approach the problem in a different way. He looked at the type of problem that a machine following logical rules could solve and tried to list them all. If they comprised the whole of mathematics then the conjecture would be solved.

Turing led a research team in Buckinghamshire and developed the most secret invention of the Second World War, Colossus, the world's first electro-mechanical computer. It was this machine that cracked the German 'Enigma' message codes throughout the war.

After the war, Turing went to America to lend his genius to the USA's first computer project. With his help, the first American computer was built. This computer was called the ENIAC and was developed at the University of Pennsylvania. It used 18,000 valves; one of these would blow every two minutes!

One of the reasons why Turing's name is virtually unknown is because he was working for MI6 and enveloped himself and his work in secrecy. The British government did not release details of Turing's pioneering work until 1975.

Computer development surged forward but it wasn't until the invention of the silicon transistor in 1947 that rapid computing became possible.

Transistors can do everything a valve can do but they do it faster, more reliably and without generating heat. Like valves, they are electronic switches that can be switched on and off and can be used to represent either the zeros or the ones of the binary code. Throughout the 50's and early 60's larger and faster computers were built and they were used by big business as well as governments.

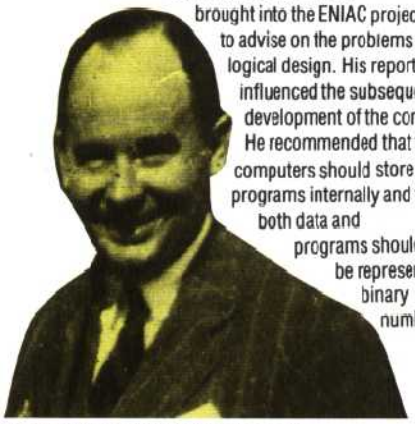
In the mid-60's, scientists reasoned that an electronic circuit would work just as well if it were miniaturised. With billions of space race dollars behind them, laboratories started experimenting in placing circuit designs on a single chip of silicon and then etching the design onto the chip. Before the end of the 60's this 'integrated circuit' was born and computing had taken a massive leap forward.

The development of a 'circuit-on-a-chip' led naturally to a 'multiple-circuit-on-a-chip' and the microprocessor was the inevitable outcome of layering several chips together.

Although microchip technology bears little resemblance to the giant analytical engine that Babbage and Ada Lovelace built, and scarcely more to Turing's Colossus, the practical 'architecture' that Babbage created is still used in today's microprocessor. The theory that made it possible, Turing's mathematical proof of the feasibility of computing, is unsurpassed.

The 'Architect' Of The Modern Computer

John Von Neumann was brought into the ENIAC project to advise on the problems of logical design. His report influenced the subsequent development of the computer. He recommended that future computers should store their programs internally and that both data and programs should be represented by binary numbers



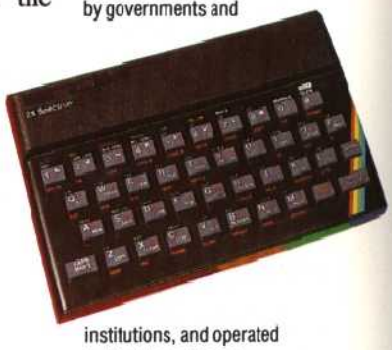
COURTESY OF LONDON MATHEMATICAL SOCIETY

Steve Wozniac

Steve Wozniac is often referred to as a 'living legend' in the computer business. Pictured here with his first invention, the Apple I (now a collector's item) Wozniac designed computers at school. Although he never trained as an engineer, he did more to miniaturise the computer for cheap home use than anyone else. The Apple II, which he developed in 1976, had the first home computer disk drive and is still one of the world's biggest sellers. Wozniac has recently returned to the Apple Corporation to work on new projects

The Sinclair Spectrum

Developed less than 40 years after those first cumbersome computers that were housed in whole rooms, the Spectrum is small, compact and cheap. The Spectrum was the first personal computer with colour capability that you could buy for less than £100. The first computers were huge complex machines, built by governments and



institutions, and operated behind closed doors. Nowadays, thanks to machines like the Spectrum, most families can afford a home computer