly of a stage in which the production of goods was still mainly carried on **manually**. (In Latin, *manus* means 'hand'.)

Tim Ingold explains:[2]

> By 'manufacture' Marx is referring to the largely pre-industrial phase of capitalist production, stretching roughly from the middle of the sixteenth century to the end of the eighteenth. The characteristic feature of such manufacture was the assembly, within a single workshop, of a large number of highly specialised, skilled artisans performing complementary tasks within a rigidly prescribed division of labour. These artisans, however, did not co-operate of their own accord, for their association was a result not of relations among themselves but of each having contracted to the same employer who commanded the sum total of their labour-power. ...

In *Capital*, Marx wrote this about the change from handicraft production to 'manufacture':

> [M]anufacture can hardly be distinguished, in its earliest stages, from the handicraft trades of the guilds, except by the greater number of workers simultaneously employed by the same individual capital. It is merely an enlargement of the workshop of the master craftsman of the guilds. At first, then, the difference is purely quantitative. ...[3]

Manufacture, he says, originates in two ways:[4]

> **1. By the assembling together in one workshop, under the control of a single capitalist, of workers belonging to various independent handicrafts, through whose hands a given article must pass on its way to completion**. A carriage, for example, was formerly the product of a great number of independent craftsmen, such as

[1] Rubin's chapter on 'The Age of Merchant Capitalism', distributed previously. See pp. 1-2.

[2] Ingold, Tim. *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill*. Routledge, 2000. P. 309.

[3] *Capital*, vol 1. Penguin ed., 1976. P. 439.

[4] Pp 455-458.

> wheelwrights, harness-makers, tailors, locksmiths, upholsterers, turners, fringe-makers, glaziers, painters, polishers, gilders, etc. In the manufacture of carriages, however, all these different craftsmen are assembled in one building where the unfinished product passes from hand to hand. ... At first, the manufacture of carriages appeared as a combination of various independent handicrafts. But it gradually began to signify the splitting-up of carriage production into its various detailed operations, and each single operation crystallized into the exclusive function of a particular worker, the manufacture as a whole being performed by these partial workers in conjunction. In the same way, cloth manufacture, as also a whole series of other manufactures, arose from combining together different handicrafts under the command of a single capitalist.
>
> **2. Manufacture can also arise in exactly the opposite way. One capitalist simultaneously employs in one workshop a number of craftsmen who all do the same work, or the same kind of work, such as making paper, type or needles**. This is co-operation in its simplest form. Each of these craftsmen (with the help, perhaps, of one or two apprentices) makes the entire commodity, and he consequently performs in succession all the operations necessary to produce it; He still works in his old handicraft-like way. But very soon external circumstances cause a different use to be made of the concentration of the workers on one spot and the simultaneousness of their work. An increased quantity of the article has perhaps to be delivered within a given time. The work is therefore divided up. Instead of each man being allowed to perform all the various operations in succession, these operations are changed into disconnected, isolated ones, carried on side by side; each is assigned to a different craftsman, and the whole of them together are performed simultaneously by the co-operators. This accidental division is repeated, develops advantages of its own and gradually ossifies into a systematic division of labour.

And further:[5]

> Since the product of each specialized worker is, at the same time, only a particular stage in the development of a finished article which is the same in each case, each worker, or group of workers, prepares the raw material for another worker or group of workers. The result of the labour of the one is the starting-point for the labour of the other. One worker therefore directly sets the other to work. The labour-time necessary to attain the desired effect in each partial process is learnt by experience, and the mechanism of manufacture, taken as a whole, is based on the assumption that a given result will be obtained in a given time. It is only on this assumption that the various supplementary labour processes can proceed uninterruptedly, simultaneously, and side by side. It is clear that the direct mutual interdependence of the different pieces of work, and therefore of the workers,

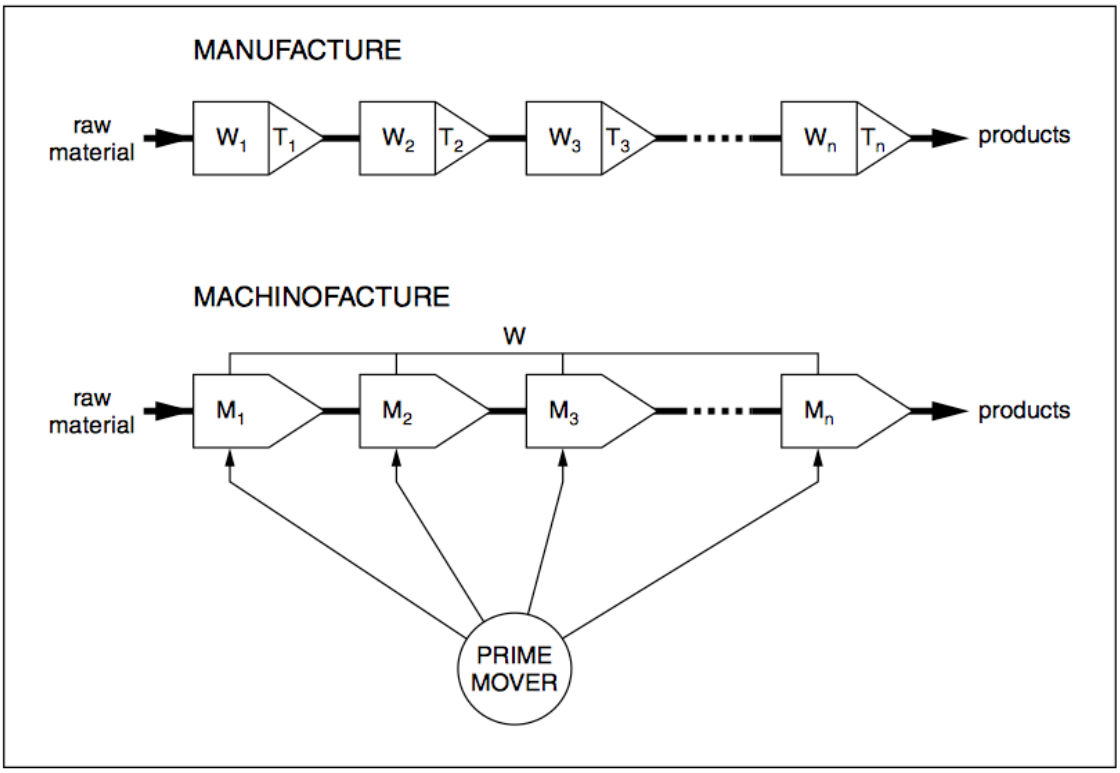
The next stage, in which machinery enters the picture in a decisive way, Marx and Engels call

[5] Pp 464-465.

'machinofacture'. 'Machinofacture' then provides the basis for the rise of 'large-scale industry'.

In **'machinofacture'**, the machinery is driven by steam, electrical and other forms of motive power and the worker increasingly becomes an appendage of the machines. Nevertheless, the machines operates under human direction, and large quantities of labour remain a major ingredient in the production process.

Ingold has provided this diagram to illustrate the difference between 'manufacture' and 'machinofacture':



Later still — and this is occurring now — there is a development from 'machinofacture' to a production process increasingly carried out by robots, i.e. machines that are told what to do by computer programs, without the intervention (or only a minimal intervention) by human beings. This could be called 'computer-facture' or, better still, 'robofacture'.

PowerPoint slides: Assembly line.pptx

(continued on next page)

Machinery and automation —

the production of motor vehicles provides a good illustration of how this has developed over the past hundred years

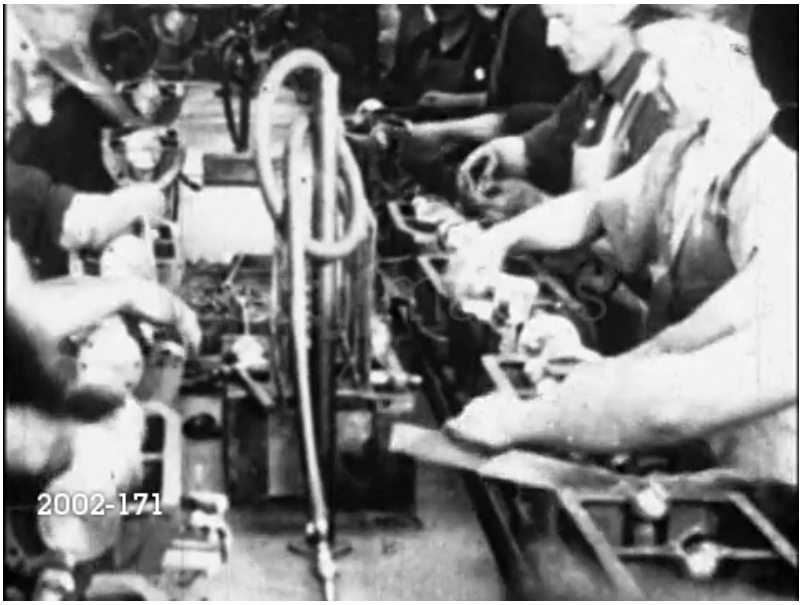
1910 — in a Ford factory, workers are sanding wheel spokes by hand

2

Video clip

Video clip

In the same factory, 1910



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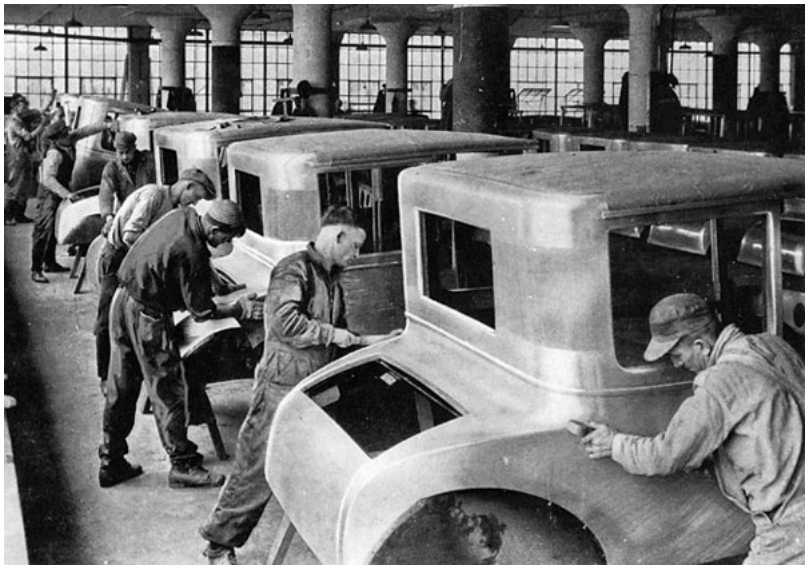


Undated — probably the same period

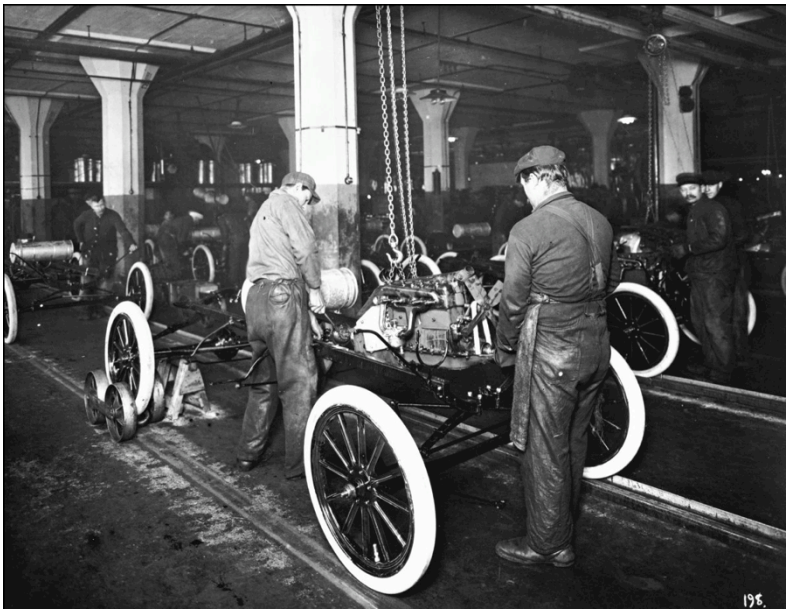
4

Part of the Ford assembly line

1913

5

Ford introduces the first moving assembly line in 1913



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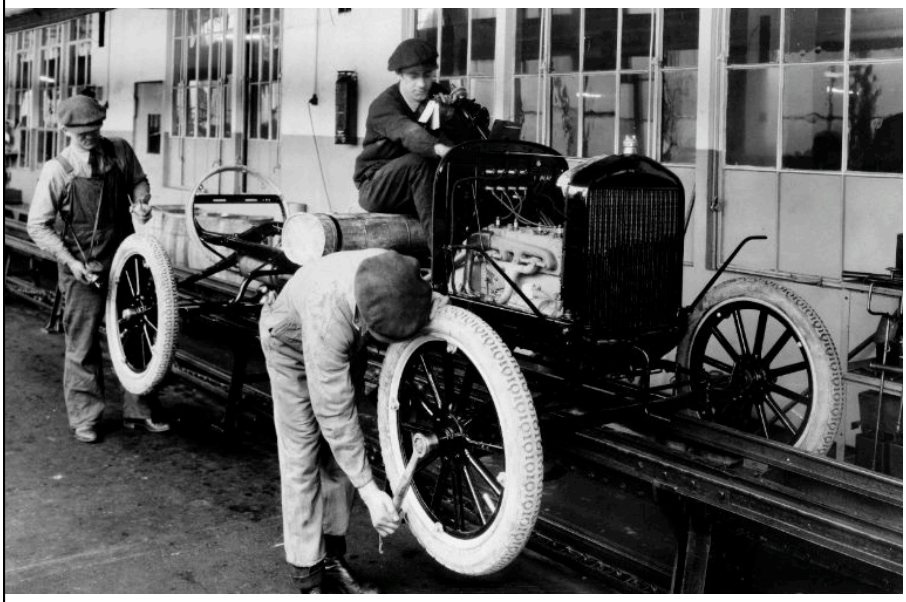
1924 — the 10 millionth Model-T Ford



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Charlie Chaplin — scene from 'Modern Times' 1936

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Video clip

Tucker engine assembly

1940s

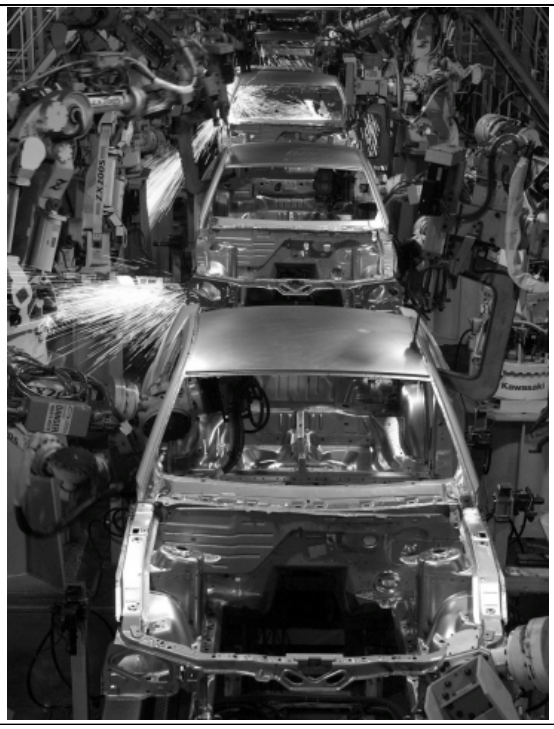
9

General Motors Pontiac chassis assembly line, 1961

10

On to the age of robotics — machinery run by computers…

11



2004

Robots welding Ford Mustangs

12

2008

Automation in Ford Fiesta plant, Germany

13

Some parts of the production process still require the skill and judgment of human beings, but increasingly even these functions are also being automated.

14

Video clip

Hyundai factory in Russia, 2015

15

In a General Motors plant 2016

16

Video clip

Mercedes-Benz C-class factory, East London, South Africa

17

Mercedes-Benz C-class factory, East London, South Africa

18

Mercedes-Benz C-class factory, East London, South Africa

19

This factory is producing plastic parts for motor vehicles. How many workers do you see?

20

Video clip

'Computer-facture' or '<u>robofacture</u>'

The computer revolution had its origins during the Second World War (1939-1945), notably in making the billions of calculations needed to crack coded messages in a short time. Initially computers were massive things, consuming vast amounts of electricity and generating vast amounts of heat. The post-War missile and space race between the USA and the Soviet Union carried computerisation forward. The challenge was to increase computing power while reducing size and energy consumption. Hand-held calculators appeared in the early 1970s. Compact computers began to arrive on corporate desktops in the mid to late 1970s, and the first Apple computers, using microprocessors and designed for hobbyists, were sold in the late 1970s. However, it was only in the early 1980s that the first mass-produced personal computers appear. Along with this, computer-based automation of production began to make significant strides. As we have seen, today robots carry out a range of complex industrial operations with hardly any workers in attendance, and are moving increasingly into service and professional spheres.

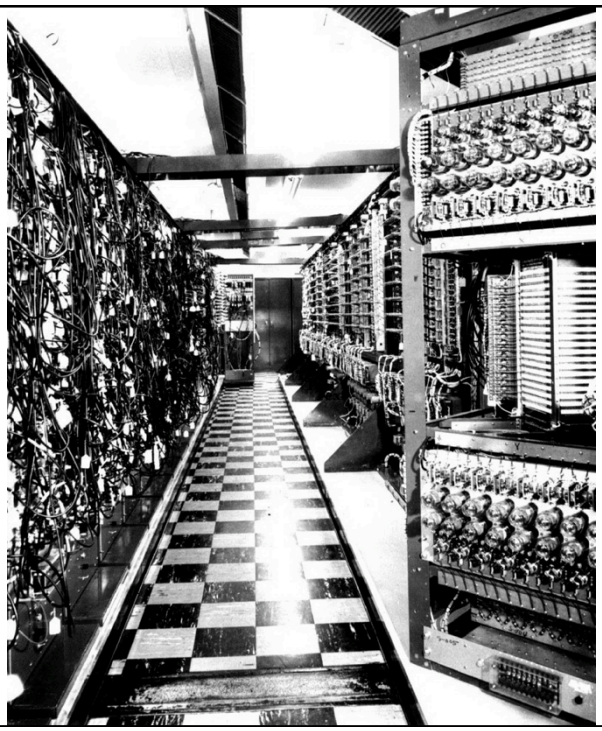
PowerPoint slides: Computers.pptx

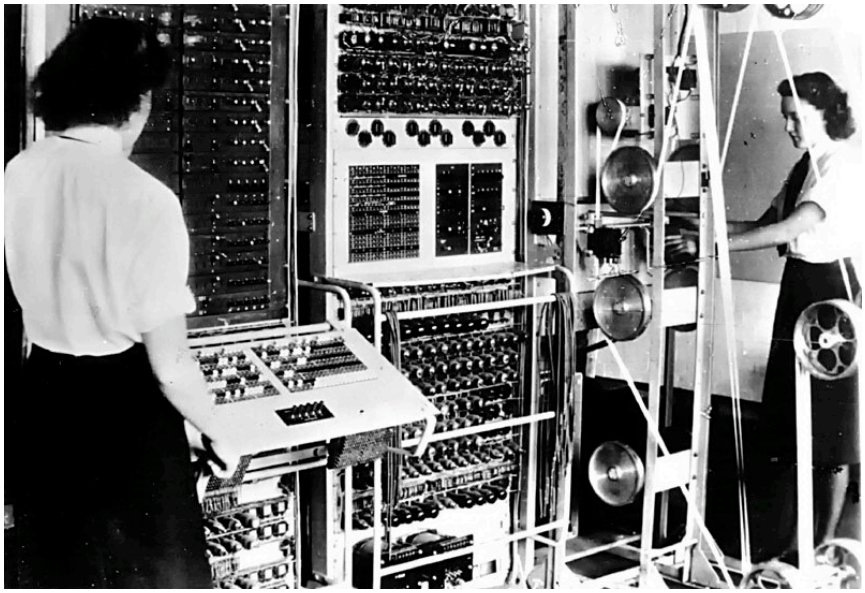
(see next page for details)

We'll be showing a documentary film illustrating modern computerised milk production on a large scale, with very little human labour, in the next session.

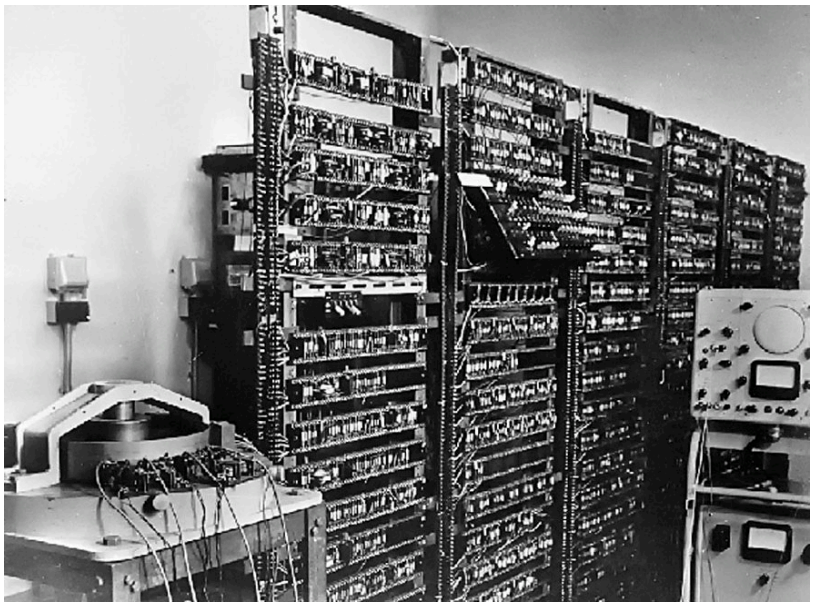
1943

Computer built at MIT to run a flight simulator to train bomber crews

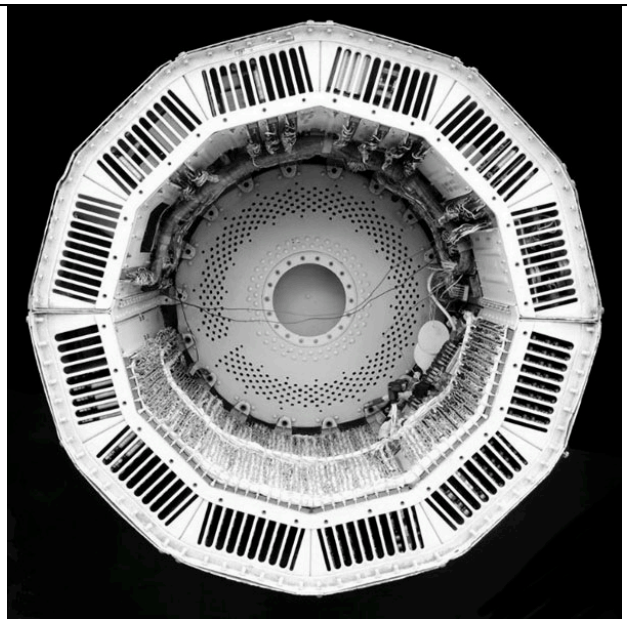




1944 The computer at Bletchley Park, England, for decoding German military messages



1953 Computer at Manchester University, using transistors instead of valves



1961 U.S. Minuteman missile on-board guidance computer

1973 The Wang word-processor and computer using a cassette tape for data storage

1977 The Apple II, which needed a colour TV set to display

1981

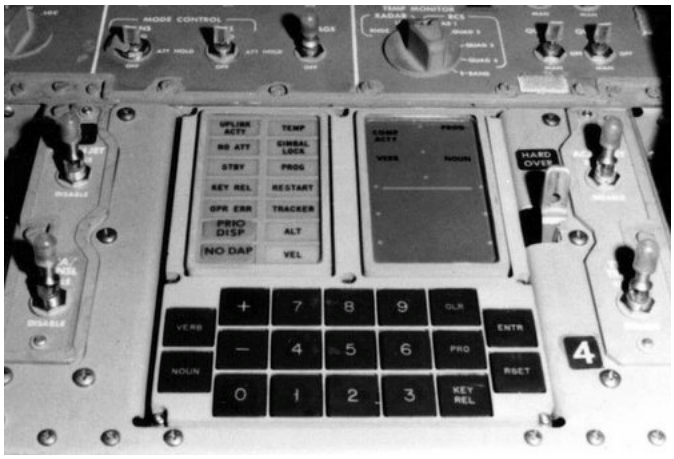
IBM PC

Osborne portable PC

And so on… to the electronic marvels of the present day.

The Apollo 11 spacecraft that achieved the first moon landing in 1969 had a computerised guidance system that represented a big step forward in computing power, with about 2,800 integrated circuits ('microchips').

But compare it (say) with the iPhone 4S (now already out of date).



Apollo's guidance system had a processor speed of 1 MHz. The phone's processor speed is 800 MHz.

It had 4 KB of memory, versus the phone's 16, 32 or 64 GB.

It weighed 32 kg (32,000 grams), versus the phone's 140 grams.

It used 55 watts of power, versus the phone's 1.5 watts.