

INFORMATION PIONEERS: EPISODE TWO

ALAN TURING

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ARCHIVE FOOTAGE begins over:

ADVOCATE (V.O.)

In 1936 events unfolded in Europe that would shape the 20th century: Civil war broke out in Spain; the Nazis retook the Rhineland; Mussolini marched into Abyssinia. And that same year a quiet young mathematician completed a new theory in his rooms at Cambridge University.

In the STUDIO:

ADVOCATE

While the world changed around him, with little fanfare Alan Turing, just 24 years old, dreamt up a machine that could be taught to think. This idea was going to change the course of history too.

Turing's invention was originally described in his academic paper as an imaginary machine to crunch imaginary equations.

ANIMATION illustrates:

ADVOCATE (V.O.)

The machine read symbols printed on a tape.

We see running, like cloth under the head of a sewing machine: [A blue circle] [A yellow circle]

ADVOCATE (V.O.)

Each of those symbols made the machine carry out a particular function.

We see: [A blank] [Print green circle]

ADVOCATE (V.O.)

The order of the symbols was in fact a program. The machine understood this program by referring to an internal table setting out what the function of each symbol was.

We see: [One oval] [One oval] [One oval] [One oval]

ADVOCATE (V.O.)

No tea breaks, no pens running out, no human errors.

(MORE)

Slowly but surely the machine could do
incredibly complicated calculations -
with an infinitely long tape to work
on. And endless time to do them in.

We see: [One large circle] Machines retracts and erases
everything.

ADVOCATE (V.O.)

It then produced the result as a new
set of symbols.

We see: Machine now prints one complete flower made up
of a large circle surrounded by four oval petals.

ADVOCATE (V.O.)

Alan Turing's search for a thinking
machine began when he realised that
those symbols in his machine did not
just have to be seen as numbers. They
could in fact mean anything at all.

Very different tasks - singing a song,
writing a poem, building a database,
planning a chess move...

We see: Machine symbols converted into musical notes,
complex algebraic equations, lyrics. Every kind of
language imaginable transformed into symbols and driven
into one single big machine.

ADVOCATE (V.O.)

...problem solving, ideas, emotions
perhaps - anything that could be
converted and written down in symbols
could be carried out!

And not by different machines. ALL of
them achieved within this same
machine. A universal machine.

In the STUDIO:

ADVOCATE

An electronic brain! A computer.

Turing's academic paper had thrown
down the gauntlet. But that's where it
remained. On paper.

ARCHIVE FOOTAGE illustrates:

ADVOCATE (V.O.)

World War Two arrived and Turing was
recruited to help build machines to
crack German codes.

(MORE)

These were complex creations, with Turing's mathematical and engineering intelligence in their DNA. But they still had just one specific task. Once that was achieved, the war de-coders were obsolete.

In the STUDIO:

ADVOCATE

And all the time, while working for an Allied victory, Turing dreamt of his universal machine.

After the war, as Turing, and others, began to physically try and build the kind of computer he had imagined, he became a pioneer of what we now know as Artificial Intelligence.

ARCHIVE FOOTAGE illustrates:

ADVOCATE (V.O.)

Because Turing had come to see great potential for his thinking machines. And in the dangerous, hypocritical, chaotic world around him, a more logical and reliable intelligence must have seemed like something worth working for.

He was convinced these computers would be able to take on tasks we could not achieve ourselves and make life better. Turing described them as children. In fact in Manchester, the world's first stored-program computer, inspired by Turing's ideas, was nicknamed... 'Baby'.

But Turing wasn't thinking of the humanoid robots of science fiction that people feared would take over the world... Computers to him were like humans because they too, as with children, could learn from us - their instructors.

After all when we're born aren't our own brains just unorganised machines - that become organised through rigorous training and experience?

Turing thought so. And so we should try and create computers that weren't like adults, but learnt like children.

In the STUDIO:

ADVOCATE (CONT'D)

Could you say a machine had intelligence? Yes said Turing. A child, when given knowledge by a teacher, is not told that knowledge doesn't belong to them.

Against a lot of confusion and paranoia, Turing tried to make people realise that it was up to us to become better teachers... And so set this new technology free.

Replicating the brain, creating self-learning emotional intelligence is still proving an immense challenge for us. But we're slowly understanding more and more.

ARCHIVE FOOTAGE illustrates:

ADVOCATE (V.O.)

Now our computers do far more than sing songs and play chess: Intelligent machines can drive our cars unaided, guide life-saving surgery, fly planes, determine wars, keep us in touch, informed and predict the future.

We trust and respect these machines now, these children. We ought to because our lives depend on them. These are the descendents of Turing's universal machine.

A robot recently learnt how to recognise different shaped rocks... This Mars Rover is working away, year after year, discovering facts for us on another planet, millions of miles away.

Its life began with a young man hunched over a desk in Cambridge.

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