

# MILLENNIUM

## lookback

IN THE PAST 25 YEARS THE WORLD OF COMPUTING HAS MOVED FROM PROJECTS BUILT IN ENTHUSIASTS' GARAGES, TO INNOVATIONS WHICH TOUCH OUR EVERYDAY LIVES. ADELE DYER TRAVELS BACK IN TIME.

YEAR  
HARDWARE  
SOFTWARE

**I**T'S A CHICKEN and egg thing. Is computing driven forward by the need for faster machines to run the software we need or does software simply piggyback on the faster hardware, giving us more features and more realtime applications? Or is the drive forward provided by the desire of users to carry out tasks on their computers?

Perhaps the best answer is that the great advances of the last 25 years have been a combination of all three. Where would we have been without the IBM PC, or the GUI operating system, or equally VisiCalc the first spreadsheet and the first killer application, giving business users a reason to buy a computer? On the other hand, you could say that the whole computing revolution came about not because we needed computers, but because a few people were innovative and imaginative, driven by their own interests to create a computer that would sit on every desk and in every home.

The history of computing has as many twists and turns, as many miraculous inventions and as many fortunes won and lost as a Jeffrey Archer novel. The early history of computing was dominated by enthusiastic amateurs who were creative in their thinking because they were following up their own interest and were businesspeople almost by mistake. Take the cost of the MITS Altair 8800, regarded by many as the first personal computer, certainly the first to be commercially available and mass produced, which went on sale in 1975. MITS was eventually overtaken by those with better computers, but it did unwittingly set Bill Gates and Paul Allen, who wrote a version of BASIC to run on the machine, on the road to setting up Microsoft.

Looking back at the early machines, the spirit of experimentation was strong. Many of them – such as the Nascom 1, a British micro featured in the very first issue of PCW – had to be soldered together by the buyer and plugged into the TV. There were few universal standards in the early days with machines using a huge array of different processors and components. Every machine at this time was completely different, unlike the mass of near identical clones we see today. But out of small beginnings come great things. The first Apple was built in Steve Jobs' garage, after a meeting between Jobs and Wozniak at the Homebrew Computer Club, where each member built their own computer from their own trial and error designs. Even Intel started out as two people designing processors, producing each design in a matter of weeks. The original x86, the 8086 and the basis on which all current Intel processors are based, only took two men three weeks to perfect.

**H**OWEVER, THE BIGGEST events in computing were a little better planned. If you consider some of the milestones in computer hardware, they have all fulfilled very specific goals. The Sinclair ZX-80 was intended as a machine that could be bought by everyone, and brought the price down to a spectacularly low £100 for a fully-built computer. Today you cannot even buy a handheld for that price. The BBC micro, by comparison, was built with the sole purpose of educating the general public about computers. It was commissioned by the BBC for a programme it was putting together called *Making the most of the micro* and built by Acorn. This led to the predominance of Acorns in

| 1975                  | 1976                             | 1977     | 1978                      | 1979  | 1980   | 1981                                | 1982  |
|-----------------------|----------------------------------|----------|---------------------------|---|--|-------------------------------------|---|
| Altair 8800, IBM 5100 | Apple founded, Zilog Z80, Cray 1 | Apple II | Intel 8086, Commodore Pet | Atari 400 and 800, Motorola 68000                     | Sinclair ZX-80, Acorn Atom, first 5.25in hard drives | IBM PC, BBC Micro, Sinclair ZX-81   | Compaq portable, ZX Spectrum, Commodore 64, MIDI standard published |
| Microsoft founded     | CP/M written for Z80             |          |                           | WordStar, AppleWrite I, VisiCalc, Space Invaders, Ada | Q-DOS sold to Microsoft                              | MS-DOS, Xerox develops Start system | Lotus 1-2-3   |

| 1983                                | 1984  | 1985   | 1986   | 1987  | 1988                               | 1989   | 1990              |
|-------------------------------------|---|--|--|---|------------------------------------|--|-------------------|
| IBM XT, 3.5in DD floppy, Apple Lisa | Apple Mac, IBM PC AT, Amstrad CPC64, First Psion, IDE developed | Sony and Philips introduce CD-ROM, Intel 80386, Token Ring | Amstrad PC1512, Compaq DeskPro 386 SCSI-1 standard finalised | Apple Mac II, Acorn Archimedes, 9.6Kbit/sec modem | NeXT, IBM PS/2, EISA               | EIDE, Sun SPARCStation, Intel 486 DX, Creative Labs SoundBlaster | Apple Mac Classic |
| MS Word 1, DR GEM, WordPerfect 3.0  | DNS introduced to Internet (1,000 names), DOS 3.0               | Windows launched, Aldus PageMaker                          | Laplink, Norton Utilities                                    | Ventura 1, QuarkXPress, Windows 2 released        | OS/2 1.1, NeXTStep, Ami wp, Tetris | WordPerfect 5.1, Lotus Notes, www invented by Tim Berners-Lee    | Windows 3.0       |

schools. The IBM PC and the Apple II were both meant to appeal to the business sector, providing computing power for what in those days was considered to be a bargain price (around £1,200).

And it was, of course, IBM's PC which did more for the computing industry than any other machine. It was not that it was revolutionary – similar machines had been made by Sharp, Altair, Tandy and Apple – but it was IBM's might behind the product that made it. Many of the standards introduced in that first machine and its subsequent models are still used in machines today, such as a hard disk as standard, spare drive bays for peripherals, 5.25in 1.2MB floppies and later 3.5in 1.44MB floppies, and you could even overclock the PC AT until IBM stamped on the practise with a BIOS that fixed the clock speed. But most of all it was the first open design, based on third-party components.

IBM clones soon followed. The first, from Columbia Data Products arrived just seven months later. However, IBM's lead dwindled a few years later when it decided not to adopt the Intel 386 processor, leaving Compaq to produce the first of these machines in 1986. From this date onwards machines were based primarily around faster processors. The 486 came along in 1989 and the Pentium in 1993. So far, Moore's law, which states that processors double in complexity every year, has not been completely accurate. It is true that they have doubled in speed, but complexity is more debatable.

**T**HIS IS NOT TO SAY THERE were no interesting machines after the arrival of the 386, as the first Psion arrived in 1984, complete with a single-line display, and established the idea of a handheld computer. Notebook computers have, thankfully, got smaller and lighter than the original 20lb luggables. And over the years we have seen a rise of handheld communication devices such as the Nokia 9110. We have also seen RISC machines like Sun's SPARCstations and Steve Jobs' ambitious NeXT cube, now part of Apple.

One advantage of the faster hardware was to make the use of better software possible. Without

the 386, Windows would never have got off the ground, as it needed far more power than was available from any other platform. And if you think the processors currently being produced are unnecessarily powerful, just think of what they can do. Continuous voice recognition was delayed only by the proliferation of processors fast enough to run the software, and if we are ever to have voice-only interaction with our PCs, yet more power will be needed.

Before the hardware settled down into predictable, stable formats, the early years of software development saw fortunes made and lost by chance. The classic story is, of course, that surrounding the original PC. In 1980 when IBM was looking for an operating system for its Chess project, Big Blue approached Gary Kildall's company Digital Research, which created CP/M. However, Kildall was out of the office when IBM called and his wife sent them away empty handed, believing the company had bigger fish to fry. Gates pitched to supply an operating system that had not yet been written. In the end he bought the rights to a CP/M knock-off, Q-DOS, from Seattle Computing Products for \$100,000 and renamed it MS-DOS.

Operating systems have always provoked a certain amount of competition and contention, however. The history of the GUIs in particular is strewn with writs. It is now generally accepted that the idea for the mouse-driven graphical user interface came from Xerox PARC, the Start System was the first WIMP (Windows, Icons, Menus and Pointing Devices). Xerox did not have the foresight to see just what it had, but when Xerox bought 1,000 Apple shares in return for letting the company share its technology, Jobs and Wozniak certainly saw the possibilities. Apple later came up with a GUI for the Apple IIGS and perfected this on the Mac. Xerox sued, but lost its case. Digital Research also produced its own GUI, GEM, which won glowing reviews, but never took off. When Microsoft followed suit



| 1991  | 1992                     | 1993   | 1994   | 1995   | 1996                             | 1997   | 1998  |
|---|--------------------------|--|--|--|----------------------------------|--|---|
| Psion Series 3, SoundBlaster Pro Deluxe (first PC stereo)                                 | CD-I, Digital Alpha, PCI | Intel Pentiums 60, 66 and 75, Motorola PowerPC 601 | Acorn PC600, Hayes 28.8Kbit/sec modem, 3Dfx and Videologic 3D graphics cards | Iomega Zip drive, Compaq LS-120, Pentium Pro | Intel Pentium 200                | Intel Pentium MMX and Pentium II, AMD K6, first CE handhelds at Comdex | Apple iMac, Intel Deschutes PII 333 and Celeron |
| Apple System 7, MS Visual Basic, Windows versions of Word, Excel, PageMaker and CorelDraw | Windows 3.1, MS Access   | Mosaic, ID Software Doom, MS Encarta               | Windows 3.11, Netscape Navigator, Doom II, Descent, Command and Conquer      | Windows 95, NT 3.51, JavaScript              | MS Internet Explorer, Windows CE | Quake 2, Bladerunner, Grand Theft Auto                                 | Windows 98, continuous speech recognition       |



▲ GAME ON: ATARI'S VCS WAS A DEDICATED GAMES SYSTEM

with Windows, it was Apple's turn to sue for copyright in 1988, but it too lost its case. Microsoft and IBM had also just parted company with a great deal of acrimony, after Microsoft refused to support

OS/2, which was originally a joint project between the two companies. By that time, 1990, Microsoft had

Windows 3.0 and was well on its way to dominance of the OS market. Since then, however, the release of Linux and BeOS has introduced a little healthy competition.

However, without decent applications to run on our operating systems, computers would still be merely toys for enthusiasts to tinker with. The change came thanks to what are known as killer applications: spreadsheets, word processors, browsers and email packages. VisiCalc was the first of these killer apps in 1979, a spreadsheet that allowed users to do their accounts on a computer. It was written by Dan Bricklin and Bob Frankston, using a computer on a time-share basis. Bricklin developed the functional design and documentation, while studying for an MBA, and Frankston programmed at night when computer time was cheaper. When the product was first sold, it was just 25K long and cost \$100.

The first version of VisiCalc was produced for the Apple II and proved a huge advantage for Apple. Versions for other platforms were produced, but it was eventually eclipsed by Lotus 1-2-3.

Another product that proved crucial for the fortunes of Apple was Aldus' PageMaker. Paul Brainerd's company produced the first version in 1985 and ensured that Macs, the first platform on which it was available, would be the machines of choice for every newspaper and magazine, and every repro and graphics house the world over.

Word processors made their first appearance in 1979 with WordStar and AppleWrite I. We had to wait until 1983 for WordPerfect from SSI, followed swiftly by Microsoft's first version of Word. Other innovative pieces of software quickly appeared after this – 1986 saw the first versions of Laplink, Norton Utilities and Sidekick, the first contacts manager.

So you have your hardware and your software, but effective work in any office cannot be conducted without networks. Ethernet was dreamed up in the Xerox PARC facility in 1973 and office networks came of age in 1985 when IBM launched Token Ring. However, the most interesting breakthroughs were happening in a very low-key manner.

THE INTERNET STARTED OUT as a bomb-proof means of communication for the US military. It then came to be used by academics to exchange information about their research. As far back as 1982 TCP/IP was named as the protocol to support EUnet, Europe's forerunner to the Internet. Tim Berners-Lee, working at the Cern particle-physics lab, came up with the first spec for the world wide web in 1989 and in 1992 Demon started offering internet accounts for £10 a month.

We had to wait until 1993 for the first graphical browser, Mosaic, which added pictures and hyperlinks to the previously text-based web. The project at the University of Illinois was led by Marc Andreessen, who later founded Netscape, which in turn had a virtual monopoly in the browser market until Microsoft's entry in 1996.

Over the last 25 years of this century the rise of the computer has been a major force in shaping the economies and the way of life of most of the world. It has changed the way we do business, the way we communicate, and has affected the operation of everything from factory machinery to washing machines. Some pundits claim that the Internet is bringing about a greater change in the way we live than the Industrial Revolution did in the last century. Only time will tell, but let's hope the next 25 years bring as many exciting and indispensable machines. □

| 1999  | 2000 |
|---|------|
| Intel Pentium III, AMD Athlon, 2 mega pixel digital cameras | ?    |
| Linux Kernel 2.2.0  | ?    |