

## RADAR

Clive Akass reflects on the wartime pioneers who fell beyond the radar of computing history

# Boffins emerge from back room

If you think this wonderful contraption (pictured right) looks like a glorified ear-trumpet, you are not far wrong. It's a listening device from the First World War, designed to provide an early warning of the approach and direction of enemy aircraft. Apparently, in good weather, it was surprisingly effective.

And if you are wondering how it is connected with computing, the clue is in the picture below. This shows Freddie Williams and Tom Kilburn with part of 'The Baby', the world's first stored-program digital computer, which they built at Manchester University.

The link between the two is radar, the electronic descendant of that ear trumpet. The pictures are part of a new touring exhibition called *The Magic Ear\**, set up by writer David Robertson, who believes that the contribution of wartime radar pioneers to computing has been unfairly overshadowed by the work of Alan Turing at the Bletchley Park codebreaking centre.

Radar scientists at the Telecommunications Research Establishment (TRE), which moved to Malvern in 1942, used logic



circuits that were equivalent to the basic building blocks of modern computers. In addition 'they knew all about the latest pulse circuit techniques and how to apply them,' said Robertson.

They brought the two technologies together to detect and analyse 'blips' from a distant target by passing reflected and reference pulse streams, remarkably similar to clocked computer data streams, through an AND gate.

'They even used the word "gate",' said Chris Burton, of the Computer Conservation Society, who helped build a replica of 'The Baby' for its

fiftieth anniversary in 1998 (see Tom Kilburn interview, *PCW*, May 1998).

Bletchley codebreakers used mechanical and (later) electronic proto-computers, but their influence in the crucial post-war decades was less than it might have been because of the secrecy surrounding their work. 'No-one knew anything about it,' Burton said.

No-one except Turing that is, but he was becoming bogged down in the ill-fated ACE computer project at the National Physical Laboratory.

It was the men who had worked at TRE (now the defence research establishment DERA) who built Britain's first general-purpose computers. They included Kilburn, Williams, and Maurice Wilkes, who went to Cambridge to build the first operational (as opposed to experimental) stored-program computer.

Williams used his knowledge of another radar-accelerated technology to provide the final building

block needed to produce the true precursor of the modern computer... random access memory.

You can see the result in the picture below: cathode-ray-tube memory. This used a 32 x 32 matrix of on-screen charges, a total of 1,024 bits that could be written like a radar trace by an electron beam and read by a capacitively-coupled wire mesh.

Memory was addressed in much the same way as modern RAM and, astonishingly, CRT memory was still being used in the early 1960s.

Robertson is writing the biography of another little-known pioneer, Alan Freed, who back in the 1930s invented the Pulse Code Modulation still used by today's modems.

All these men (these were pre-feminist days) were products of the classic age of the boffin, a creature assigned by wartime myth-makers to the status of anonymous 'back-room boy'. Turing, famously crushed by an uncaring world, killed himself in 1954.

Robertson believes we are in danger of crushing the memory of Turing's contemporaries, consigning them to the back rooms of history. 'They are old men now,' he said. 'We should get their stories before it is too late.'

For information on *The Baby* take a look at:

[www.cs.man.ac.uk/Visitor\\_subweb/history.php3](http://www.cs.man.ac.uk/Visitor_subweb/history.php3)

Computer Conservation Society  
[www.cs.man.ac.uk/CCS/](http://www.cs.man.ac.uk/CCS/)

*\*The Magic Ear, sponsored by DERA and the Imperial War Museum, is at Malvern Library until 7 October, after which it will tour libraries and museums across the country.*



*Freddie Williams and Tom Kilburn and 'The Baby', which had a cathode ray tube memory*