What s Cooking at the Science Museum

Software engineer Dave Patten describes the vital role of Acorns at this important London venue.

The Science Museum is one of London s most popular attractions, with over 1.1 million visitors a year. Most people do not associate the word museum with modern computers, even when the museum in question is the Science Museum. They might expect to find old computers on display or a gallery on the history of computing, and these people would not be disappointed, but we also use modern computers in exhibitions to help us interpret objects and information. We have over 60 computer-based displays at the Science Museum and over 90% of these run on Acorn hardware.

The Channel Tunnel interactive incorporates a Replay movie clip

ACORNS IN THE SCIENCE MUSEUM

The Science Museum has a long history of developing interactive exhibits for use by the public. The Children s Gallery, built in the 1920s, was the first hands-on museum exhibition in the world.

In the early 1980s the Museum decided to start using computers as an interpretive medium alongside video, audio commentaries and tape slide shows. The need to standardise on one computer was appreciated very early on. This allowed us to build up expertise on a particular system as well as making the task of the maintenance team easier, and reducing the amount of spares that we needed to stock. We looked at the computers currently available, and eventually chose the Acorn BBC micro.

We made this decision for a number of reasons. The Beeb was robust, and had a generous provision of built-in I/O ports, allowing us to control external equipment easily; and we have developed a number of specialised interfaces for it, including a video overlay system. The Beeb also allowed us to store programs on EPROM. This proved to be very important because EPROMs are an extremely reliable storage medium. They are hermetically sealed and have no moving parts, whereas floppy disc drives rotate and are open to any dirt in the atmosphere. As some areas of the Museum can be quite dusty, especially when building work is in progress, nearby floppy discs are easily damaged. I have seen one disc where the magnetic coating had been completely worn away and the disc had transparent tracks.

WHAT ARE WE DOING NOW ?

On May 3rd 1994, we opened a temporary exhibition about the Channel Tunnel, called The Channel Tunnel - the whole story, which will run for 6 months before moving up to the National Railway Museum at York, and hopefully then on to a venue somewhere in Europe. This exhibition contains two computer interactives, one a survey which collects popular views on the Tunnel and the other which deals with popular fears about the Tunnel. This program, which was written for us by Lee Calcraft, also includes a Replay movie clip; the first time we have used this on a gallery. The response to this has been very favourable with someone at

the opening asking if the video was coming from a laser disc.

For about two years the Museum has been running a series of exhibitions, sponsored by Nuclear Electric, under the banner of Science Box. These are small temporary exhibitions

Build yourself a Lotus sports bike

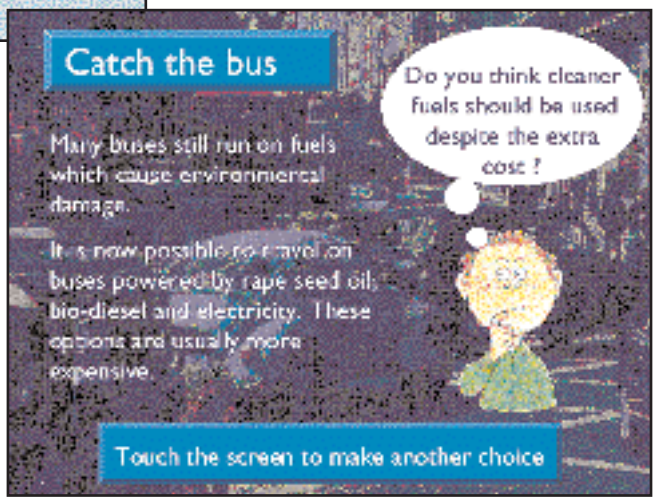
that last for three or four months on issues of contemporary science. These exhibitions have covered subjects such as passive smoking, nanotechnology, DNA fingerprinting and the Lotus Sports bike. All of these exhibitions have at least one, often two, computer interactives running on Archimedes computers with touch screens.

On the 24th May we opened the latest exhibition in our Science Box series. It is called City Limits, and is about the sustainability of cities. It looks at our lives in cities today, and the impacts of urban lifestyles and considers what changes we must all make to ensure the future survival of the city. This exhibition contains four computer based interactives, two of which run on Archimedes computers: one dealing with transport issues and the other with environmental issues including recycling and conservation of resources.

The computer interactives are a highly popular part of every Science Box exhibition. We know this both from surveys carried out by the Museum s Evaluation Unit and also because the computers log how frequently they are used. The computer exhibits are generally used by at least 10,000 people over the twelve week life of the exhibition, and in one case the DNA fingerprinting exhibit was used by over 30,000 people in twelve weeks.

Two of the Science Box series which have previously been on display at the Science Museum, Passive Smoking and the Lotus Sports Bike are now on tour around the UK. Contact the Museum to find out where they are now.

Our next new permanent gallery, called Health Matters, opens in early June, and will contain some very unusual computer displays. Five of these are about the relationship between health and lifestyle. All run on Acorn A5000 machines, and the video output is projected onto screens on the floors and walls. The visitors interact with the displays by putting their hands through holes in the exhibits or by moving their hand about inside a ring. One of the computers weighs you and measures your height while you answer questions. This information is then used to



A screen from the Transport interactive from the City Limits exhibition

personalise the results from the program.
We have also started work on a new Education centre which is due to open in the summer of 1995. I am sure this area will contain many interesting and unusual computer interactives, so watch out for further details which will be released over the next year.

WHERE DO THE PROGRAMS COME FROM ?

Much of the software that we use is written in house. Current authoring packages are not entirely suitable, and our programs are mostly written in BBC Basic with the occasional bit of assembler. Basic is a much maligned programming language often frowned upon by professional programmers, although less so now Visual Basic is one of Microsoft s preferred development languages. BBC Basic is outstanding, being both structured and exceedingly fast. Moreover, the fact that it is an interpreted rather than a compiled language allows us to see instantly the effects of minor program alterations, without needing to recompile each time.

On the Archimedes, programs are written as applications which run from the desktop but they do not multitask. We need them to take over the whole machine for two reasons. Firstly, non computer literate people would probably be confused or put off by various bits of standard window furniture such as scroll bars etc., and these also detract from the message which we are trying to get across. Secondly we must not allow the public access to the operating system, from where they might start deleting files on the hard disc!

Many exhibits use Ellinor touch screens for user input. This particular device is exceedingly accurate, and allows us to keep keyboards and mice safely hidden away behind the exhibits. Monitors are generally used in mode 28, the standard 256 colour VGA mode. The one snag with this is that the Arc s video RAM limit prevents us from using bank switching to improve the smoothness of animations. Another limitation on our displays is that to avoid wear and tear on our hard discs, we arrange to access the drive just once at power-up, loading everything, including all images and sounds, into memory. This sometimes makes for a tight squeeze, and means that user statistics must be stored on CMOS RAM, rather than on disc. The one exception to this is the Channel Tunnel interactive containing a 20Mbyte Replay movie!

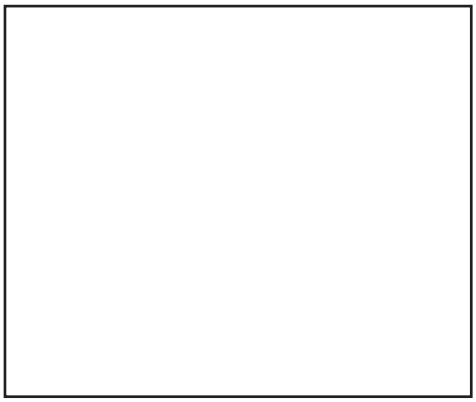
WHAT DOES THE FUTURE HOLD ?

At the moment the Museum displays less than 10% of its collections at any one time. Computerised multimedia catalogues should allow the Museum to give the public easier access to those objects not on display. The Museum is in the process of upgrading its computer database which will in future contain text and images, and hopefully at some time in the future video as well. At present this catalogue is used only internally and by academics as a tool for research, but it is hoped that by adding a user friendly front end it should be possible to give the public access to this information.

This type of system should also open up the possibility of people accessing information about the collections from outside the Museum. After all, the Museum is the custodian of the national collections for science and industry, and many people are not able to visit London easily, so access to some sort of online multimedia database might provide the next best thing.

The recent launch of Acorn s Risc PC should go a long way towards meeting our needs for the next few years. The specification looks very good, although I can t help feeling that Acorn will regret limiting the VRAM to 2Mb (remember when 480K seemed enormous). It is also a shame that they didn t take the opportunity to improve the sound handling capabilities (16 bit audio would have been nice). Apart from these two comments, the hardware looks exciting. Acorn s main problem is that, with some notable exceptions, the software often does

not keep up with these hardware developments. We need to see applications with the power and flexibility of Photoshop and multimedia authoring tools like MacroMind Director, which as well as incorporating hyperlinking also has some very powerful animation tools built in. The hardware could certainly cope with programs like these (after all, Macintoshes do), and they would make development of software for use in education and museums much simpler and faster.



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CONCLUSION

Next time you are in London why not come and visit the Science Museum, or even better why not make a day of it? With five floors of objects and interactive exhibits to explore it takes a full day. While you are there, think about what s going on behind the scenes and how Acorn machines are helping to make science more accessible. The Science Museum is open from 10am until 6pm Mondays to Saturdays and from 11am until 6pm on Sundays.