

Me and the Internet

My first essay is on the Internet, as it is possibly one of the most important developments that has occurred in the history of mankind. So why is the Internet so important to me? Well there are many reasons:

1. IT'S JUST THE BEGINNING

The Internet is being developed all the time, and I am lucky enough to be in a position that I can influence its evolution (even in a small way). This might seem obvious, but I missed some of the other recent breakthroughs. In my time I have seen the electronics industry moving from just a few transistors on a chip to millions of them on an area the size of your thumb. Just think I was not even born when the first transistor first popped its head above its circuit board (well, of course, the circuit board happened later, but it makes a great metaphor), and I was just a child when Fairchild Semiconductor first put a few transistors onto a single piece of silicon. Then I missed the SSI (Small Scale Integration), MSI (Medium Scale Integration), LSI (Large Scale Integration), and VLSI (Very Large Scale Integration) phase, because I was still learning, from school to college. After I left school I went into Electrical Engineering, and I learnt all about DC motors and 3-phase supplies. I remember learning about transistors with their three pins: the collector, the base and the emitter. It seemed to me, at the time, that you needed superior intelligence to understand all their graphs and connections. I think it was the voltage between the collector and emitter on the x-axis, and the current in the collector on the y-axis, and then there were graphs of the voltage between the base and the emitter, of course. All very confusing, and that was just for an npn transistor, when it came to a pnp transistor, all the graphs went negative, or so I think they did.

I will always remember the electronics teacher who first taught me semiconductor theory. He wore a white lab coat, and for eight of the 10 weeks he taught us electronic valve theory, and for the last two weeks he taught us, under great reluctance, the theory of the transistor. To be honest his heart wasn't really in it, as he really didn't see the future for these tiny little plastic devices. The transistor, in his option, could never really measure up to the mighty valve (I forget why, but I think it was related to its power handling, and its linearity). Where is he now? Retired, probably, or running a valve production factory. For those formulative years, I don't think I ever met anyone who really understood these tiny plastic devices (and often I think that there are few who really do understand them now). Later I even wrote a book which tried to show how it is possible to understand electronics, and silicon design, without having to revert to complex mathematics (see image on the right-hand side). In the next few weeks, I intend to write an essay on electronics and the way that it is taught, so watch this space!

I could see then, from 1977 to 1981, that the future wasn't electrical engineering (my father and my father's father had both been electricians, so it seemed a

natural move for me). For me it was electronics, so off I went to do a degree in electronics. Computing, at the time, seemed like it was too big a jump, as it was all to do with big mainframe computers which performed a silent magic, of whom were operated on by strange people in white lab coats. So, luckily for me, as I started studying for a degree, the PC was just starting to takeoff, and I remember admiring the Apple II's and the IBM PC's in the lab. From then on, I knew the future was computing. It has since blossomed as a subject, and now encapsulates not just computer programming and computer systems, but now includes networking, the Internet, databases, human/computer interaction, multimedia, the World Wide Web, E-commerce, Digital TV/Radio, and so on. It's amazing to be involved in an area that is forever changing and spawning new disciplines, each of which are more exciting than the last (or maybe that's just my option, which it is).

2 IT'S FAST.

Computing power allows users to perform many functions that, in the past, would have taken many people and lots of time to achieve. For example last year I helped organise a conference. It would have been almost impossible if I did not have e-mails, databases, spreadsheets and mailing lists. With e-mail I was able to get everyone who submitted a paper to send it to me in an electronic form. Then using a database I archived all the papers, then created lists of reviewers with their paper reference. Next I simply e-mailed the papers out to the reviewers, and got them to fill-in a form which they e-mailed back. I simply archived the reviews and then cut and pasted their rating into a spreadsheet which then give me an instant rating on the paper. After it was a simple task to e-mail on the congratulations, and the considerations out to everyone who had submitted a paper. From acceptance list I created an e-mail list with all the successful authors, and then kept them up-to-date with any changes (typically on the WWW page I had setup) and all the details of the conference. No-one in the world could ever complain that they were not kept up-to-date, as I e-mailed everyone almost on a daily basis. Some conference delegates were getting e-mails requesting whether they needed special presentation aids, or the sights of Edinburgh, or even average temperatures for the time of year. All this would have required a whole team of people, from administrators to typists, but these days, with e-mail and the Internet, it can all be done with one or two people. I must admit that Microsoft Outlook helped a lot as I was able to quickly search through whole batches of email messages search for any keywords (such as ECBS or IEEE), so that I did not miss any important e-mails. In the end the conference was a great success as everyone knew where they were going, and what they were doing.

3 IT'S INSTANT.

The thing I really like about the WWW is that I can publish material within minutes, where it would normally take me many months, if not years, to publish in the normal way. I think that there will always be a need for

traditional book publishing, as it is a totally natural way to learn, as opposed to reading material from a screen, but both methods have their usage.

Every so often something happens in technology that makes you change the way that you think about something. There's too responses to this, either you go with the flow, and learn the new techniques, or you say 'Forget it. I'm happy with where I am, and this new thing just isn't as good as all these other things'. It happened when Pascal and C came along and challenged FORTRAN. Many old FORTRAN programmers said 'You can do everything that you can do in C in FORTRAN, so why change?' Well where are the FORTRAN programmers now? It's amazing to think about how things have changed in computing. About ten years ago I was writing simple Pascal programs which did a few simple calculations, and would take no more than 64KB of memory (for both the code and the data). The computers were simple 8MHz 8086-based PCs which, if you were lucky, had a 10MB hard-disk. Then C came along, and then C++, and then Visual Basic, and then Java, and so on. We had been taught to think in functions and modules, and now we were told to think in terms of events and objects.

In education I think you either use the Internet as a tool, or you'll loose out eventually, as the consumers (the learners) will demand material to be transported or presented over it. It is a time of great opportunities, but it is also a time of change, and you can either be involved in it, or someone will eventually come along and enforce the material. What is so great about the WWW? I was trained as an engineer, and the use of colour, in any way, was always disdained. If we used coloured pens for any of our drawings, the tutor would immediately put a large red mark through it, and say something like: 'colour is not required'. On the WWW, colour is important as the human eye will very quickly tire if it does not like the layout of a page or a site. The think I have found when accessing WWW pages, is that consistency and content are the most important things. It does no good have a nice fancy home page, when the rest of the site is a jumble of old and new pages, and there's nothing that can hide a lack of content. With a book you can quickly flick through the book, and can often tell its quality. On a WWW site, it is often difficult to see what's below. The other thing that was lacking in engineering is the lack of creativity involved. As an engineer you often take other peoples ideas, and then ask them about what they want, and how they want it, and you just create exactly what they want.

Note: Well they didn't really know where to go after Very Large Scale Integration, so, after much de-bating about what came after very large, they went for ultra large with ULSI (Ultra Large Scale Integration - which is between 500,000 and 10,000,000 transistors), and then they struggled again with the next size up, so they opted for gigantic with GSI (Gigantic Scale Integration - which is over 10,000,000 transistors). Who knows the next step? Maybe UBSI (Unbelievably Big Scale Integration) or YWBHLI (You Wouldn't Believe How Large the Integration is). If any does ever use these terms in the future, you

know where you heard them first, and the copyright case will follow very quickly after that.

-- William J. Buchanan, Dec 14, 2000