Anatomy of “Anatomy of Melancholy” in XeLaTeX

Making a large *and* complex *book with* free/libre *software*

epilys

May 18, 2021

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Selecting a typeface (Junicode)

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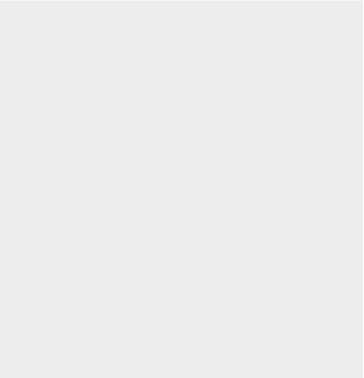

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[redacted]

Chapter 4

Organizing the artwork with `biblatex`

To simplify the handling of a large amount of artwork in the book, we store each work as a bibliography entry in a `bib` database and use the bibliography management package biblatex. The `bib` database is a plain text file with entries of the following format:

```
@Misc{TheLoveSong,
  title        = {The Love Song},
  annotation   = {{Burne-Jones associated this painting with a
   ↪  refrain from a French folk ballad: "Alas, I know a love
   ↪  song, / Sad or happy, each in turn." Cupid, his arrows
   ↪  slung over his shoulder, works the bellows on the
   ↪  portative organ. This picture, which took nine years to
   ↪  complete, unites inspirations that shaped Burne-Jones’s
   ↪  art: medievalism, Italian Renaissance painting, romance,
   ↪  beauty, and music. Like a bittersweet melody, the scene
   ↪  suggests a mood of dreamy melancholy. As one critic
   ↪  observed, "There is no story: nothing to guess at, but
   ↪  everything to feel."}},
  author       = {{Edward Burne-Jones}},
  date         = {1868/1877},
  url          =
   ↪  {https://www.metmuseum.org/art/collection/search/435826},
  note         = {47.26},
  file         = {The-Love-Song-Edward-Burne-Jones-small.jpg},
  type         = {oil on canvas},
  keywords     = {artwork},
}
```

We use the `file` field to store the image filename. Assuming the images are stored in a folder called `figures` in the same directory as the main TEX file, we define the default graphics path as

```
\graphicspath{{./figures/}}
```

This means that everytime we include a graphic with the `includegraphics` macro, it will look for it in that prepend the path to whatever we pass to `includegraphics`.

To load the database we insert this line in our main `tex` file:

```
\addbibresource{citations.bib}
```

Now, using the key for each entry we can use any of the entry fields inside the document. The fields we are interested in are:

- `author`
- `title`
- `year`
- `type`, which contains the art medium
- `file`

`biblatex` defines macros to access the fields using the entry key.

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Figure 4.1: 12

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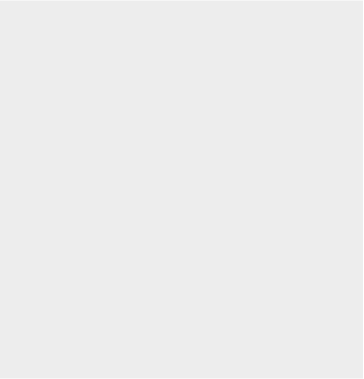

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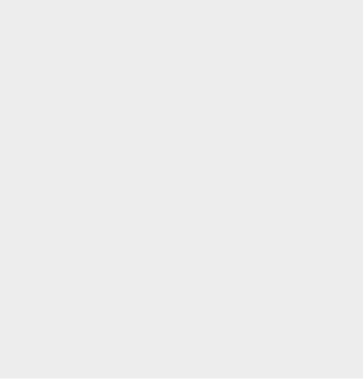

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Chapter 6

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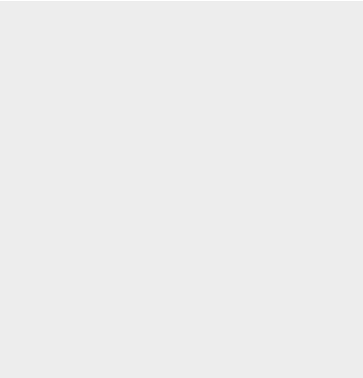

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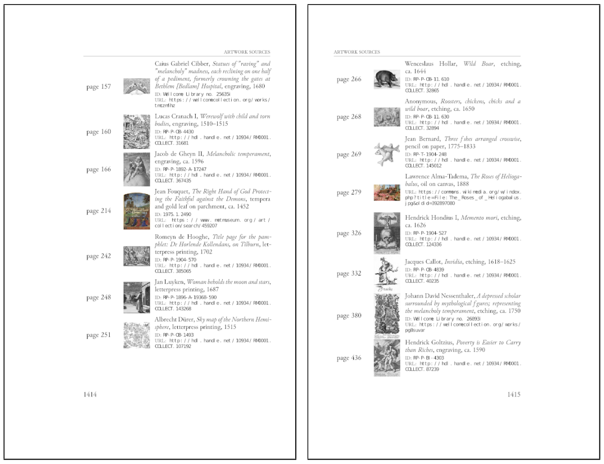
Chapter 20

Designing a custom `biblatex` bibliography style to list artwork sources



ARTWORK SOURCES

page 157 Caius Gabriel Cibber, *Statues of "raving" and "melancholy" madness, each reclining on one half of a pediment, formerly crowning the gates at Bethlem [Bedlam] Hospital*, engraving, 1680
ID: `Wellcome Library no. 25635i`
URL: `https://wellcomecollection.org/works/tnczmfhz`

page 160 Lucas Cranach I, *Werewolf with child and torn bodies*, engraving, 1510–1515
ID: `RP-P-OB-4430`
URL: `http://hdl.handle.net/10934/RM0001.COLLECT.31681`

page 166 Jacob de Gheyn II, *Melancholic temperament*, engraving, ca. 1596
ID: `RP-P-1892-A-17247`
URL: `http://hdl.handle.net/10934/RM0001.COLLECT.367435`

page 214 Jean Fouquet, *The Right Hand of God Protecting the Faithful against the Demons*, tempera and gold leaf on parchment, ca. 1452
ID: `1975.1.2490`
URL: `https://www.metmuseum.org/art/collection/search/459207`

page 242 Romeyn de Hooghe, *Title page for the pamphlet: De Horlende Kollendans, on Tilburn*, letterpress printing, 1702
ID: `RP-P-1904-570`
URL: `http://hdl.handle.net/10934/RM0001.COLLECT.385065`

page 248 Jan Luyken, *Woman beholds the moon and stars*, letterpress printing, 1687
ID: `RP-P-1896-A-19368-590`
URL: `http://hdl.handle.net/10934/RM0001.COLLECT.143268`

page 251 Albrecht Dürer, *Sky map of the Northern Hemisphere*, letterpress printing, 1515
ID: `RP-P-OB-1493`
URL: `http://hdl.handle.net/10934/RM0001.COLLECT.107192`

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ARTWORK SOURCES

page 266 Wenceslaus Hollar, *Wild Boar*, etching, ca. 1644
ID: `RP-P-OB-11.610`
URL: `http://hdl.handle.net/10934/RM0001.COLLECT.32865`

page 268 Anonymous, *Roosters, chickens, chicks and a wild boar*, etching, ca. 1650
ID: `RP-P-OB-11.630`
URL: `http://hdl.handle.net/10934/RM0001.COLLECT.32894`

page 269 Jean Bernard, *Three fishes arranged crosswise*, pencil on paper, 1775–1833
ID: `RP-T-1904-248`
URL: `http://hdl.handle.net/10934/RM0001.COLLECT.145012`

page 279 Lawrence Alma-Tadema, *The Roses of Heliogabalus*, oil on canvas, 1888
URL: `https://commons.wikimedia.org/w/index.php?title=File:The_Roses_of_Heliogabalus.jpg&oldid=392897080`

page 326 Hendrick Hondius I, *Memento mori*, etching, ca. 1626
ID: `RP-P-1904-527`
URL: `http://hdl.handle.net/10934/RM0001.COLLECT.124336`

page 332 Jacques Callot, *Invidia*, etching, 1618–1625
ID: `RP-P-OB-4839`
URL: `http://hdl.handle.net/10934/RM0001.COLLECT.40235`

page 380 Johann David Nessenthaler, *A depressed scholar surrounded by mythological figures; representing the melancholy temperament*, etching, ca. 1750
ID: `Wellcome Library no. 26893i`
URL: `https://wellcomecollection.org/works/pg8suvar`

page 436 Hendrick Goltzius, *Poverty is Easier to Carry than Riches*, engraving, ca. 1590
ID: `RP-P-BI-4303`
URL: `http://hdl.handle.net/10934/RM0001.COLLECT.87239`

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Figure 20.1: Pagespread of art bibliography.

We want to add a list of the artworks included in the book and their sources. We saw how the artwork database was compiled in a `bib` file back in chapter 4.

`biblatex` prints the bibliography with a `\printbibliography` macro. The invocation used in the book is:

```
\defbibnote{introduction}{All artworks are in the public
 ↪ domain.}
\phantomsection
\printbibliography[label=app:artworksources,
                   prenote=introduction,
                   heading=bibnumbered,
                   title={Artwork Sources}]
```

This will print a chapter with title “Artwork Sources” and a paragraph after the title, set with the `prenote` option and defined with a preceding `defbibnote` command.

Using the `numeric` bibliography style, the result is this:

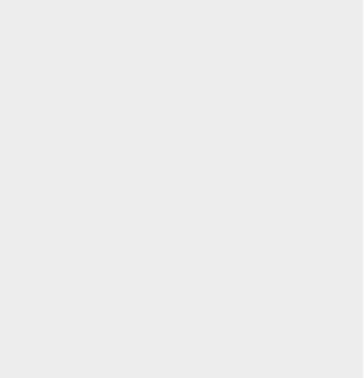

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Figure 20.2: 42

Let’s copy the numeric source file, called `numeric.bbx` to the project’s folder and name it `art-numeric.bbx`.

We want to show a list of every artwork with its name, title, format/medium, year, the source URL and the source’s identification number (called *accession number* by librarians). For extra fanciness, let’s show a thumbnail of the work and the page where it’s located.

First, we want instead of index label numbering to show the page location of each artwork. This is done by defining the bibliography’s environment with `\defbibenvironment{bibliography}`:

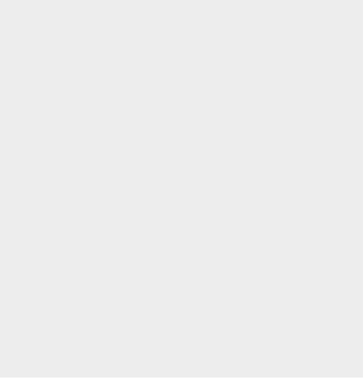

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Figure 20.3: 45

We want every label to have the same width, and a page number can range from 1 to 3 digits for a book under 10 000 pages. So let's set the label's width to the maximum width possible:

```
% This typesets the list entry labels for the artwork bibliography.
% The list is of this format:
%
% page X   [thumbnail] [details]
%
% page XY  [thumbnail] [details]
%
% page XYZ [thumbnail] [details]
%
% The "page XYZ" part is done in the following bibenvironment macro.
% We want the "page .." labels to have the same width regardless of
% how many digits the page is. For example we don't want a "Page 5"
% box to be smaller than a "Page 1234" box because this would cause
% misalignment of the list items.
%
% 1. Create new length to store the maximum page label width.
\newlength\PageRefLabelWidth
% 2. Create new box to store the maximum page label.
\newsavebox{\PageRefLabelBox}
% 3. Typeset a string that has the same width as the maximum page label
% (Book won't be more than 9999 pages, hopefully).
\savebox{\PageRefLabelBox}{\mbox{{page 9999}}}
% 4. Set length to width of box.
\setlength\PageRefLabelWidth{\wd\PageRefLabelBox}
```

Then define the bibliography environment:

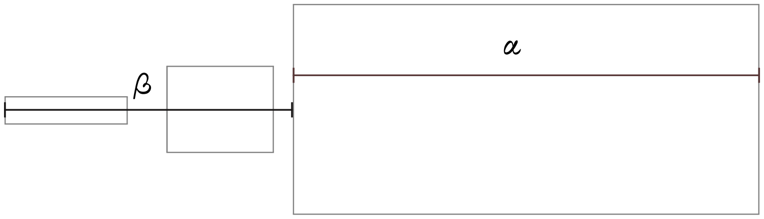
```
\defbibenvironment{bibliography}
  {\list
      % 5. and final step. put the page label in a box of set width.
     {\setlength{\fboxrule}{.5pt}\setlength{\fboxsep}{-.5pt}%
     \fbox{%
       \makebox[\PageRefLabelWidth]{%
         \usebibmacro{pagereflabel}%
      }}}%
     {\setlength{\labelwidth}{\PageRefLabelWidth}%
      \setlength{\leftmargin}{\labelwidth}%
      \setlength{\labelsep}{0pt}%
      \setlength{\itemsep}{\bibitemsep}%
      \setlength{\parsep}{\bibparsep}}%
      \renewcommand*{\makelabel}[1]{\hss##1}}
  {\endlist}
  {\item}
\endinput
```

We have to decide on the layout of each entry. Let's use the golden ratio ϕ which is a good bet.

The golden ratio which equals $\phi = 1.618\ldots$, is two lengths α and β such that $\alpha + \beta$ is to α as α is to β:

$$\frac{\alpha+\beta}{\alpha} = \frac{\alpha}{\beta} = \phi$$

We arbitrarily decide to set each thumbnail's maximum width to the width of the string "`thumbnail:`". Then, β will contain the page label and the thumbnail, and α will contain the text with the info.



We last encountered length calculations in chapter 12 where we calculated the space required for the annotation text of a figure. That required integer precision, and now we need floating point precision. To do the required arithmetic we use the LaTeX3_{ε} floating point interface from the xfp package.

First, define ϕ as a length. ϕ is equal to $\frac{\sqrt{5}+1}{2}$:

```
\edef\GoldenRatio{\fpeval{(sqrt(5)+1)/2}} % phi
\edef\GoldenRatioPlusOne{\fpeval{\GoldenRatio+1}} % phi+1
```

Then $\beta = \phi \times \alpha$ and $\alpha = \frac{\backslash\text{textwidth}}{1+\phi}$:

```
\newlength\ArtInfoWidth
\newlength\ArtThumbnailWidth
\newlength\tmpAReg
\newlength\tmpBReg
```

```

\newsavebox{\TmpBoxForWidths}
\savebox{\TmpBoxForWidths}{\mbox{thumbnail:}}%
\setlength\ArtThumbnailWidth{\wd\TmpBoxForWidths}%

\setlength\tmpAReg{\fpeval{\textwidth/\GoldenRatioPlusOne}pt}
\setlength\ArtInfoWidth{\GoldenRatio\tmpAReg}
\setlength\tmpBReg{\tmpAReg-\PageRefLabelWidth-\ArtThumbnailWidth}
```

Setting the thumbnail and the text in two `minipages` we can put them side by side:

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Figure 20.4: 48

To print the thumbnail let's define a custom `biblatex` field format. The file's relative path is stored in the `file` field of each citation entry. We can define a custom format for printing the `file` field:

```
\DeclareFieldFormat{includeartthumb}{{%
\graphicspath{{./figures/thumbs/}}%
\includegraphics[keepaspectratio,width=0.85\textwidth]{#1}}}
```

This is a simple `\includegraphics` *only* it changes `\graphicspath` locally, that is inside the group defined by the braces of the macro's definition. We remember that in chapter 4 we set `\graphicspath` to `./figures/`.

We create the thumbnails with a new `Makefile` target. First, store the paths for each figure in a variable `$INFILES` and the thumb location, which will be inside `figures/thumbs`, in a variable `$OUTFILES`.

```
INFILES:=$(shell bash -c "grep file citations.bib| \
          cut -d '{' -f2 | cut -d'}' -f1 | sed 's/^/figures\//'")
```

```
OUTFILES:=$(shell bash -c "grep file citations.bib| \
      cut -d '{' -f2 | cut -d'}' -f1 | sed
 ↪  's/^/figures\/thumbs\//'")
```

Next, add the target dependency to the pdf:

```
anatomy-of-melancholy.pdf: main.tex *.tex $(OUTFILES)
```

This means that before compiling the pdf, the targets `figure/thumbs/foobar_1`, etc. will have to be compiled first. Let's add these targets:

```
figures/thumbs/%.jpg: figures/%.jpg
    @mkdir -p figures/thumbs
    convert -thumbnail 100 "$<" "$@"
```

The first line creates the `thumbs` folder if it does not exist, and the second is an `ImageMagick` command that makes a thumbnail of width 100`px`.

Returning to LaTeX, print the author, title, year, url, etc:

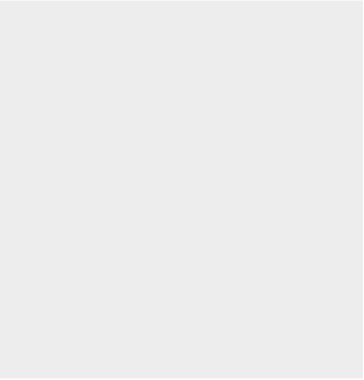

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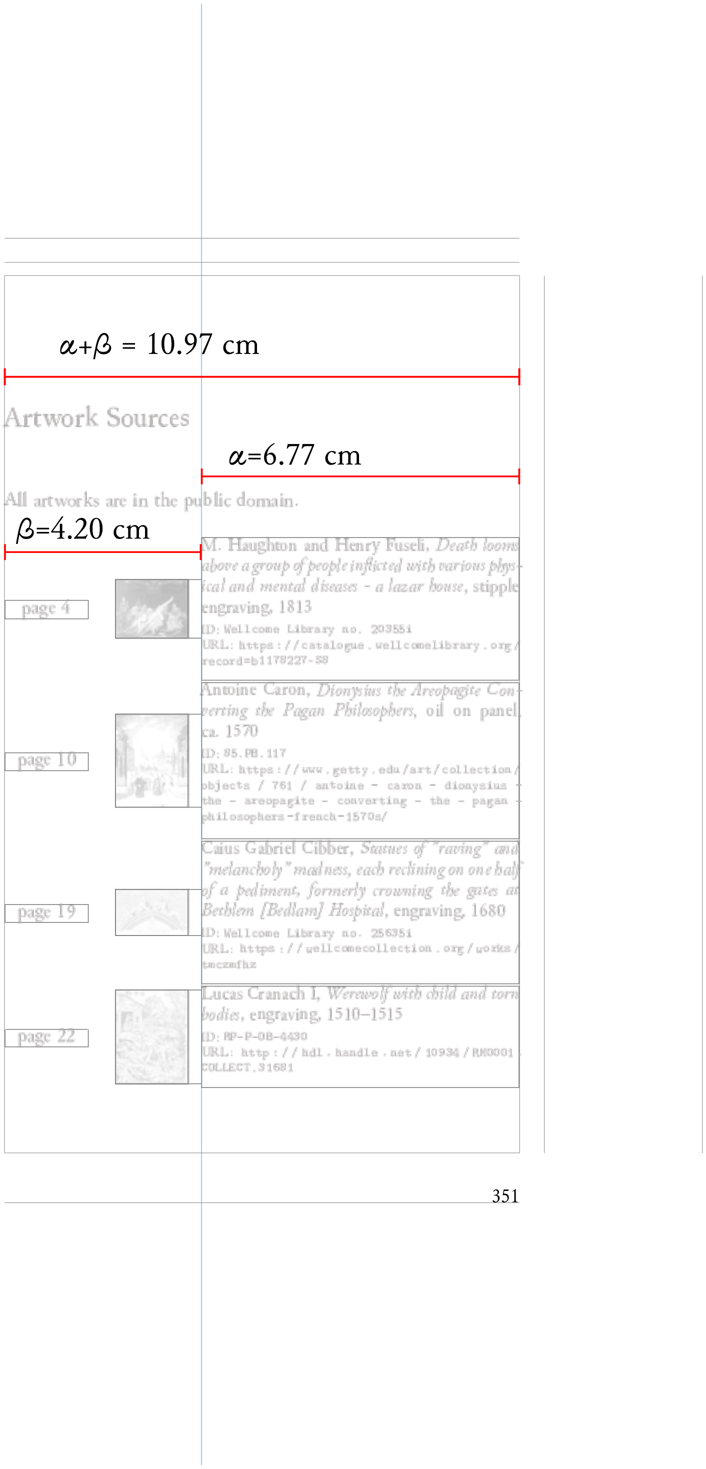
Figure 20.5: 51

Observing the result in Figure 20.6 we see that the actual page dimensions end up as $\alpha + \beta = 10.97$cm, $\alpha = 6.77$cm and $\beta = 4.20$cm. Indeed the ratio checks out:

$$\begin{aligned} \frac{\alpha+\beta}{\alpha} &= \frac{10.97}{6.77} \approx 1.6204, \text{ and} \\ \frac{\alpha}{\beta} &= \frac{6.77}{4.2} \approx 1.612 \text{ which is good enough.} \end{aligned}$$



Artwork Sources

All artworks are in the public domain.

M. Haughton and Henry Fuseli, *Death looms above a group of people inflicted with various physical and mental diseases - a lazar house*, stipple engraving, 1813
ID: Wellcome Library no. 203551
URL: https://catalogue.wellcomelibrary.org/record=b1178227-S8

Antoine Caron, *Dionysius the Areopagite Converting the Pagan Philosophers*, oil on panel, ca. 1570
ID: 85.PB.117
URL: https://www.getty.edu/art/collection/objects/761/antoine-caron-dionysius-the-areopagite-converting-the-pagan-philosophers-french-1570s/

Caius Gabriel Cibber, *Statues of "raving" and "melancholy" madness, each reclining on one half of a pediment, formerly crowning the gates at Bethlem [Bedlam] Hospital*, engraving, 1680
ID: Wellcome Library no. 256351
URL: https://wellcomecollection.org/works/tmczmfhz

Lucas Cranach I, *Werewolf with child and torn bodies*, engraving, 1510–1515
ID: RP-P-OB-4430
URL: http://hdl.handle.net/10934/RM0001.COLLECT.31681

Figure 20.6: Page layout and proportions

Chapter 21

Adding an editor’s postface

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Chapter 22

Closing with a colophon

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