Recent additions to TeX's font repertoire

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Garalde family

The first 150 years of the printing industry, beginning with Gutenberg in 1450, bear a striking resemblance to the early years of the personal computer industry. Both were intensely commercial enterprises, though with some high-toned gloss — Bibles then, scientific computing now. However, the real money driving the printers of the late 15th century was to a considerable extent *indulgences* — big money-makers for the Church as well as printers. As I learned from the fascinating books of Andrew Pettegree [2, 3], some monasteries were ordering from printers and selling to sinners hundreds of thousands of generic indulgences as soon as the technology to do so became available. The closest modern analogue may be the claim that pornographic movies drove the rapid growth of VCR and, later, DVD players.

The Lutheran Revolt of the early 16th century against the excesses of the Church did not hurt printers, as they worked overtime to bring forth the voluminous tracts generated by the religious conflict. (One must bear in mind that the first newspaper did not appear until 1605.)

Given the importance of printed media in that period, it is not surprising that much talent coalesced around the technology, and the fonts developed during that brilliant advance are, in my opinion, some of the most appealing ever created. They are referred to now as "old-style" or *Garalde* in honor of Aldus Manutius and Claude Garamont [Garamond].

Gutenberg worked with fonts that we now call 𝕭𝖑𝖆𝖈𝖐𝖑𝖊𝖙𝖙𝖊𝖗, which remained the dominant typeface in the German countries through the first part of the 20th century. Caxton, the first English printer to use Gutenberg's technology, apprenticed in Belgium and set up the first printing house in England in 1476, and also used 𝕭𝖑𝖆𝖈𝖐𝖑𝖊𝖙𝖙𝖊𝖗 exclusively. The first Roman font was developed by Nicolas Jenson of Venice, then the dominant commercial center of Europe, in the 1470s. Twenty years later, there appeared one of the great figures in publishing history — Aldus Manutius, also of Venice. Among other innovations, his company, the Aldine Press, invented the pocket book, italic type, greatly reduced the cost of books, standardized punctuation (introducing the semicolon), redefined book layout, and, through its "punchcutter" Francesco Griffo, whom we would now call a type designer, made a beautiful Roman font for the short book *De Aetna* by the poet Pietro Bembo, who became a major literary figure in the Italian Re-

naissance — lover of Lucrezia Borgia, major influence in standardizing the Italian language, creator of the *madrigal* form, and later, Cardinal of the Church. (The love letters between him and Lucrezia Borgia were considered by Lord Byron to be among the "prettiest" ever penned.) Modern revivals of the font used for *De Aetna* usually involve the name *Bembo*, though the basic free version is called *Cardo*, an obvious contraction of *Cardinal Bembo*. The fairly recent `fbb` package is based on Cardo, but with many changes — the ancient glyphs were stripped out, a kerning table was constructed for the Roman font, there being none in Cardo, and a Bold-Italic variant was created. Glyphs were added in all variants so that `fbb` has a full slate of `textcomp` characters and figures are available in proportional lining and old-style as well as tabular lining and oldstyle. Small Caps are provided in all variants. (Cardo had small caps only in Roman, regular weight.)

Sample of `fbb`:

This is fbb, a free font package similar to Bembo. It has Small Caps, a fine *Italic*, and a choice of number styles such as tabular oldstyle 0123456789.

Fifty years later, in Paris, Garamont introduced and continued to refine his Roman and Italic fonts, based initially on the *De Aetna* font and Griffo's later italic. Among the notable changes was the taming of *De Aetna*, reducing its ascenders and its over-arching 'f', planing off some of its more prickly features and creating more elegant capital letters. The remarkable account of Garamont's fonts, their origins and influences, by Beatrice Warde [1] is highly recommended. It contains, among other things, reproductions of much of the famous Egenolff-Berner specimen from 1592. The short version is that most Garamond fonts created in the early twentieth century were in fact based on later fonts by Jannon (c. 1620), not Garamont. Stempel Garamond (1925) is an exception, being based on a copy of the Egenolff-Berner specimen (see [1]) owned by the Stempel foundry.

By the late sixteenth century, fine printing was well established in parts of Europe, though not in England, judging by the mediocre quality of printing in Shakespeare's plays published during that period.

Recent Garamonds (URW++ Garamond No. 8, Garamond Premier Pro, EBGaramond) have followed Egenolff-Berner and Garamont's metal punches which appear to have been passed down to the Plantin foundry in Antwerp.

LaTeX now has a choice of two Garamonds:

- `garamondx` is an extension of Garamond No. 8, adding small caps and oldstyle figures in both weights and both shapes. Because of the license,

which is rather permissive but does not allow charging a fee, it cannot be distributed as part of TeX Live. Navigate to the url `http://tug.org/fonts/getnonfreefonts` for a script you can download that will install `garamondx` on Unix-like systems.

- `ebgaramond` (regular and italic only, no bold yet) is a very fine realization of Garamond that was recently added with LaTeX support.

SAMPLE OF `garamondx`:

This is garamondx, an extension of URW++ Garamond No 8. It has SMALL CAPS in all four styles, *Italics* and ***Bold Italics***, and a choice of figures in all four styles, such as tabular oldstyle 0123456789.

SAMPLE OF `ebgaramond`:

This is ebgaramond, a new realization of Garamond based on the Ebenolff-Berner specimen. It has very nice SMALL CAPS, a very fine *Italic*, and a choice of figures in all four styles, such as tabular oldstyle 0123456789.

Other serifed roman families

PALATINO:

Named for the Italian writing master Giambattista Palatino, and inspired by Italian Renaissance fonts, Palatino has a larger x-height than typical old-style fonts and is more readable on-screen. It was one of the earliest fonts outside the Computer Modern family to gain TeX support, and remains one of the best-represented fonts for TeX.

- OpenType:
  - TeX Gyre Pagella + Asana Math;
  - TeX Gyre Pagella + Pagella Math.
- PostScript:
  - newpxtext + newpxmath;
  - TeX Gyre Pagella + newpxmath;
  - mathpazo (text and math), fewer features than the preceding;
  - eulervm as math can be used for a more informal appearance.
- Kpfonts (complete text and math) is based on URW++ Palatino clones, but has its own distinctive, light appearance.

TIMES:

Many choices are now available.

- OpenType:
  - STIX (text + math), and its unofficial extension XITS;
  - TeX Gyre Termes + STIX math;
  - TeX Gyre Termes + Termes Math.
- PostScript:
  - newtxtext + newtxmath/STIX;
  - TeX Gyre Termes + newtxmath/STIX;
  - STIX (text and math).
- STIX math has an unparalleled collection of mathematical symbols and alphabets matched to Times;
- STIX text fonts, as of version 1.1, lack some of the features of packages such as TeX Gyre Termes and newtxtext, but more is promised for 2.0.0 (`http://stixfonts.org`);
- the main difference between TeX Gyre Termes and newtxtext is that the latter has an option to use oldstyle figures as the default in text mode;
- MathTime (commercial but reasonably priced) is still a worthwhile Times-based math package with symbols generally lighter than STIX and having a number of features distinct from STIX;
- older choices such as `mathptmx` have now outlived their usefulness.

LIBERTINE:

LinuxLibertine is no longer new, but has undergone many fairly recent changes. It works well with the math package `[libertine]newtxmath`. In my opinion, this is an excellent choice for both screen and print. A number of recent math e-publications have used this combination.

SAMPLE OF `libertine`:

This is LinuxLibertine. It has SMALL CAPS, *Italic*, and a choice of number styles such as tabular oldstyle 0123456789.

BASKERVILLE:

A "transitional" font (c. 1760), as was Plantin, the Times precursor. Baskerville ("the English Manutius"), was a master of fine detail, having been in the furniture finishing business (japanning) for a number of years. He set out to improve on Caslon, the then-dominant font throughout England and its colonies. Baskerville's fonts, which bear the unmistakable heritage of oldstyle fonts, were favorites of Benjamin Franklin. Many commercial versions are available, most notably Storm Baskerville Pro. Free versions include:

- Baskervald (BaskervaldADF) was not designed with TeX in mind, and requires modifications to its ligature side bearings, its basic math character heights, and its kerning tables.
- (OpenType):
  `Baskervaldx.otf`, derived from BaskervaldADF, works OK with TeX.
- (PostScript):
  Baskervaldx + `[baskervaldx]newtxmath` works OK. Baskervald[x] lacks the high contrast that gives Baskerville its distinction as a print font,

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and when scaled up to an x-height that matches the italic, it becomes a rather heavy Roman font.

- GFSBaskerville — for Greek, not Roman use.
- LibreBaskerville — lacks Bold Italic, and is designed as a web font, with larger x-height, larger counters and wider spacing than fonts intended for print output.

SAMPLE OF `Baskervaldx`:

This is Baskervaldx, a font similar to Baskerville. It has SMALL CAPS, *Italic*, and a choice of number styles such as tabular oldstyle 0123456789.

UTOPIA:

The design goals for Utopia seem to have been to avoid any trace of old-style ornamentation, and in this Adobe has been very successful. The font looks quite austere, with tightly packed letters and, in my opinion, overly small inter-word spacing.

Adobe donated the four basic PostScript fonts to the X Consortium in 1992, though the terms of the license were not clear. In 2006, it was rereleased to the TEX Users Group under clarified terms which allow modification and redistribution provided no name trademarked by Adobe is used.

- Fourier (Utopia text, fourier math) will make use of full (expert, Adobe) Utopia, if available.
- MathDesign [`utopia`] (Utopia text, MathDesign math) can also use expert fonts from Adobe.
- The ADF Venturis fonts are based on Utopia.
- An extension of the (free, basic part of) Utopia by Andrey Panov, dubbed Heuristica (Evristika), is available now from CTAN, TEX Live and MiKTEX along with LATEX support files. (The OpenType Heuristica fonts there have been modified, adding a number of lookup tables, so that they are parsed better by `otftotfm` and should work much better with `fontspec`.) It has added ligatures, oldstyle and superior figures and Roman small caps, and can be used with matching math via [`utopia`]`newtxmath`. (Fourier and MathDesign cannot currently use the Heuristica extensions, being tied to Adobe's organization of Utopia Expert.)
- The LATEX support files for Heuristica now contain an option to set the factor by which to multiply the inter-word spacing, `\fontdimen2`. The default value is 1, and the value 1.2 is suggested as a starting point.
- As of version 1.04, a `sinf` lookup has been added for subscript figures, superior letters have been added to each font and the `sups` lookups have been extended to cover letters so that French abbreviations like Mme are available.

SAMPLE OF `Heuristica`:

This is Heuristica, an extension of Utopia. It has SMALL CAPS, *Italic*, and a choice of number styles such as tabular oldstyle 0123456789.

CHARTER:

Bitstream contributed their four basic Charter fonts to the X Consortium under a very liberal license, and they have been available in TEX for many years. Their low contrasts, high x-heights and use of piecewise linear outlines where possible may make them interesting again as fonts that will render well on small devices and perhaps projected slides. (It's worth noting that their designer, Matthew Carter, created Georgia for Microsoft. It is widely considered to be one of the clearest serifed fonts for viewing on screen, and bears a number of similarities to Charter, though the latter is heavier.)

The XCharter fonts add superior figures and small caps in all styles, plus oldstyle figures (proportionally spaced only) with options to select the form of 'one' — `oldstyle` gives you 1 (the default if no option is specified) and `oldstyleI` gives you I. The original Charter fonts had some idiosyncratic kerning, especially with P-comma, P-period and P-hyphen. These have now been corrected in all styles.

SAMPLE OF `XCharter`:

This is XCharter, an extension of Charter. It has SMALL CAPS, *Italic*, and a choice of number styles such as proportional oldstyle 0123456789.

Typewriter fonts

The `courier` font that has long been available on CTAN is too light and too spread out for any use I can imagine in TEX, except to generate examples of what not to use. There are now several choices that are more attractive than you might expect for a monospaced font. Most are not new, but have been renovated recently so may appear new to you.

SERIFED TYPEWRITER FONTS:

- The `zlmtt` package provides access to all features of TeX Gyre Latin Modern Typewriter, a very substantial extension of `cmtt`. Best suited to lighter Roman fonts, though it can be scaled to be a better match up for some heavier Roman faces. The fonts themselves have been described thoroughly by Will Robertson in [4]. SMALL CAPS are available in regular, upright only. The font does have a bold variant, but the boldness is almost imperceptible due to the design goal of keeping the widths of bold glyphs the same as those in regular weight. The individual pieces are regrettably inconvenient to access through the `lmodern` package.

```
A sample of text using lmtt and its
bold variant.
```

- The `newtxtt` package is built on an enhanced version of the typewriter fonts from the `txfonts` package, with the addition of several choices of forms for 'zero'. The fonts are of the same width as `cmtt`, but are heavier and taller, matching Times weight and size. Sᴍᴀʟʟ Cᴀᴘs are available in upright shape only. The newest version of the package has an option to reduce the interword space, so that, while it is no longer monospaced, it looks better for blocks of text that do not need to be aligned letter by letter.

```
A sample of text using newtxtt and its
bold variant.
```

Sᴀɴs Sᴇʀɪғ Tʏᴘᴇᴡʀɪᴛᴇʀ Fᴏɴᴛs:
Two good packages are now available.

- `Inconsolata--zi4` is an extension of the original Inconsolata package by Karl Berry, offering regular and bold weights, a choice of styles for 'zero', 'l' and quotes. It is based on an extension of Raph Levien's fine *Inconsolata* fonts, which are not dissimilar to Microsoft's *Consolas*.

```
A sample of text using inconsolata and its
bold variant.
```

- The `beramono` package is based on Bitstream's Vera Sans Mono. All glyphs are unmistakable. It is available only in T1 and TS1 encodings. The more recent DejaVu Sans Mono package is a further extension with many more encodings and accented glyphs.

```
A sample of text using beramono and its
bold variant.
```

Sans serif fonts

There are now several choices of (proportionally spaced) sans serif fonts available to TeX users, among the more recent being **cabin** (similar to Gill Sans), raleway and SourceSansPro. As fonts of this type are frequently made available in a multiplicity of weights, their support files can profit from use of the `mweights` package that allows you to choose which weight will be called "regular" and which will be called "bold", independent of the corresponding choices for roman and typewriter.

Sans serif fonts are often used to render slides, as their simpler geometry is usually less corrupted by rasterization than serifed fonts. They are in many cases poor at distinguishing homoglyphs such as upper case 'i', lower case 'el' and the lining figure 'one' [5]. This makes their use for file names problematic. In much the same way, it can be difficult to distinguish a sans serif proportional glyph from a sans serif typewriter glyph, and if both are used to indicate distinct objects (e.g., sans serif for menu items and display items in a computer program, `tt` for file names), then confusion is quite possible. (If you use sans serif for headings, as in German typography, and only for headings, this is not an issue.) If you make serious use of sans serif for other than headings, it may be wise to choose a serifed typewriter font even though your eye may wander to sans serif typewriter.

Note one peculiarity of **cabin** if you use it for email addresses, as in **person@example.org** — that white-on-black @ is unfortunate and the font would benefit from an alternate, black-on-white, symbol.

Further

For an expanded collection of descriptions and samples of many of the fonts mentioned above, see `http://math.ucsd.edu/~msharpe/RcntFnts.pdf`.

References

[1] Beatrice Warde, writing as "Paul Beaujon". The "Garamond" types, sixteenth and seventeenth century sources reconsidered. *The Fleuron*, pp. 131–179, 1926. `http://www.garamond.culture.fr/kcfinder/files/3_3_4_article_beatrice_warde.pdf`

[2] Andrew Pettegree. *The Invention of News: How the World Came to Know About Itself.* Yale University Press, New Haven, 2011.

[3] Andrew Pettegree. *The Book in the Renaissance.* Yale University Press, New Haven, 2014.

[4] Will Robertson. An exploration of the Latin Modern fonts. *The PracTeX Journal*, 2006-1, 2006. `http://tug.org/pracjourn/2006-1/robertson/robertson.pdf`

[5] Charles Bigelow. Oh, oh, zero! *TUGboat* **34**:2, pp. 168–181, 2013. `http://tug.org/TUGboat/tb34-2/tb107bigelow-zero.pdf`

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