

## Travels in T<sub>E</sub>X Land: Another ornament for “thought breaks”

David Walden

**Abstract** In this column in each issue I muse on my wanderings around the T<sub>E</sub>X world. I suggested at the end of section 2 of my last column that I would continue my investigation of colors and T<sub>E</sub>X in this issue. However, I was distracted for much of the period between issues by a health problem (now resolved). Thus, in this issue I only have time to touch *briefly* again on a topic from my column in TPJ 2005-4—another ornament to use for “thought breaks.”

### Another ornament to use with “thought breaks”

Before reading the rest of this column, you might look up my column in issue 2005-4 and read section 4 on “thought breaks”: <http://www.tug.org/pracjournal/2005-4/walden/>. You might also look at Steve Peter’s piece in the same issue on “swelled rules”: <http://www.tug.org/pracjournal/2005-4/peter/>.

In the previous column I began using the words “thought breaks” to describe those points in the text of a book or article where a new train of thought begins without there being a section or subsection title. Such breaks are often indicated by some extra vertical space and some sort of ornament or by some extra vertical space and perhaps a different font face for a character, few characters, or few words, as shown at the beginning of the following paragraph (this particular style of thought break, including the seemingly odd half line indent, is used in the U.S. hardback edition of Robertson Davies’ book *The Cunning Man*, published by Viking in 1994).

**D**URING my health situation, I spent some of my time reading *The Book of Salt* by Monique Truong. I read the paperback edition from the “A Mariner Book” imprint of Houghton Mifflin Company

(Boston and New York) that was first published in 2004. This book used an ornament to indicate thought breaks (see page 36, for example) that I greatly admire. Thus, I thought I would try to replicate it ...

bitter in the back of my throat. I point to a table on which several quinces sit yellowing in a blue and white china bowl. I shake my head in their direction, and I leave the room, speechless.



Paper-white narcissuses, one hundred bulbs in shallow pools of moistened pebbles, their roots exposed, clinging, pale anchors

... in some way that allowed me to use it with  $\text{T}_\text{E}\text{X}$ .

The easiest thing is to scan the ornament, clean it up a bit with Photoshop, and access it as a graphic, e.g.,

```
\noindent\hfil\scalebox{.12}  
  {\includegraphics{salt-ornament-alone-3.jpg}}\hfil
```

which results in the following.



That looks pretty good (especially on the printed page—print it out). Blown up about eight times, it looks like this:



But those little imperfections aren't really visible in the size I would use it in a book, as shown above.

However, I thought that it might be “more pure” to somehow recreate the ornament in METAFONT, MetaPost, or some  $\text{L}^{\text{A}}\text{T}_\text{E}\text{X}$  graphics package.

At this point, I got to chatting (via email) with issue editor, Yuri Robbers. He noted three possibilities that came to mind for him for creating the desired graphic:

1. using a large print on graph paper and hand coding the outline of the ornament
2. using autotrace and pstoeedit
3. from MetaPost to METAFONT or an otherwise usable glyph or font

## First approach

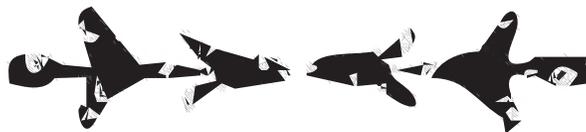
The first approach had already come to mind before I talked with Yuri. As Yuri noted, this was the approach used by Donald Knuth, and described in his *Digital Typography* book, to develop his early fonts and also used by Knuth with Zapf to develop the Euler Math Fonts. However, the 600 dpi scan I have would still need to be blown up by a factor of four or more to be big enough to measure and hand code its coordinates, but at that magnification it no longer is made up of smooth curves and straight lines—rather, it's made up of lots of pixels that would require lots of interpolation, e.g., using a French curve to draw the outline.

## Second approach

The second approach had immediate appeal because it sounded like a program would do the tracing for me, as described by Karl Berry in “Making outline fonts from bitmap images,” *TUGboat*, Volume 22 (2001), Number 4, pp. 281-295, which Yuri pointed me to. So, I downloaded an already-compiled Windows version of the autotrace program from <http://autotrace.sourceforge.net/>, unzipped it into a folder autotrace, opened salt-ornament-alone-3.jpg with Photoshop, saved it as a bitmapped file, salt-ornament-alone-3.bmp in the directory autotrace, read the README file a tiny bit, and gave the command

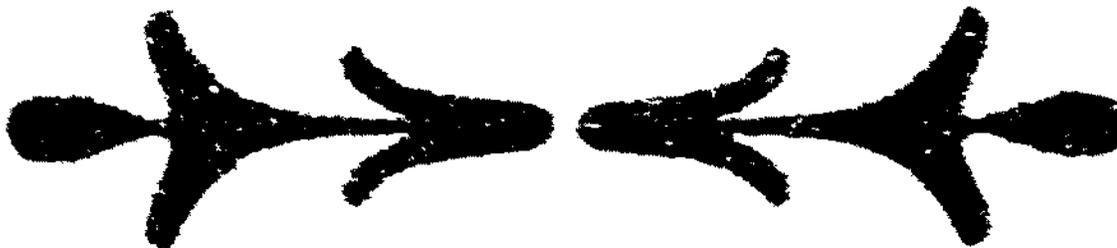
```
./autotrace.exe --output-format eps --output-file out.eps salt-ornament-alone.bmp
```

This ran to completion but produced the following file (blown up so you can see the details)

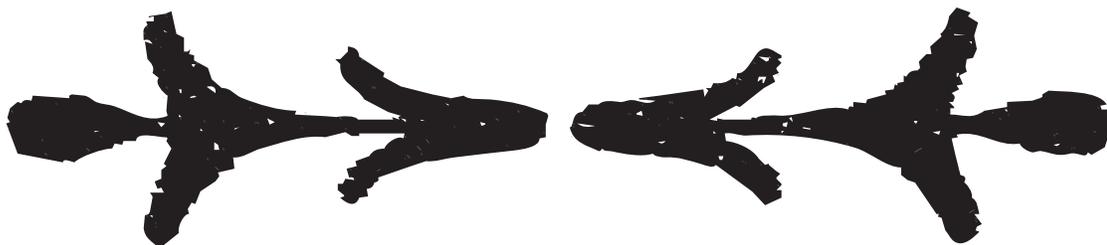


which is not usable. But it is sort of amazing that it managed to find the outline at all. To make `autotrace` do what I wanted was maybe going to take more reading of the options described in the README file.

But, before taking the big step of reading and understanding the `autotrace` man page (all the documentation it has, apparently), I decided to first bash ahead and see if a better scan of the ornament would help. I rescanned the ornament at 2400dpi (4 times more resolution than the first scan had) and specified for the scanner to directly output a bitmap image (rather than outputting a JPG which I later converted to a bitmap using Photoshop), and specified B&W rather than color (I had scanned the earlier image in color and later converted it to B&W in Photoshop). This resulted in approximately the following image



which has a few white spots and some non-smooth corners but looked pretty good. So I tried `autotrace` again, which resulted in the following as an EPS or PDF file.



That's only slightly worse than the scan—which still leaves me sort of impressed with that capabilities of `autotrace`. But, of course, I could have just converted my improved bitmap to EPS or PDF with Photoshop and skipped using `autotrace`, so it was actually not much help in my situation versus just using

the scan itself with `\includegraphics` embedded in a new  $\text{\LaTeX}$  command such as `\dropinornament`.

See also the Appendix.

### Third approach

Thus, it seemed like it was time to try Yuri's third suggestion—trying to figure out some curves in MetaPost, for instance, that approximate the desired ornament.

I looked at the documentation in the *Graphics Companion* for a few minutes and got discouraged about figuring out how to find the points to generate splines, Bézier curves, etc. (like many or perhaps most people, I have a pretty short attention span for reading documentation). So I looked again at the high resolution scan of the previous section, this time with Illustrator. With Illustrator it was pretty easy to select the pen tool, touch points approximately on the outline of the scan (fuzzy though it was at the edges), and read the X-Y coordinates of the pen position from Illustrator's GUI display.

Thus, I collected points along the top half of the left half of the ornament. I put these into Excel, thinking that I would use Excel to create a reflected set of points with which to draw the bottom half of the left half of the ornament. In the end, I didn't need Excel for this, but it was handy to have the points in Excel for converting all of the points to positions where both their X and Y coordinates were positive (MetaPost apparently didn't like points with negative X values that I had recorded from the images position in Illustrator).

I next looked up how to use MetaPost to draw a set of connecting curves from point by looking at the first 20 or so pages of Hans Hagen's MetaFun manual ([www.pragma-ade.com/general/manuals/metafun-p.pdf](http://www.pragma-ade.com/general/manuals/metafun-p.pdf)). I tried one small test using his instructions on page 9 for running MetaPost directly, but immediately switched over to running Con $\text{\TeX}$ 's `texexec`, as also described on page 9, so I could easily go straight to a PDF without having to run Adobe's Distiller. (Of course, I could also have looked at MetaPost output using Mi $\text{\TeX}$ 's YAP display of DVI files.)

It took me at least an extra hour to get all the X-Y coordinates typed correctly into my text editor (just using the scan directly is looking better all the time). Here is what I fed into MetaPost via `texexec`:

```
\starttext
\startuseMPgraphic{dummy}
  path p;
  p := (1,145)..
    (4,156.5)..
    (13.5,162.5)..
    (27.5,164)..
    (42,163)..
    (55.5,160)..
    (68.5,155)..
    (83,149)..
    (92,150)..
    (96,160.5)..
    (91,170)..
    (86,182.5)..
    (82.5,198.5)..
    (84,207.5)..
    (89,211.5)..
    (96,211.5)..
    (102,205)..
    (107,193.5)..
    (115,183)..
    (125,172)..
    (136.5,163.5)..
    (155,155.5)..
    (171.5,152)..
    (187,150)..
    (208.5,149.5)..
    (221.5,148.5)..
    (228,148.333)..
    (233.167,148.5)..
    (234.833,148.5)..
    (235,149.667)..
    (234.167,150.667)..
    (230,151.883)..
```

```

(223.167,155)..
(212.833,161.333)..
(204.833,167.333)..
(199.5,175)..
(198.167,182.333)..
(199.833,186.667)..
(203.167,189.667)..
(208.167,189.667)..
(210.833,187)..
(216.5,180.667)..
(225.5,173.333)..
(233.833,168)..
(241.167,166)..
(251.167,164)..
(258.833,162.667)..
(267.167,161.333)..
(274.5,160.333)..
(284.167,160)..
(293.5,159)..
(304.5,158)..
(313.167,155.667)..
(317.833,153.667)..
(321.167,151)..
(322.5,145.667)..
(322.5,145)--cycle);
fill p withcolor black;
draw p;
path q;
q := p reflectedabout((0,145),(335,145));
fill q withcolor black;
draw q;

```

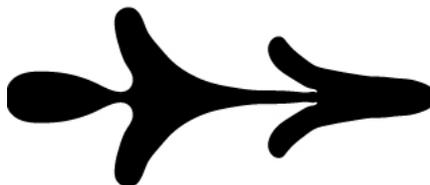
```

\stopuseMPgraphic
\useMPgraphic{dummy}
\stoptext

```

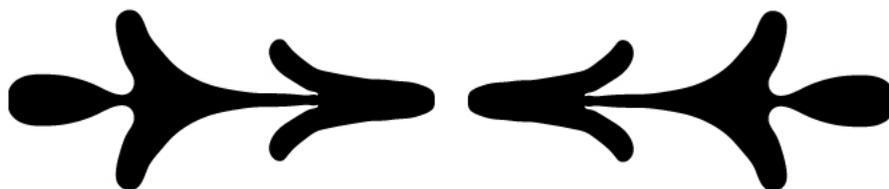
I learned about filling a closed cycle by glancing at Troy Henderson's "A beginner's guide to MetaPost for creating high-quality graphics" (<http://www.ursoswald.ch/metapost/tutorial.html>). I learned about creating the bottom half of the left half of the ornament by reflection in MetaPost from the same few pages at the beginning of Hans' manual.<sup>1</sup>

The figure produced by the above MetaPost code is the following, which I converted into a JPG so I could include it here using `includegraphics`:



Obviously at this point I could have tuned up some of the coordinates in my MetaPost file to eliminate slight imperfections in the ornament. However, when the ornament is reduced to the appropriate size for use in a book or paper, I doubt these imperfections will show, and so I will not bother trying to make things more perfect.

Now I suppose I need to learn how to give a name to the above drawing in my MetaPost code and then rotate it about a vertical axis to get the other half of the ornament. And I also suppose I need to learn to input the Postscript from MetaPost into  $\text{\LaTeX}$  file. However, it really is easy to just copy the half ornament in Photoshop, rotate it, paste the rotated copy, and save the pair of half-ornaments as a graphic, e.g.,



which I can insert into any text file by defining a macro with the appropriate scaling and with an appropriate name, e.g., into a `thoughtbreak` macro such as I illustrated in my 2005-4 column:

```
\newcommand{\thoughtbreak}{\vskip2pt
```

---

1. You can get the file itself, `half-ornament.mp`, from the HTML page for this column.

```
\centerline{\scalebox{.05}{\includegraphics{two-half-ornaments.jpg}}}
\vskip2pt\noindent{}}
```



This looks pretty good compared with the scan from the book on page 2, so I think I'll end this column now. The graphic for this ornament is in the file `two-half-ornaments.jpg` which can be accessed via this column's HTML page.

## Postscript

The 2008 Major League Baseball season is about to start, and the *Red Sox Annual 2008* from Maple Street Press (Hanover, MA) has been published and uses the following ornament for its thought breaks.



I love it.

## Addendum

After I thought I was finished with this column, I received an email from Aditya Mahajan who had read the column on the journal's staging website before this issue was officially posted for public viewing. He said, "I do not understand why, ultimately, you are using the ornament as a jpg. Since you have created the ornament from MetaPost, you can simply include either a pdf or eps into your document. That way, you retain the advantage of having the ornament as a vector graphic. A jpg is a bitmap format and will not look good when zoomed in; the pdf/eps format will look good even when zoomed in.

"Since you are using MetaPost inside ConT<sub>E</sub>Xt, you can just say

```
\starttext
\startMPpage
metapost code
```

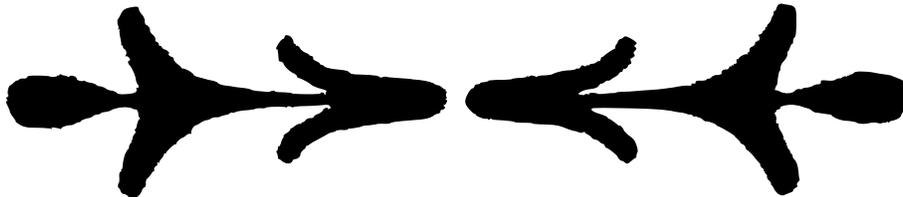
```
\stopMPpage  
\stoptext
```

and you will get a pdf whose page size is same as the size of the ornament.”

There were two reasons why I used a jpg. First, I only created half the ornament in MetaPost, and it was easier for me to use Photoshop to create the other half of the ornament and save the two halves as a jpg than it was to learn how to create the other half of the ornament using some symmetry operation in MetaPost. Second, I did not know how to get a PDF page which was only as big as the ornament when included as a graphic; Aditya Mahajan’s set of commands above apparently solves that problem.

## Appendix — Yuri’s experiment with autotrace

After reading the subsection on my efforts with the second approach, Yuri Robbers tried the second approach himself using my 2400dpi scan. He cleaned up the scanned image using Gimp (the free equivalent of me using Photoshop) and then ran autotrace. The autotrace processing created the file `yuri.mp`, which in turn was converted into an EPS file which produce the following image:



His result is not quite as good as my result from using the third approach, but it is obviously a pretty good result.

The content of Yuri’s MetaPost file (`yuri.mp`) can be seen by looking at the link on the HTML page for this column.

## Acknowledgments

Issue editor Yuri Robbers provided editorial and editing help and other guidance and ideas. Karl Berry caught several typos and made other useful suggestions.

## Biographical note

David Walden is retired after a career as an engineer, engineering manager, and general manager involved with research and development of computer and other high tech systems. He holds an undergraduate math degree and completed a graduate school sequence of courses in computer science. More history is at [www.walden-family.com/dave](http://www.walden-family.com/dave).