Barbara Beeton and asked her what it should look like. And I must say: she did a very nice job!

The logo on Antoni Diller's book looks horrible, since the 'A' in LaTeX is *much* too far to the right. Not only that, but it is also reproduced like that many times on the front cover. Add to this the poor design of the book and the fact that it was reproduced from low-resolution output, I am afraid that there is another book about LaTeX on the market that I cannot recommend.

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Typesetting on Personal Computers

ET — A TeX-Compatible Editor for MSDOS Computers

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Abstract

An editor for visually editing (LA)TeX files is described. It runs on MSDOS computers. A comparison with `Scientific Word` is given.

1 Introduction

Many of us are familiar with the advantages of (LA)TeX for scientific word processing and typesetting. It provides a high quality of typesetting of complex mathematical material that is fully acceptable for the best publishers. The software runs on a wide variety of host computers. Document files are plain ASCII files that can be readily transmitted without problems between disparate computers and over network connections. In the kinds of scientific collaboration that many of us are involved in, these last advantages are very important. The portability allows electronic submission of papers to journals and electronic bulletin boards.

However, the user interface of TeX shows its great age of well over a decade. For LaTeX to output

$$\phi(x,Q) = \frac{Z_2^{(Q)}}{Z_2^{(\Lambda)}} \int^{Q^2} \frac{dk_\perp^2}{16\pi^2} \psi^{(\Lambda)}(x,k_\perp), \qquad (1)$$

the user has to put up with typing

```
\begin{equation}
\phi(x,Q) = \frac {Z_2^{(Q)}}{Z_2^{(\Lambda)}}
            \int^{Q^2}
            \frac {dk_\perp^2}{16\pi^2}
            \psi^{(\Lambda)} (x,k_\perp).
\end{equation}
```

Even though this formula is quite simple, the source text is relatively complicated to edit. The reason is that one's mind has to translate the TeX source to something like Eq. (1).

On the other hand, one mostly edits scientific papers in terms of content rather than appearance. Thus it is not essential to have an editor with a full WYSIWYG ('What You See Is What You Get') display that shows on-screen exactly what one will get on paper. Remember that a handwritten equation in a colleague's draft of a paper is much easier to read than the corresponding TeX source, at least if the equation is complicated and the handwriting is neat. But one should be able to edit in terms of the content of a document, not in terms of the low-level TeX commands. This is particularly important when one is composing a document at the keyboard, as I often do, for example from the transparencies of a talk at a conference.

To handle this problem, I have written an editor called ET (for Edit TeX). It satisfies the following requirements:

- ET should allow one to edit visually the most common mathematical constructs directly, and should immediately show them on-screen. ET in fact works with Greek letters, sub- and superscripts and built-up fractions, showing them as mathematics, not as TeX control sequences.
- ET should make it easy to type and edit these objects from the keyboard. It is frustrating to navigate a menu to perform a common and simple operation like entering a single Greek character.
- ET should generate standard, or almost-standard, TeX and LaTeX files, with at most a small number of special macro definitions.
- ET should be able to import an ordinary (LA)TeX file and edit it. That is to say, it can handle files generated by a collaborator who neither uses ET nor knows about it.

- It should be simple or trivial to enter ordinary TEX and LATEX commands for constructs that ET does not handle.
- ET should run with adequate performance on even a low-grade computer like the cheap IBM clone many people have at home for simple word processing. (Of course, one would probably do the TEX printout using a fancier machine at the office.)

For the purposes of the editor, a LATEX file is an ordinary TEX file: the differences between TEX and LATEX are almost entirely in the commands that concern the overall structure of the document. Indeed, I find it relatively unimportant to have a WYSIWYG display for such 'structural commands', at least in scientific papers. To see the characters `\section` is as useful as seeing a section heading formatted identically to the final hard copy.

I find ET to be a comfortable editor to use for composing (LA)TEX papers. When I am working on a collaboratively written paper and receive a draft from a co-author, I find it best to use ET in preference to using a regular editor on the TEX file when I am revising the draft.

One of the great advantages of using ET is that many trivial TEX errors are avoided. Errors with unbalanced braces and with misspelled control sequence names are restricted to those parts of the file that are typed in ordinary TEX.

ET runs on most MSDOS PCs — typical IBM clones. It will also run under DOS Windows and SunPC on Sun workstations (which emulate an IBM PC).

To obtain ET, it is easiest to use anonymous ftp to `ftp.phys.psu.edu` — see a later section for details. If that is not possible, contact me — most easily by e-mail to `collins@phys.psu.edu`.

2 What ET Does

As regards its non-mathematical features, ET is a fairly standard editor for ASCII text files. It has the usual features for insertion and deletion, for searching and replacing of text, for cutting and pasting, and so forth. Editing functions are invoked by the PC keys in the usual way. Control-key combinations can also be used; the default is to assign them in the manner of the WordStar word processor that is familiar to many veteran users of personal computers. The assignments of the keyboard commands are completely reconfigurable. There is also a pull-down menu and on-line help. At present, there is no mouse support, although I plan to add this in a future version, if I get sufficiently many requests from users.

Two sizes of screen font are provided. The smaller of these allows over 43 lines on a VGA screen. The larger only gives 33 lines on a VGA, but is easier to read.

The editor contains an alternate font of Greek letters and common mathematical symbols. These are entered very simply: For example `alt/G` followed by `f` results in a ϕ on the screen. Characters in the Greek/symbol font are of course treated as single characters by ET, for example by the delete key.

There are simple keyboard short-cuts for opening subscripts, superscripts and fractions (`alt/L`, `alt/H`, and `alt/F`, respectively). The results are immediately visible on screen. Special short-cuts speed up entry of simple formulae — specifically `alt/+` superscripts the previous character and `alt/-` subscripts the previous character. Thus there is no need to access the menu for common operations, and ET is well suited to rapid touch typing.

Eq. (1) was entered using ET mathematics only. The only regular TEX commands (LATEX actually) consisted of the `\begin{equation}` and the `\end{equation}` lines.

Ordinary (LA)TEX commands may be freely intermixed with ET's mathematics: they are simply typed as in a normal text editor.

Although ET writes to the screen in graphics mode, it is fast and responsive on even the slowest of PCs. Care has been taken in the writing of the screen driver routines to ensure this. (The contrast with the `Scientific Word` [1] program is quite noticeable.)

Since TEX syntax is not very convenient for fast parsing, ET works with its own file format (which is regular ASCII text with interspersed control characters). Programs are provided for conversion in both directions, to and from regular TEX. Suppose I receive a file `paper.tex` from a colleague. I first convert it to ET:

```
textoet paper
```

This generates a file `paper.et`. Then I edit this file:

```
et paper
```

An extra step of conversion to TEX is needed before (LA)TEXing the file:

```
ettotex paper
latex paper
```

This process can be automated by a batch file, of course. The `ettotex` conversion is much faster than the processing by TEX, so the extra conversion does not give a significant time penalty.

It is the `paper.tex` file that results from the `ettotex` conversion that I send back to my collaborators.

Very rarely, the `textoet` conversion produces an undesired result. (This can happen in a macro definition, for example.) There are 'metacommands' that can be put in the `.tex` file to turn the conversion to ET off and on. These have the form of TEX comments, so that they do not interfere with normal processing by TEX. The untranslated part of the file is passed through as normal text. This does not preclude the use of normal TEX comments; it simply means that those few TEX comments that have the form of metacommands have the side effect of being instructions to the translation program.

The conversion from TEX is simple-minded, but robust. This enables it to handle (or ignore) TEX syntax errors, such as those generated, for example, by an older colleague who is rather inexpert at using TEX.

I have used ET and the conversion programs for a few years on all my scientific papers. Most of these have been written in collaboration with colleagues at other institutions round the world. A typical paper is transmitted by e-mail dozens of times. The conversion programs in particular have given no trouble with papers written by other people by normal methods (i.e., without ET) and without taking any precautions because of my use of ET. This is in sharp contrast to the `Scientific Word` program, which almost always crashes the operating system when importing even a syntactically correct LATEX file, and cannot handle plain TEX at all.

3 Compatibility with (LA)TEX

ET is fully compatible with LATEX. For other varieties, including plain TEX, the most that is needed is a definition of the macro `\frac`, viz.,

```
\def\frac#1#2{{#1 \over #2}}
```

4 Hardware and Software Requirements

The ET program and the `ettotex` and `textoet` converters run on any MSDOS (i.e., IBM compatible) computer.[1] This includes computers running Windows and OS/2. (ET will need to be run as a full-screen non-Windows program if you are running Windows, and it will need to run in an 'MSDOS compatibility box' under OS/2.)

The only restrictions are that there should be sufficient memory, which is normally present on current MSDOS computers, and that there should be a suitable video card, which at present means: EGA, VGA, CGA, Hercules. It would be fairly simple for me to add to this list any other graphics-capable card.

[1] Such compatible computers include emulators of IBM PCs, in particular, DOS Windows and SunPC on Sun workstations. To ensure compatibility in such a mixed UNIX-MSDOS environment, both ET and `textoet` will correctly read text files in the standard UNIX format.

5 Comparison with `Scientific Word`

Recently, a scientific word processor, `Scientific Word` [1], has become available whose announced purpose is identical to that of ET.

`Scientific Word` is a much fancier program than ET, and it aims to take much more of the burden of using TEX from the user. As such it is an excellent program. Unfortunately `Scientific Word` has some severe disadvantages, which leave ET a very useful tool in many situations.

The simplest disadvantages are that `Scientific Word`'s editor is slow and that it lacks some basic features like search and replace. It also runs only under Windows (which is not a great disadvantage nowadays).

The main problem I have found is that `Scientific Word` relies on its own extensive package of LATEX macros. In a collaborative environment, where one may receive a first draft of a paper written in some other TEX dialect (and in particular not in LATEX), this is a fatal problem, especially when `Scientific Word`'s utility to import LATEX files typically crashes the operating system without so much as an error message from the filter. The authors of `Scientific Word` explicitly say that they do not regard the importing of TEX to be an important function. The philosophy I have adopted with ET is essentially the opposite, and this is based on the actual use I and all my colleagues make of TEX. If we did not collaborate and did not submit papers electronically to journals and to bulletin boards, a regular WYSIWYG editor with good equation handling facilities would be very tempting.

Another problem is that `Scientific Word` does not allow free intermixture of regular TEX commands in a simple way. For example, one is forced to edit an `eqnarray` environment entirely in TEX in a separate window, and entirely without the benefit of the mathematics editing features of `Scientific Word`. Again, I see one of the important features of TEX to be its ability to define new commands and to redefine old ones. Therefore ET is designed to handle such definitions. Or rather, it is designed not to handle them, but to treat as regular text any constructs it has not been programmed to know about, and this treatment needs no special precautions or special configuration.

6 How to Obtain ET

ET and its associated programs and files are freely available by anonymous ftp or by request on floppy disk. (Note that the program is copyrighted and is not public domain.)

The following is a typical session for obtaining ET by anonymous ftp. User input is underlined.

```
>:  ftp ftp.phys.psu.edu
Name (ftp.phys.psu.edu:collins):
anonymous
331 Guest login ok,
send e-mail address, e.g.
user@host", as password.
Password:  _ ...
YOUR NAME@NODE GOES HERE

ftp> cd pub/dos_tools/et
ftp> binary
ftp> prompt
ftp> mget *.*
ftp> bye
```

Some changes may be necessary if you are using a different version of ftp. The `image` command, or its equivalent[2] is essential to avoid mangling the files, especially the executable files.[3] Remember that if you download these files to a non-MSDOS machine, and then download them to a PC by a terminal emulator program (e.g., KERMIT), then you will have to set the file type to `image` or `binary`, or whatever is the equivalent for your program.

The files can also be obtained in a compressed form in a file `etzip.exe`, which is available from the same anonymous ftp location. This file is in the subdirectory `zip` of the directory where the uncompressed files are held. It is a self-unzipping file: execute the file on an MSDOS computer, and it will generate the files for ET.

A `aaaread.me` file among those you have downloaded will tell you how to install ET. There is also a documentation file `etdoc.et` that will give you a manual for ET when printed out.

If for some reason you are unable to use ftp to obtain ET, I can send it to you on a floppy disk. Send me a request at the address shown at the end of this article. Include $5 for shipping etc., and state the MSDOS disk size and density that you can use.

In any case, if you use the program and find it useful, send me a brief note (preferably by e-mail to the address given below), so that I can send information about new versions. Also, let me know of any requests you have for new features, and of course let me know about any bugs. I am aware of some of the improvements that can be made. But there is only a point to spending some of my limited time on improving the program if there is an audience for it (and if I know about the audience).

Acknowledgments

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References

[1] `Scientific Word`, TCI Software Research, Inc., Las Cruces, NM.

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[2] E.g., the use of the command `ftp /image` to invoke `ftp` on some VAX/VMS systems.

[3] The text files can usually be downloaded safely in ASCII mode, but may suffer from extra carriage return characters at the ends of lines.