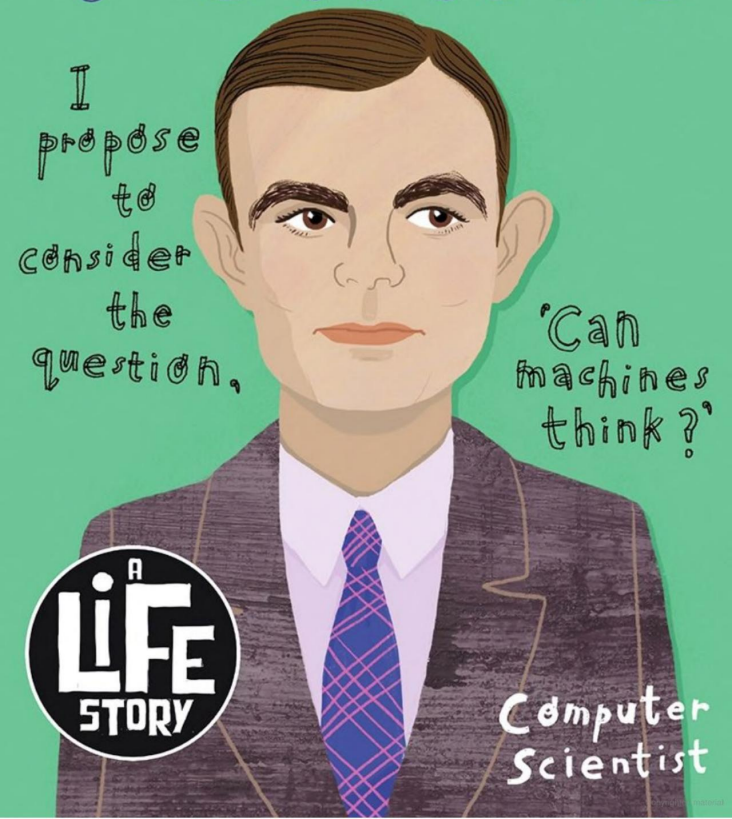
ALAN TURING


I propose to consider the question,
'Can machines think?'
A LIFE STORY
Computer Scientist

For Ben and Zac, who understand maths,
and why Alan mattered.

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INTRODUCTION

Meet Alan Turing: genius mathematician, heroic wartime codebreaker, the founder of computing and gay rights icon. You see, this man didn't just do one brilliant thing in his lifetime – he racked up a whole list of them.

He was the man who, years before anyone had even imagined such a machine, came up with the theory that would pave the way for the modern computer. He also came up with what we now know as "artificial intelligence", foreseeing a day when computers would not just outwit humans at chess, but be able to imitate them so well they might fool other humans. Next he turned his maths brilliance to the world of biology to explain the appearance of what's known as the Fibonacci sequence in leaves, and why leopards got their spots. And he still found the time to keep up his top level long-distance running, only just missing out on representing Britain at the 1948 Olympics.

But best of all, his theories cracked the "impossible" Enigma encryption machine in World War Two, helping British intelligence get one step ahead of German attacks, and saving millions of lives in the process. All this from a boy whose school reports had written him off as "not very good" and "a very grubby person".

What makes his story even more extraordinary is that these incredible achievements went virtually unrecognized in his own lifetime. Instead of being grateful, the government treated him as a danger to society and he died not a hero, but in disgrace. Thankfully, that's all changed now, and Alan Turing's name is synonymous with codebreaking as well as computing, and not just in Britain but around the whole world.

This is the story of how Alan went from struggling schoolboy to gifted and talented academic to wartime hero to computer innovator. It's an extraordinary story, but then his was an extraordinary life.

FIBONACCI SEQUENCE

The Fibonacci sequence is the series of numbers **0, 1, 1, 2, 3, 5, 8, 13, 21, 34** and so on. The next number is made by adding together the two previous numbers.

It can be seen throughout nature – in the patterns of sunflower seeds, the distinct shape of pinecones, the number of petals on some flowers, and elsewhere.

TURING'S BRITAIN

Before we meet Alan, it's worth knowing a little about what life was like at the turn of the twentieth century.

Forget computer games and tablets, and even TV. Back then people were lucky to even have a telephone. Cars were few and far between, and the aeroplane had only just been invented. Instead, people used trains, boats, horses or bicycles to get around, or they just saddled up "Shanks's pony" (which meant walking).

Toys existed of course. There were board games and balls, as well as toy guns. But many children went without or made their own fun. One thing was the same though: school, which was compulsory even in those days, but only until you were twelve (although lots of children left long before that to start work). Everything was much stricter too, and school masters often punished children by caning them or beating

them with a slipper (this was even legal). Lessons were different too, with an emphasis on traditional subjects like Latin and Greek rather than science and maths.

Adults didn't have it easy either. Few women went to university or worked in high-powered jobs and, along with working-class men, they couldn't vote. Although Queen Victoria died in 1901, strict Victorian values lingered, dictating what people should and shouldn't say, do and wear.

Another important difference back then was that Britain wasn't just Scotland, Wales and England but had its own "empire". That meant it ruled lots of other places, including Canada, Australia, parts of Africa and India. By 1912, the Empire stretched to over 400 million people – nearly a quarter of the world's population. Despite this power, Britain was on the brink of war with Germany.

This was the world Alan Mathison Turing was born into on 23 June 1912.

I think it's time to meet him.

VICTORIAN VALUES

Victorian values dictated that children should be "seen and not heard"; in other words, they should never answer adults back. Women were expected to cover up at all times – no trousers for them! And everyone had to be polite at all times.

THE SCRUFFY SCHOOLBOY

All in the Family

Alan Turing's life was fairly extraordinary from the day he was born.

His mother, Ethel Sara Stoney (who later began going by just Sara), was highly educated, which was unusual for a woman at that time. She attended Cheltenham Ladies' College as well as the famous Sorbonne in Paris for university.

In fact, the Stoney family were rather an exceptional lot, making a mark in the fields of mathematics and science, where Alan was to find his passion and later fame. Alan's distant cousin, George Johnstone Stoney, who died the year before Alan was born, had been a scientist and was best known for coining the word "electron". Determined that his daughters should be as well-educated as their brothers, George sent

Edith Anne to Cambridge to study maths. She later lectured in physics and became president of the Association of Science Teachers. Meanwhile, her sister, Florence Ada, became a consultant radiologist who served in World War One and was awarded the Admiralty Star as well as an OBE. George's brother, who went by the unlikely name of Bindon Blood Stoney, was a successful railway engineer and became known as the "father of Irish concrete". Another Stoney, Edward Waller, became the chief engineer in Madras, India and was awarded the rather wordy title of Companion of the Order of the Indian Empire.

Edward was Ethel's father – Alan's grandfather – and it was there, in Madras, that she first met a young civil servant called Julius Turing.

An Unusual Arrangement

Julius and Ethel married in India in 1907. A year later, Ethel gave birth to their first son, John Ferrier, in Madras, where she herself had been born. In fact, it seems almost an accident that Alan was born in Britain at all. In 1912, Julius and Ethel brought John back to England on what was called "extended leave" – a sort of long holiday for people who worked abroad. Ethel was pregnant at the time, and a few months later, on 23 June, in Warrington Lodge Nursing Home in Little Venice in London, they welcomed Alan into the world.

Then, Julius's leave at an end, Alan's parents returned to Madras as expected; Julius first and Ethel a few months later. What was not expected, at least not by us today, is that they left their small boys, Alan and John, behind in England. This can't have been an easy decision to make but, not long before this, John had contracted the disease dysentery from infected cows' milk, and become seriously ill with diarrhoea and vomiting, losing a dangerous amount of weight. Ethel was scared of it happening again and so, rather than risk

the same fate for either of the boys, she handed them over to a Mr and Mrs Ward, who became the boys' foster parents for the next few years.

A BLUE PLAQUE

Warrington Lodge in Little Venice, where Alan was born, is now the Colonnade Hotel. Alan is honoured by a blue plaque, which mark the English residences of some of the world's most important people, while another famous former resident, Sigmund Freud, has the best suite named after him.

Early Promise

The Wards lived in a rambling house called Baston Lodge in St Leonards-on-Sea, on the south coast of England. It was a busy home – they had four daughters of their own and an ever-changing roster of other foster children, including, at times, the Turings' cousins. The nursery, where Alan spent his time as a baby, was run by a formidable woman called Nanny Thompson, who stood for no nonsense. Despite this, Alan was happy enough here in the early days, playing with his brother and cousins, avoiding the Wards' daughter Joan (whom Alan thought was a "tyrant"), and seeing his parents when they returned for holidays. Mrs Ward found his lack of interest in guns and swords odd for a boy. Alan, it seems, much preferred books.

He was a bright child from the off, teaching himself to read and even inventing his own words:

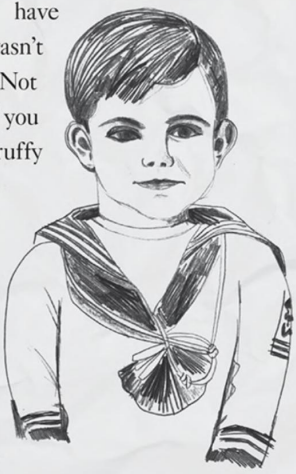
"Greasicle" referred to the way a candle flickered or guttered in the wind.
"Quockling" was the noise made by seagulls fighting over food.

red dot on his left thumb to help him remember, which he called his "knowing" spot. Nor could he fathom the calendar and didn't seem to understand that Christmas always fell on the same date. He even took to planting broken toy soldiers in the ground, hoping they would grow.

But he was an honest boy, determined to tell the truth above everything. When his mother asked if he would be good while she was away, he replied that he would, but that sometimes he would forget. It was this absolute honesty that was to cause him enormous trouble later in life.

Those days were still in the distant future though. First, there was school to get through. And, while he may have been bright, school wasn't necessarily easy or fun. Not in those days, and not if you had a tendency to be a scruffy sort of boy.

Alan and John later moved to other foster parents – The Meyers – in Hertfordshire.



A young Alan Turing

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