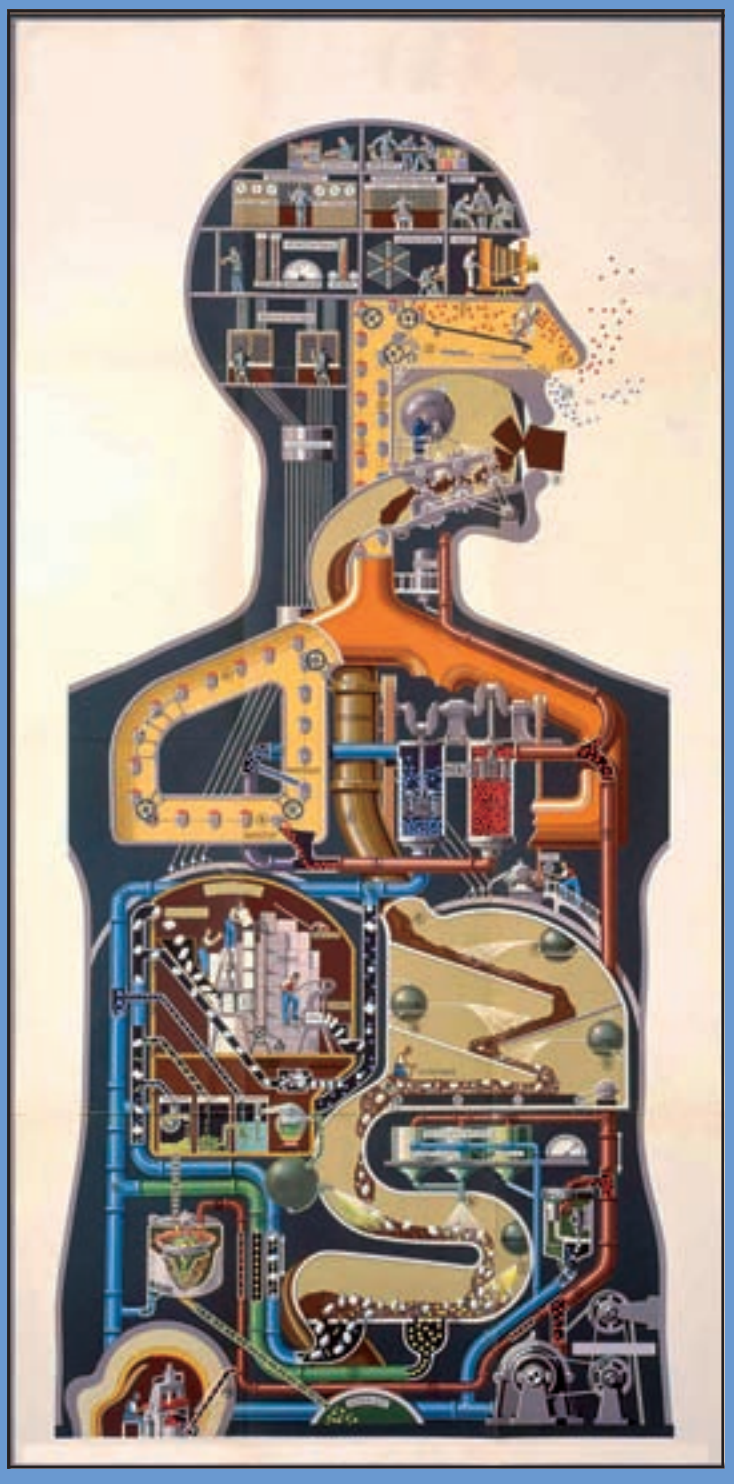
MAN AND MACHINE



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These texts examine the relationship between human beings and machines.
They explore how machines can be both a pleasure and a burden to our existence.

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This web page is taken from a science museum website and explores the relationship between humans and robots.

http://www.robots.org.uk Go

Robots rule...

Search

What is a robot?

To qualify as a robot, a machine has to be able to do two things:

- get information from its surroundings
- do something physical, such as move or manipulate objects.

robotics at work in a chemical factory

Where does the word come from?

The word 'robot' comes from the Czech word robota, meaning drudgery or labour.

If you think robots are mainly the stuff of sci-fi movies, think again. Right now, all over the world, robots are on the move. They're painting cars at Ford plants, assembling toys for Mattel, walking into live volcanoes, driving trains in Paris, and operating as surveillance networks for businesses. As they grow tougher, nimbler, and smarter, today's robots are doing more and more things we can't – or don't want to – do.

The concept of robotics became popular through fictional stories in the 1940s, but the idea of using robotic creations to do our bidding is much, much older. The ancient Greek poet Homer described maidens of gold, metallic helpers for the Greek gods. The golems of medieval Jewish legend were robot-like servants made of clay, brought to life by a spoken charm. Leonardo da Vinci drew plans for a mechanical man as early as 1495.

But real robots wouldn't become possible until the 1950s and 60s, with the invention of transistors and integrated circuits. Compact, reliable electronics and a growing computer industry added brains to the brawn of already existing machines. In 1959, researchers demonstrated the possibility of robotic manufacturing when they unveiled a computer-controlled milling machine.

the golems of medieval Jewish legend

a model of Leonardo da Vinci's mechanical man

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Public fascination with robotics peaked in the early 1980s, boosted in part by movies like *Star Wars*, which featured robots C3-PO and R2-D2 as helpful sidekicks to their human masters. But interest sagged in a few short years as people discovered that getting robots to do things that we think of as easy – like moving across a cluttered room – is surprisingly difficult.

Today, robots are enjoying a revival. A Dream Robot (DR), which is aimed at the entertainment market, is currently being developed. The DR can sing, dance, and recognise faces and voices, which scientists hope will create a spark between the robot and its owners. Researchers are also working on ways to help robots move and 'think' more efficiently. Although most robots in use today are designed for specific tasks, the goal is to make universal robots, which are flexible enough to do just about anything a human does – and more.

The ultimate challenge would be a hospital made up of robot doctors. This would drive development in just about every area of robotics, from the ability to perform intricate tasks to communicating and demonstrating teamwork. But until then the question is, if robots are ever made smart enough to do our work will they also be smart enough to refuse to do it for us? Could we suddenly have a robotic-rebellion on our hands?

robot and human play chess

R2-D2 and C3-PO

Robot wars!

In a 1920s play called *Rossum's Universal Robots*, robots are invented to help people by performing simple, repetitive tasks. However, the mechanical servants turn against humans and take over the world. [read more…]

Robotic arm for surgeons

A robotic arm able to carry out an intricate life-saving heart operation is being pioneered by UK surgeons. In the future, the system could be controlled by a doctor through images on a computer screen. [read more…]

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In this poem Cynddylan has just got a new tractor. The poem was written in 1950 and at this time modern machinery was still too expensive for most farmers in rural Wales.

The Tractor

Ah, you should see Cynddylan on a tractor.
Gone the old look that yoked him to the soil,
He's a new man now, part of the machine,
His nerves of metal and his blood oil.
The clutch curses, but the gears obey
His least bidding, and lo, he's away
Out of the farmyard, scattering hens.
Riding to work now as a great man should,
He is the knight at arms breaking the fields'
Mirror of silence, emptying the wood
Of foxes and squirrels and bright jays.
The sun comes over the tall trees
Kindling all the hedges, but not for him
Who runs his engine on a different fuel.
And all the birds are singing, bills wide in vain,
As Cynddylan passes proudly up the lane.

R S Thomas

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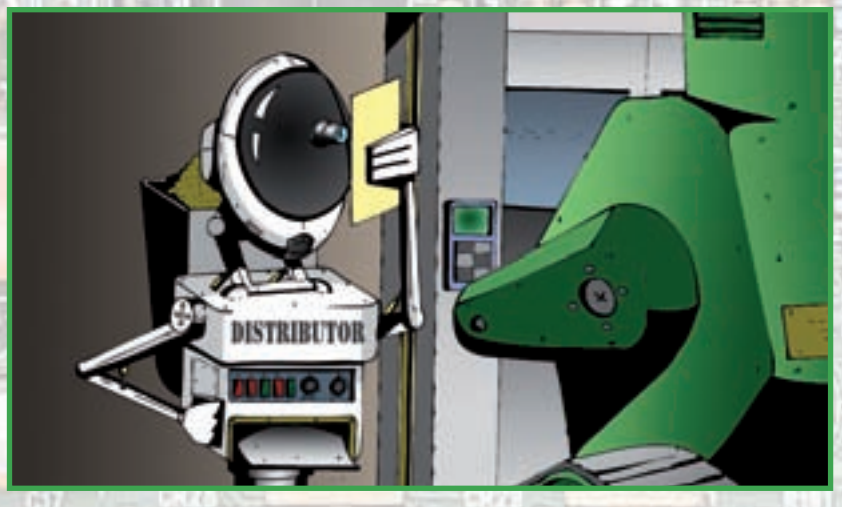
In this extract from a science fiction story, machines become confused when they stop receiving instructions from their human masters.

Who can replace a man?

By Brian Aldiss

Morning filtered into the sky, lending it the grey tone of the ground below. The field-minder finished turning the top-soil of a three-thousand-acre field. When it had turned the last furrow, it climbed onto the highway and looked back at its work. It went slowly down the road, taking its time. No other machines passed on its way back to the Agricultural Station.

In the station yard it saw several other machines that it recognized; most of them should have been out about their tasks by now. Instead, some were inactive and some careered round the yard in a strange fashion, shouting or hooting. Steering carefully past them, the field-minder moved over to Warehouse Three and spoke to the seed-distributor, which stood idly outside.
'I have a requirement for seed potatoes,' it said to the distributor, and with a quick internal motion punched out an order card specifying quantity, and several other details. It ejected the card and handed it to the distributor. The distributor held the card close to its eye and then said, 'The requirement is in order, but the store is not yet unlocked. The required seed potatoes are in the store. Therefore I cannot produce the requirement.'



Increasingly of late there had been breakdowns in the complex system of machine labour, but this particular hitch had not occurred before. The field-minder thought, then it said, 'Why is the store not yet unlocked?'
'Because Supply Operative Type P has not come in this morning. Supply Operative P is the unlocker.'
'What class brain do you have, seed-distributor?' it asked.
'I have a Class Five brain.'
'I have a Class Three brain. Therefore I am superior to you. Therefore I will go and see why the unlocker has not come this morning.'

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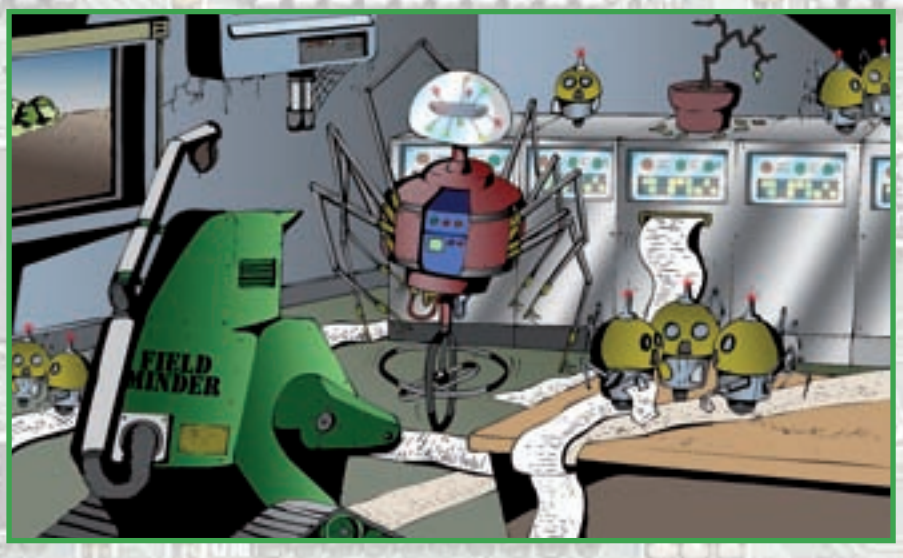
The field-minder pushed through the sliding doors into the echoing confines of the station itself. Most of the machines here were clerical, and consequently small. They stood about in little groups, eyeing each other, not conversing. The unlocker was easy to find: it had fifty arms, most of them with more than one finger, each tipped by a key; it looked like a pin-cushion stuck with hat pins. The field-minder approached it.

'I can do no more work until Warehouse Three is unlocked,' it told the unlocker. 'Your duty is to unlock the warehouse every morning. Why have you not unlocked the warehouse this morning?'

'I had no orders this morning,' replied the unlocker. 'I have to have orders every morning. When I have orders I unlock the warehouse.'



'None of us have had any orders this morning,' a pen-propeller said, skittering towards them. It was no bigger than a toaster, and had ten retractable arms.

'Why have you had no orders this morning?' asked the field-minder.

'Because the radio issued none,' said the unlocker, slowly rotating a dozen of its arms.

'Because the radio station in the city was issued with no orders this morning,' said the pen-propeller.

'You have a Class Three brain; I have a Class Three brain,' the field-minder said to the pen-propeller. 'We will speak to each other. This lack of orders is unprecedented. Have you further information on it?'

'Yesterday orders came from the city. Today no orders have come. Yet the radio has not broken down. Therefore *they* have broken down …' said the little pen-propeller.

'The *men* have broken down?' asked the unlocker.

'That is a logical deduction,' said the field-minder.

'That is the logical deduction,' said the pen-propeller. 'For if a machine had broken down, it would have been quickly replaced. But who can replace a man?'

'If all men have broken down, then we have replaced man,' said the field-minder.

He and the pen-propeller eyed one another thoughtfully.

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Acknowledgements
'Robots rule...' adapted from *The history and workings of robotics*, by Pearl Tesler
http://www.thetech.org/robotics/universal/index.html
'The Tractor' by R S Thomas, 1950
'Who can replace a man?' adapted from *Who can replace a man?* by Brian Aldiss, 1958

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