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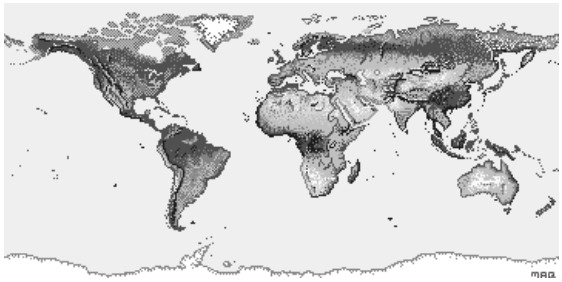

Computers and the Environment

This issue of *BITs* does not contain the usual monthly "news", but is devoted to a topic which is of continuing interest to computer users. The environment - and perceived problems with it -have become major concerns for many people at the end of the twentieth century. Sir David Smith launched the University's Agenda for the Environment in 1991, aiming to put the University at the forefront of environmental teaching, research and institutional behaviour.

There are ways in which we can use computers to reduce our impact on the environment, and we can also minimise the impact they have. As a contribution to the Agenda for the Environment, this issue of *BITs* offers some suggestions on "environment-friendly" computing.

Nick Stroud (EUCS)

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Paper

Use less paper

If you use a computer to produce a report or essay, try and get it all right before you print it: for example, using a spell-checker and looking at the complete page view might save time and trouble as well as paper.

Paper which has already been printed on one side might still be usable for printing draft copies, or as scrap paper, or even as drawing paper for a local nursery.

If you need a paper copy of information whose format is not important, you may be able to save paper by compressing two or even four pages into one. For example the Unix utility a2ps formats a plain text file to get two pages on to one A4 sheet. The result has to be sent to a PostScript laser printer, as in the following example on **festival** or **castle**:

```
a2ps -nn infile | lpr -Pps23
```

(If you omit the -nn here, the lines are numbered for easy reference.)

The latest version of Apple's LaserWriter driver (8.0), which is available from the MacSIG PD archive in the Main Library, allows Mac users to get two or four pages on to one A4 sheet (see Page Setup options in the `File' menu of applications which use this printer driver).

Another way to save small amounts of paper is to avoid printing the startup page when you switch on a laser printer: to do this, remove the paper tray before you switch on the printer, and reinsert it when the printer has warmed up (some printers have a special switch to cancel this startup page, and utilities are available to do the same job from your computer).

Recycle paper

Even though we might be able to use less paper, we will never be able to use none at all - which raises the problem of what to do with it when we've finished with it.

Some paper needn't be thrown away: for example, old computer magazines can be donated to a public library, school, user group, hospital or doctor's waiting room.

Some paper must be thrown out, so we are fortunate to have a free recycling scheme on our doorstep. Lothian & Edinburgh Environmental Partnership - LEEP - has collected over 40 tons of paper from the University for recycling, but not all departments have yet availed themselves of the scheme. LEEP provides everything to set up a recycling system: for more information contact them on 555 4010. This not only reduces UK paper imports, but also reduces the University's annual waste disposal bill.

LEEP only takes "office waste". Other scrap paper - "mixed waste" such as magazines and newspapers, circulars, coloured paper and envelopes - can go in the District Council's paper-recycling bins, or if you have a lot it can be collected free by a commercial recycling firm such as Hannay's (0506 854724), or Kelvin Salvage (0236 822352).

What about recycled paper?

Paper is a commodity we all use in many forms: often taken for granted, we can't imagine life without it - in office, school, home or wherever. Twenty years ago I was told that the paperless society was just round the corner, but mushrooming information technology has not reduced our use of paper: far from it.

Simultaneously, we are all more aware of the world and its resources. Trees are part of this, and paper - an essential medium in the dissemination of this knowledge - has been particularly targeted. My first and most memorable experience of changing attitudes was to be accused of murdering trees because I did not favour a total shift to the use of recycled paper. Why, as a reprographics person, was I not aware of what was going on? Ah, but I was, and I am!

As a paper buyer I have to ensure the best possible price, quality and service while operating within the constraints of the Universities of Scotland Joint Consultative and Advisory Committee on Purchasing (JCACP) - which does not yet recommend recycled paper for use in copiers or printers.

I am not against the recycling of paper (I am a faithful and regular contributor to the paper bank), but I have to temper my support with a few facts of life:

* `Repeat' recycled paper is available from Printing/Supplies Services, but it costs more than our regular paper

* our regular paper comes from a modern Swedish integrated forest-to-paper-mill, with very low emission to the environment: it is not chlorine-bleached

* recycling will not help the rain forests

* fibre degrades in successive recyclings and must be topped up with new fibre

The paper-making industry has not been inactive. It sees no future in exhausting its basic source of papermaking fibre:

* most wood pulp comes from natural forests managed on a sustainable basis

* new plantations of fast growing trees (with beneficial chemical side effects) are managed as industrial crops

* more trees are planted than consumed, and the latest developments in forestry techniques ensure that supply keeps ahead of demand.

Yes, we do need to recycle waste paper. Despite improvements in farming techniques we still need to conserve our trees and recycling helps. However, we desperately need to educate ourselves to use less paper. It is this avenue, now that we have the electronic means, that we should use to preserve our trees.

David Stewart-Robinson (Printing Dept)

Why print BITs?

BITs is available on EDINFO before it is printed, but many people who want to know about IT in Edinburgh still don't have access to a networked terminal. Paper and electronic versions complement each other: a paper newsletter is more likely to be read, while the electronic version provides a fast way to locate information in previous issues. Facilities for online information - such as WorldWideWeb - are improving all the time, and EUCS may experiment with an electronic issue of *IT Forum* soon.

Electronic mail

Offices consume hundreds of billions of pages a year - millions of tons of paper, hundreds of millions of trees.

Can you use electronic mail for some memos and letters? If you already use a computer for other work, the cost of using it for correspondence is marginal. And as well as saving paper, distributing information over computer networks can save another precious commodity - time.

My name?
Hartley, R.R.A. Hartley!

But, of course, it isn't and I no longer have any interest in fly fishing! I did, however, recently need a book on a group of invertebrates. One of the UK's largest suppliers of natural history books is the Natural History Book Service, located in a huge warehouse on an industrial estate on the outskirts of Totnes in Devon. Their letterhead gives an electronic mail (email) address on GreenNet, an international network which can be accessed from **festival**, **castle** or Pegasus on a local area network. This allowed me to order the book by sending a credit card number in an electronic mail message.

Electronic mail is no longer the tool just of academics. More and more firms and individuals communicate via email rather than by letter, telephone or FAX. In the academic community, we use Internet, but networks can speak to other networks, so it is easy to exchange messages with users on, for example, GreenNet, MCIMail or Compuserve. The University Library orders inter-library loans via email, with a considerable real-money saving. What other savings could be made? Are there any suppliers of chemicals, books or consumables who accept orders via email? If not, perhaps they could be encouraged to consider such methods?

Good old Internet: it's not just there for the serious things in life!

Richard Bacon (EUCS)

There have been advances since I wrote this article (May 1993). For example, the technical publishers O'Reilly have opened an on-line ordering service (email to `order@ora.com` *or use WorldWideWeb to* gopher://gopher.ora.com*), and there is an On Line Book Store (further details in future issues of BITs).*

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Printing

Printers

Laser printers with `environmentally-friendly features' are becoming available. These features include: low cost-per-page; duplex printing (printing on both sides of the paper); power management (the printer switches itself off if unused for a certain length of time); and reduced ozone emissions. EUCS is constantly evaluating new printers, for future network provision.

You can get remarkably good results without using a laser printer. Ink-jet printers are excellent for low volume, local use or draft copies, and only use about 1% of the power of a laser printer.

Refill toner cartridges!

EUCS Stores can supply remanufactured - recycled - toner cartridges for most popular laser printers, as well as the normal brand new cartridges. These are proving to be extremely reliable in use, yet cost little more than half the price of the new cartridges.

Several companies provide a recycling service, many - advertising in computer publications - offering a couple of pounds for each cartridge returned. EUCS hasn't the resources to administer a scheme which could forward such small sums to individual departments, so instead has negotiated the best possible deal with one reliable remanufacturer - resulting in a very competitive purchase price. Spent cartridges can be returned, post-paid, for recycling.

The three cartridges which cover most printers are the 92295A, 92297A and 92298A. EUCS has supplied around 1,500 of these in the last year or so and had problems with less than 1% of them (which were replaced instantly from stock). Because EUCS operates so many laser printers in public Computing Labs we can test consumables reasonably exhaustively before offering them to paying customers. This helps us to find the best suppliers and the best prices.

Just as our wide experience has shown the reliability of remanufactured toner cartridges, so it has shown us that recycling printer ribbons by re-inking them is *not* very successful: EUCS Stores used to supply these, but received so many complaints that it was not worth continuing with them. We do supply re-inking kits for the older Hewlett-Packard DeskWriter/DeskJet cartridges (though not yet for the newer high-capacity ones); to use these, however, you do need to have your own ink cartridge for refilling.

In summary, EUCS Stores is constantly balancing all factors to give our customers the best value we can - not always necessarily the cheapest, but the most reliable. Buying in bulk in collaboration with the other Scottish Universities, we can get especially good deals for consumables. And we are always happy to consider anything which will save people money and help the environment.

For the latest information on what is available and how much it costs, see the online pricelist in EDINFO or on **festival** or **castle**, or contact Stores (tel 650 4962, open 9:15-12:15, 1:45-4:45pm).

Hamish Robertson (EUCS)

Use less toner

Apple Mac users might like to investigate `Toner Tuner', which lets you set the darkness of printouts from 0% to 100%, so you don't waste toner when printing drafts. If you print all your drafts at 50%, you'll save a good deal of toner over the lifetime of a toner cartridge. For more information contact Working Software by email to `workingsw@aol.com`, or MacLine (081 401 1111).

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Energy

There are millions of microcomputers in Britain, and a vast amount of power-hungry peripheral equipment like laser printers, using over 10 billion kilowatt/hours of electricity per year. Not only do these consume power themselves, but they produce heat - so more power is needed to cool down our offices. One estimate suggests that Europe will need to build two nuclear power stations every year to cope with the rapid increase in the use of personal computers.

Worried by such predictions, computer manufacturers are trying to reduce the energy consumption of their products - particularly under the stimulus of the US EPA's Energy Star programme - and many modern computers and monitors switch themselves off when not in use. We can achieve the same savings with older computers with a few simple precautions:

* Turn off your computer when you won't be using it for several hours or days. At least turn off the monitor, which takes over half the power consumed by an average computer (just as we turn off the TV when we aren't watching it). Switching off and on *may* reduce the number of hours for which electrical equipment will work - some experts maintain that the power surge at switch-on is harmful - but the equipment will still give you a longer working life if you don't waste operating hours when you aren't using it - at night, weekends and holidays. Fileservers can be run with their monitors off all the time. Note that a screensaver on a conventional monitor is *not* saving power.

(Some computers on networks should *not* be switched off as this can disrupt network operation - though their monitors can be off.)

* Switch off printers and other peripheral equipment when not in use.

* Turn down heating in winter if there are enough PCs to keep you warm!

* Make multiple copies on photocopiers, not on laser printers.

* Don't buy a PC with lots of expansion slots if you don't need them (you won't need such a big power supply).

* Report heating and lighting defects to Works Division RepairLine, ext 2494.

On a grander scale, computers are increasingly saving vast amounts of energy in the design, manufacture and use of other machines and systems by simulating them - like aerodynamic tests of turbine blades and aircraft wings, and more accurate predictions of power required in the National Grid.

Computer programs can help large organisations with energy management, to make the most efficient use of heating, lighting and other power consumption in buildings.

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Health: the Personal Environment

During normal operation, photocopiers or laser printers can emit minute quantities of various gases or particles which could affect people, though filters trap most of this inside the equipment itself. These filter units are generally renewed when the equipment is serviced and harmful emissions are thereby reduced to levels where there are no significant risks to health. Nevertheless, you are advised to use this type of equipment in an area which is ventilated to the standards of a modern office environment.

The regulations governing the use of Display Screen Equipment, based upon an EC directive, are particularly useful in cataloguing the simple steps you should take to ensure that you don't suffer any ill health as a result of using a computer. You can get a copy of the Health and Safety Executive guidance booklet on Working with VDUs from Health and Safety Services, Old College. The main advice in the new regulations is that you should sit comfortably when using a computer, work in an adequate space, and with satisfactory lighting. Use a foot rest and document holder if these make life easier. Plan your work so that breaks or changes of activity prevent both the onset of fatigue and the job becoming stressful.

If you are an employee who habitually uses a VDU for a significant part of your work, you can ask for a free eyesight test. Access to the University's appointed optometrist is arranged through Health and Safety Services, Old College. Should your eye test reveal that you need special glasses for your work, you will be provided with them free of charge.

There is no risk to health from radiation emitted from computer screens or VDUs - front, back or sides. Levels are so small that they cannot harm anyone, even pregnant women. So there is no need to carry out radiation checks, and you do not need to use special devices such as eye protection, screens or aprons.

Dr Peter Sykes (Health and Safety)

Repetitive Strain Injury (RSI)

An Australian professor has labelled RSI a "group hysterical reaction to boring, unsatisfying jobs". By contrast, a British doctor writes of the growing consensus that RSI "is a complex condition with elements of psychogenic illness superimposed on word-related fatigue and discomfort."

Whatever RSI actually is, there are simple working procedures designed to ensure that you don't get it! These procedures are explained in the Display Screen Equipment Regulations and guidance which have been widely circulated by Health and Safety Services. If you would like more information or advice, please contact the University's Occupational Health Advisor, Dominique Desoutter, at the Occupational Health Unit, Drummond Street Annexe (next to the Geography Department) - tel (650) 8192.

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Miscellany

You can find out about environmental discussion groups on Usenet - such as "talk.environment" - in the EUCS publication *Usenet overview*, available from EUCS Sales Points, which tells you how to locate and subscribe to them. These groups permit the worldwide exchange of information at the cost of a negligible amount of electricity. This is among the topics discussed in a book by Don Rittner - *EcoLinking - Everyone's Guide to Online Environmental Information*, published by Peachpit Press - which is available in local bookshops.

PC Conferencing (mentioned for example in last June's *BITs*) and "telecottaging" have arrived. People can use computers and communications networks to work from home or local IT Centres, saving time, money and a vast amount of energy - in addition to reducing the need for "energy-guzzling offices". This is one of the benefits of SuperJANET, the UK's new high-speed academic network whose progress has been charted in *BITs*.

Many companies are now finding that there are significant advantages - savings in time and money - in having their employees work at home, either using a standalone computer, or logging in to the office computer across a network. One obvious example is British Telecom, which is experimenting with providing its Directory Enquiries service this way. This form of working - from home or from a small local IT Centre - is "Telecottaging", or "Telecommuting", and is potentially a good way to bring employment to rural communities. Further information from the Association of Teleworkers, Telecottagers and Telecentres on 0800 616008.

Earthwatch runs scientific environmental field projects around the world, finding volunteers to help scientists collect data which is then analysed on computers to develop our understanding of our planet. Further information from 0865 311600. (In an interview last year, David Bellamy praised the use of computers in Geographical Information Systems, which are helping the quest to achieve sustainable development.)

Computer manufacturers are increasingly aware of environmental concerns. Most of them have now found alternatives to CFCs as circuit board cleaners. There is a new, environment-friendly, interpretation of the three Rs now: Reduce, Reuse, Recycle. There is also an Industry Council for Electronic Equipment Recycling - and there will soon be European Community legislation on electronic waste.

Incidentally - and apocryphally - the ozone hole now growing over the Antarctic wasn't noticed for several years as a computer was programmed to reject observed data because it couldn't be right. Computers can only be as good as the people who make, program and use them!

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Anything else?

The Editor welcomes any suggestions for ways of diminishing our impact on the environment, using computers or in our use of them, for inclusion in future editions of *BITs* or *IT Forum*.

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