MISCELLANEOUS

CAVING, COMPUTERS AND COMMON SENSE

Gordon L. Greaves

ABSTRACT.

The Personal Computer became a usable tool for scientists and researchers in all fields some time ago. Although the prediction of "a computer in every home" still has a long way to go, a computer in every office is becoming a reality. Certain aspects of personal computing are tailor made for the caving field.

INTRODUCTION.

Using a Personal Computer is no longer a habit restricted to the fortunate few. Computers have dropped in price and gained in power in quantum leaps. In the early days (and bear in mind that we are discussing a life span of fifteen years!), there was very little that a personal computer could do. It was, in reality, not much more than a diabolically expensive calculator that took up far too much room to be practical. That situation did not change until the advent of the first of the spreadsheet programs, VisiCalc. At last the computer could do some useful work. From this simple beginning, the explosion took place. Todays equivalent, Microsoft Excel, is usurping some of the work that required major installations in earlier days.

One major factor is required in any aspect of computing - the operators imagination. To sit down with a standard word processor, spreadsheet or even an accounting package with no imagination means that you will only reap about thirty to fifty percent of the benefits that program is capable of bringing you.

DESKTOP PUBLISHING.

Desktop Publishing, or DTP, is the art of utilising everyday computer equipment to create work that would normally be done by a professional printer using typesetters and gluepots. With DTP, this can all be done in one operation under *your* control, and allows you try various layouts at minimal expense. There are various traps to avoid in DTP, some of which have been dealt with in our other paper, but we did not cover fonts and graphics in any detail.

A page of varying type styles (or "fonts" as they are termed in DTP) tends to detract from the actual content of the document itself. Some examples of fonts are virtually unreadable when used en masse - a short notation in a different font can attract the reader and be acceptable, whereas a large block of text in the same font is not. An example is the Helvetica font. Helvetica is ideal as a headline. It is stark and stands out. As "body text", however, Helvetica can be confusing. The generally accepted font for body text is Times Roman, or a variety thereof. The major difference between these two fonts is that Helvetica is a "sans serif" font, while Times Roman is a "serif" style. A serif is a small cross-line at the top and bottom of a character which tends to lead the human eye from one letter to the next. The curves are also carefully designed to be pleasing to the eye. It is interesting to note that most of the typefaces in general use today are several hundred years old.

Another area that deserves discussion is "justification" of text. It is generally considered that a "ragged" right margin is an informal style, while "flush" right margins indicate a formal passage. You will note that this entire publication is fully justified (flush left and right margins). While this can occasionally mean slightly larger spaces between some words, using a "proportional" font will tend to alleviate this. A proportional font is one that takes up the required amount of space for a given letter, while a non-proportional font takes the same amount of text space for every letter, regardless of that letter's width.. Table 1 should help to clarify the distinction. Table 2 shows some of the fonts generally available.

TABLE 1.
PROPORTIONAL AND NON PROPORTIONAL FONTS.

abcdefghijklmnopqrstuvwxyz 1234567890 Times Roman 10 point proportional.

abcdefghijklmnopqrstuvwxyz 1234567890 Helvetica 10 point proportional.

abcdefghijklmnopqrstuvwxyz 1234567890 Courier 10 point non-proportional.

abcdefghijklmnopqrstuvwxyz 1234567890 Lineprinter 8.5 point non-proportional.

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TABLE 2.
FONT TYPES.

Courier font, general use.

Times-Roman, body text.

Helvetica, headlines.

University Roman, old fashioned.

Broadway, headlines.

Cooper Black, headlines.

Coronet, invitations, tickets, etc.

Bauer Bodoni, decorative.

Another major factor in the presentation of documents is the use of graphics. A picture may be worth a thousand words, but it can also make the author wish that the picture had been left out altogether. There are certain rules that should be followed to attract interest in a publication, and a lot of these rules concern the placement and sizing of graphic images. Graphs that are nowhere near the text which describes them should be avoided at all cost, as the reader has to continually move their eyes away from the centre of interest, the text. Graphic images in the top left-hand corner tend to keep drawing the eye back up to the top of the page, whereas the same graphic placed in the bottom right-hand corner will tend to force the reader to continue through the page.

Graphics should be scanned at their final size - in other words, if the required final image is 10 cm by 10 cm, enlarge or reduce using the scanners software so that the image file generated is 10 cm by 10 cm. If you generate the image at a different size, re-scaling it in the publishing software will lead to distortions and an enormous loss of quality.

Careful use of background graphics (i.e. Graphic images faded into the background behind the text) can be a great attraction on a page, giving the reader the impression of friendliness. A plain page in a dry text can be almost impossible to read, as no doubt you have discovered. You must encourage the reader to read and assimilate the information you are trying to put across.

SPREADSHEETS.

From its humble beginnings, the spreadsheet has now advanced to the stage where they are amongst the most powerful programs available on a personal computer. The major programs, such as Excel, Multiplan and Lotus, feature a capability known as a "macro". A macro is simply a method of writing a sub-program, so that when a certain combination of keys is pressed, a predetermined action will occur that is not an original function. Most major programs now allow you to "record" a macro, rather than having to write it as a program. To record a macro, you turn on the recorder, then step through the proposed task yourself until such time as the task is completed. The recorder is then turned off, and the macro assigned a key which will initiate it. No programming skills are required. The macro is then ready for use whenever a new set of data is entered.

Given a datum line through the centre of a cave, it is a simple task, using Microsoft Excel as an example, to draw a cave map. At points one meter apart along the datum line, measure the distance from the datum line to one side of the cave wall. Then measure the other side in a similar fashion. Enter the figures into Excel, giving one side a positive value and the other side a negative value. The floor layout of the cave (or roof to floor, should you have those figures) can then be charted using a line graph. And you also have the figures available should you wish to calculate the floor area of the cave, or the area of any section. While in the chart section, text can be added anywhere on the page. As the only requirement for drawing this map is the entry of two rows of figures, the speed and accuracy benefits can be enormous.

Unfortunately, caves do not very often run in a straight line. This means that a new chart would have to be prepared for each section, then the sections joined together.

Printing on a laser printer will give a very professional quality to your map. Refer to Appendix I for an example of an imaginary cave map drawn using a combination of Excel and a Hewlett-Packard LaserJet Series II. This map was drawn solely to test out the theory, which was conceived during the writing of this article.

Spreadsheets can, of course, calculate all the variables involved in statistically reporting on cave and surface biology. Since spreadsheets have the capability of manipulating figures in any way, shape or form, most jobs that would previously have required many hours of hand calculation or the use of a large computer, this power is now available cheaply to all.

DATABASES.

A database program is simply a method of holding data. Up until the last twelve months or so, this data had to be in a rigidly structured form. Recently we have seen the advent of the "hyper" databases, such as HyperCard for the Macintosh and similar software for the IBM. These programs allow related data to be entered without any regard for format. As data is entered, keywords are marked and future retrieval on the subject matter involves simply telling the software what information you want. It then searches by keyword and retrieves all relevant data.

Structured databases, on the other hand, limit the amount of data that can be placed in any field on a screen form. They also limit the type of data that can be entered into a field. For example, a field may require numeric data, and will reject any alphabetic input, often with an indecipherable message. Once again, the power of the program is far greater than many realise. Many of the databases in use today are what is known as "relational"databases, describing the feature that allows them to have multiple files linked together in a programmable form. From these, which include such programs as dBase, Informix and filePro, a complete "stand-alone" program can be constructed - for example accounting packages. However, programming knowledge is definitely required.

Structured databases can also be of the single file, "flat file" type. These do not allow interlinked files, and all data must be entered into one large file. Some clever variations have appeared in this area in recent years, not the least of which is a program called "Q & A". This program has a feature called the "Intelligent Assistant", which can be trained to answer queries that bear no relationship to program requests. For example, given that each item was in a separate field, it would be possible to type in **"give me a list of all caves in Chillagoe that contain more than 50 swiflets and less than 100 bats and have a cave tag number higher than 200".** The Intelligent Assistant would examine your request and return a confirmatory question, for example **"do you want me to list all caves where prefix = ch and swiflets > 50 and bats < 100 and tagnumber > 200?".** A press of a key and the information is on your screen in something under three seconds! Q & A also has word processing facilities, and can enter the databases answer directly into your document. The main drawback is the amount of memory required, as all database and word processor documents are held in memory - 640K is a minimum.

HARDWARE (COMPUTERS).

This is probably the most argued about item in the personal computing field. There is, however, one standard, IBM/MS-Dos, and we are seeing the emergence of the Macintosh as a second standard. There are a great many systems that operate under the IBM standard, but only Apple computers can run Macintosh software. Beware of the cheaper machinery with a brand name of which you have never heard. While it is not necessarily bad equipment, it would be comforting to know that the equipment you buy today will still have a viable supplier two years from now. "Your Computer" put it best some time ago when they said "If we threw a party for every supplier who advertised in our first issue who is still in business, we would have to get some people from Rent-A-Crowd to help fill a very small room". This is a fair indication of the situation in the industry.

Another area that requires careful consideration is the type of equipment you require. These days some of the portable machines are more powerful than their desktop equivalents - and they can be run on batteries in the field, or from the cigarette lighter outlet in a vehicle. For example, referring back to the section on spreadsheets, it would be possible to take a portable computer into a cave and actually map it while you were there, checking the output given against what you can see around you. You would not need to print; an on-screen display would be sufficient.

HARDWARE (PRINTERS).

Printers range from quite cheap dot matrix printers to the high-output lasers and beyond. Two kinds of lasers are expected within the very near future at affordable prices - the colour laser and the high-resolution laser. High-resolution lasers will have output around 1200 dots per inch, and will be virtually indistinguishable from typeset documents. Colour lasers will almost certainly have the capability to produce any colour or shade at very high resolution. In fact, both are available now, but the pricing is prohibitive. Recently Hewlett-Packard released the IID, a duplexing laser printer - it can print both sides of a sheet of paper at 300 dots per inch at a rate of 7.4 pages pages per minute.

Some of the dot-matrix printers are also capable of printing in very high resolution, due to making multiple passes over each line of text or graphics. The more pins in the head, the better the output. Head types are either 9 pin or 24 pin, and one manufacturer has recently released a 32 pin printer.

HARDWARE (SCANNERS).

Scanners come in two major forms, the hand held and flat-bed type. While the flat-bed has been around for some time, the hand held scanner is a comparatively recent innovation. Both types have special software which must be loaded prior to use, and may generate images in a number of formats. Great care needs to be taken here - not all image types are acceptable to all publishing software. As a rule of thumb, if the scanner won't generate a "TIFF" file (Tag Image File Format) don't bother with it.

HARDWARE (DIGITISERS).

Digitisers come in many types. The simplest digitiser is the common joystick, which can be used with some graphics software to draw on-screen images. The most versatile digitiser is the mouse - preferred because of it's ability to work with a wide variety of software and it's insignificant price. With most mice (meese?), two buttons are more than sufficient. Some have one, others have three or more (there is one on the market with seven....), but the most common, the Microsoft Mouse, has two, and most software is written to utilise just two. Other digitiser types include the graphics tablet, which requires the use of a flat, generally A4 sized tabletop

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Other digitiser types include the graphics tablet, which requires the use of a flat, generally A4 sized tabletop device equipped with either a cross hair or stylus type cursor, and capable of being used up to 10 cm away from the pad itself. This can be handy should you be trying to recreate a graphic from a bound publication.

CONCLUSION.

Rules are made to be broken, but the following should assist anyone contemplating entry into the Personal Computing field.

- If you cannot guarantee on-going support, don't buy it!

- If it's been around for a while and no-one else is using it, there has to be a good reason. It probably doesn't work...

- Don't be an orphan. Buying something simply because it looks good is not a recipe for continued enjoyment of computer hardware or software. Will it do the job?

- Buy major software and hardware from a brand name you know.

- Ensure that the dealership from whom you purchase knows what they are talking about. When they have finished talking, make them show you. If you cannot get a demonstration of what they are offering, run, don't walk, to the nearest exit!

- When taking delivery of equipment, ensure that the equipment is set up for you, if you don't have the knowledge to do so yourself and you are shown that the system does in fact work as advertised.

Until you consider yourself an expert in computing, stay away from anything new - the .01 version of anything has most of the "bugs" removed from the .00 version....

Computing can be anything from a labour saver to an art-form. You can enjoy your time with a Personal Computer, or it can be a nightmare. Every computer system should have at least one game on it somewhere - hours and hours of technical work staring at a screen can send your mind totally numb, or even mildly insane. Rest and Recreation is definitely advised (Flight Simulator is GREAT!).

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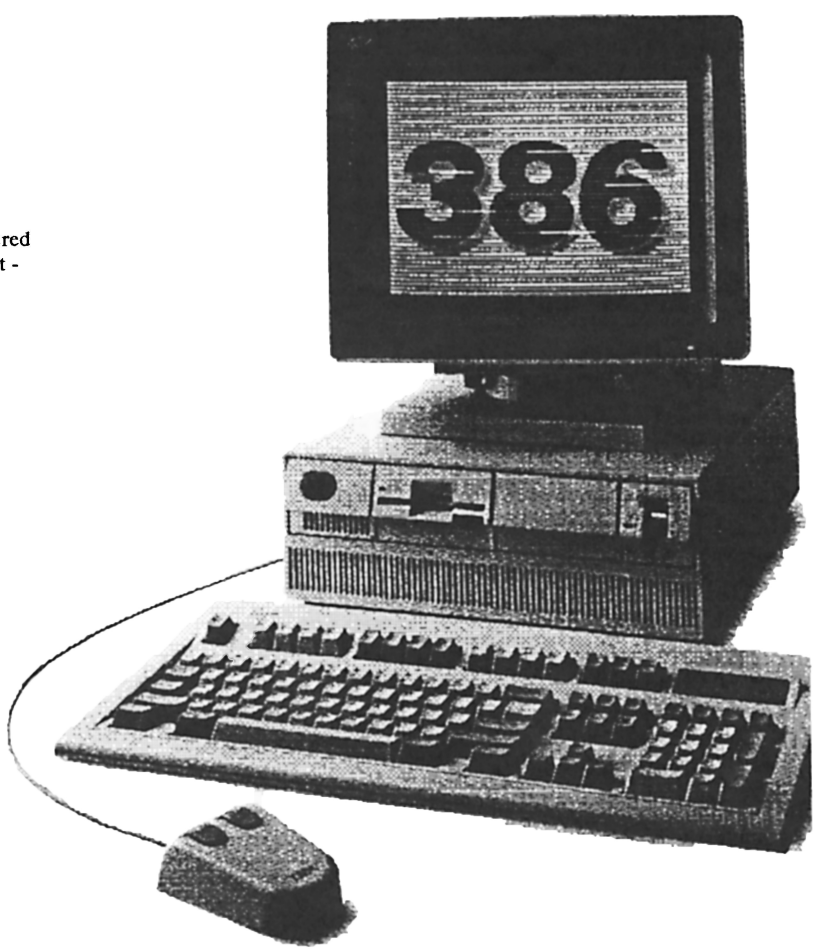
Gordon L. Greaves,
82, Minnie Street,
Cairns, Q. 4870.



Scanned Photo - The IBM Personal System/2 Model 70 scanned on a Hewlett-Packard ScanJet.

APPENDIX I.

TYPICAL CAVE PROFILE PRODUCED BY "EXCEL".

Cave Profile - A series of points was entered, using positive for above the datum line, and negative for below. The data was then sent to the charting section and the resultant chart printed.