Building a Model Astrolabe

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This document describes the electronic file archive which accompany the author's paper of the same title in the Journal of the British Astronomical Association. It also contains images of all of the components which need to be printed out to build a model astrolabe tailored for a latitude of 52°N. The astrolabe presented in this document is a slightly modernised version of that described in Geoffrey Chaucer's c. 1391 *Treatise on the Astrolabe*, and has been constructed following a prescription similar to that described in Eisner (1975, 1976a, 1976b).

This document can be downloaded from

`http://pyxplot.org.uk/astrolabe/astrolabe.pdf`,

and the accompanying files may be downloaded from

`http://pyxplot.org.uk/astrolabe/astrolabe.tar.gz` (tarball)

or

`http://pyxplot.org.uk/astrolabe/astrolabe.zip` (zip archive).

Assembly Instructions

To build a model astrolabe tailored for a latitude of 52°N, Figures 1, 2 and 3 should be printed out onto paper, or more preferably onto thin card. Figure 4 should be printed onto a sheet of transparent acetate. The two sides of the *mother* (Figures 1 and 2) should be glued rigidly back-to-back, perhaps sandwiching a piece of rigid card. The *rête*, printed onto transparent acetate[2], should be placed over the *climate*, which for simplicity is incorporated into the front of the mother in this document.

The *rule* and the *alidade* should be placed on either side of the astrolabe: the rule, marked out with a declination scale, should rotate over the front of the mother; the alidade should rotate over the back of the mother. The two tabs on the side of the alidade should be folded out to form a sight used for measuring the altitudes of celestial and terrestrial objects. The whole construction may then finally be fastened together by placing a split-pin paper fastener through the centre.

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[2]Historically, the rête would have been made of the same material as the rest of the astrolabe and marked with arrows showing the positions of prominent stars. As much of the material of the rête as possible would then have been cut away to allow the climate below to be seen. We use transparent plastic here because it is so much more practical than the traditional form of rête.

Astrolabes for Other Latitudes

The components needed to build astrolabes tailored for latitudes other than 52°N can be found in the accompanying electronic file archive, which can be downloaded from:

`http://pyxplot.org.uk/astrolabe/astrolabe.tar.gz` (tarball)

or

`http://pyxplot.org.uk/astrolabe/astrolabe.zip` (zip archive).

The images are stored in the `output` directory of this archive, and each is available as encapsulated postscript (`.eps`), as a GIF bitmap image (`.gif`), or in PDF format. All of the required components must be printed at exactly the same scale in order to be of consistent sizes when fitted together. For example, the option to enlarge each of the PDF documents to fit the page size must *not* be selected in the printer setup options in Adobe Acrobat Reader, and the GIF images must be printed at a common dots-per-inch resolution.

For latitudes in the northern hemisphere, the following images should be printed:

- `mother_back.???` – The back of the mother of the astrolabe. This image also appears in Figure 1, and is not latitude dependent.

- `mother_front_north.???` – The front of the mother of a northern-hemisphere astrolabe. Note that, in contrast to Figure 2, the rête is not incorporated into the mother here. The hours advance clockwise around the edge of the mother.

- `rule_north.???` – The rule and the alidade of a northern-hemisphere astrolabe.

- `rete_north.???` – The rête of a northern-hemisphere astrolabe.

- `climate_xxN.???` – The climate of the astrolabe, customised to the required latitude xx°N.

For latitudes in the southern hemisphere, the following images should be printed. Note that a different rête is required, showing the southern sky, and that the declination scale on the rule also changes sign:

- `mother_back.???` – The back of the mother of the astrolabe. This image also appears in Figure 1, and is not latitude dependent.

- `mother_front_south.???` – The front of the mother of a southern-hemisphere astrolabe. Note that, in contrast to Figure 2, the rête is not incorporated into the mother here. The hours advance anticlockwise around the edge of the mother.

- `rule_south.???` – The rule and the alidade of a southern-hemisphere astrolabe.

- `rete_south.???` – The rête of a southern-hemisphere astrolabe.

- `climate_xxS.???` – The climate of the astrolabe, customised to the required latitude xx°S.

Customised Astrolabes

The astrolabe images presented here were produced using PyXPlot, an open-source vector graphics scripting language developed by the same author. PyX-Plot has a website[3] with extensive documentation, and is available as a standard package in a number of Linux distributions including Ubuntu, Debian and Gentoo. Unfortunately, it is not available for Microsoft Windows at the present time.

The PyXPlot scripts used to generate the images in this document are included in the accompanying file archive and may be modified to generate customised astrolabes. For example, to produce an astrolabe with your own choice of saints' days or birthdays on the back of the mother, the file `RawData/Saints-Days.dat` should be modified. A `Makefile` is included which rebuilds all of the image files shipped in the `output` directory.

References

[1] Ford, D.C., *J. Brit. astr. Ass.*, submitted.

[2] Chaucer, G., *Treatise on the Astrolabe*, in *The Riverside Chaucer*, ed. L.D. Benson (Boston, 1987)

[3] Eisner, S., *J. Brit. astr. Ass.*, **86**(1), 18-29 (1975)

[4] Eisner, S., *J. Brit. astr. Ass.*, **86**(2), 125-132 (1976a)

[5] Eisner, S., *J. Brit. astr. Ass.*, **86**(3), 219-227 (1976b)

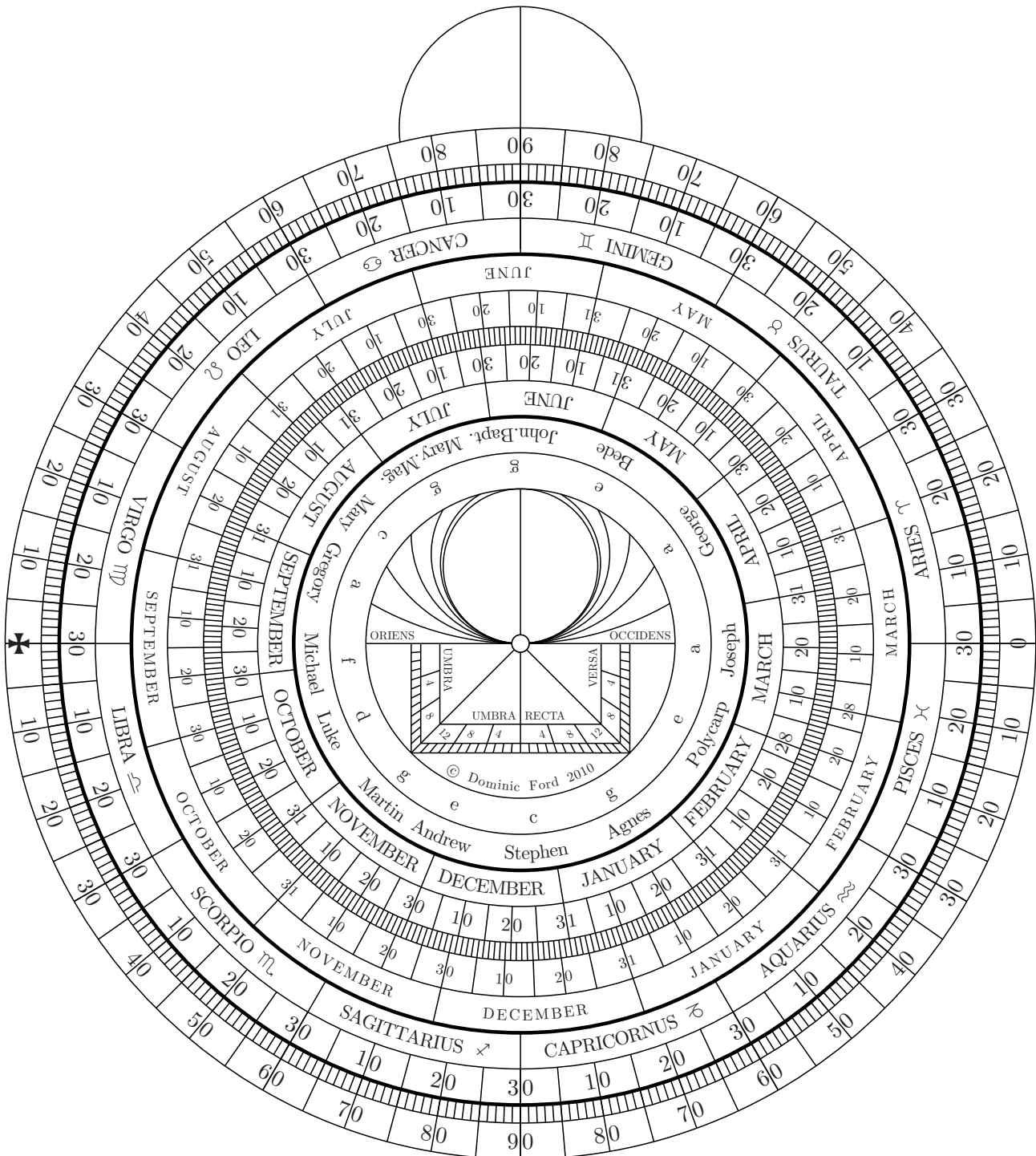---

[3]`http://www.pyxplot.org.uk`

Figure 1: The back of the mother of the astrolabe.

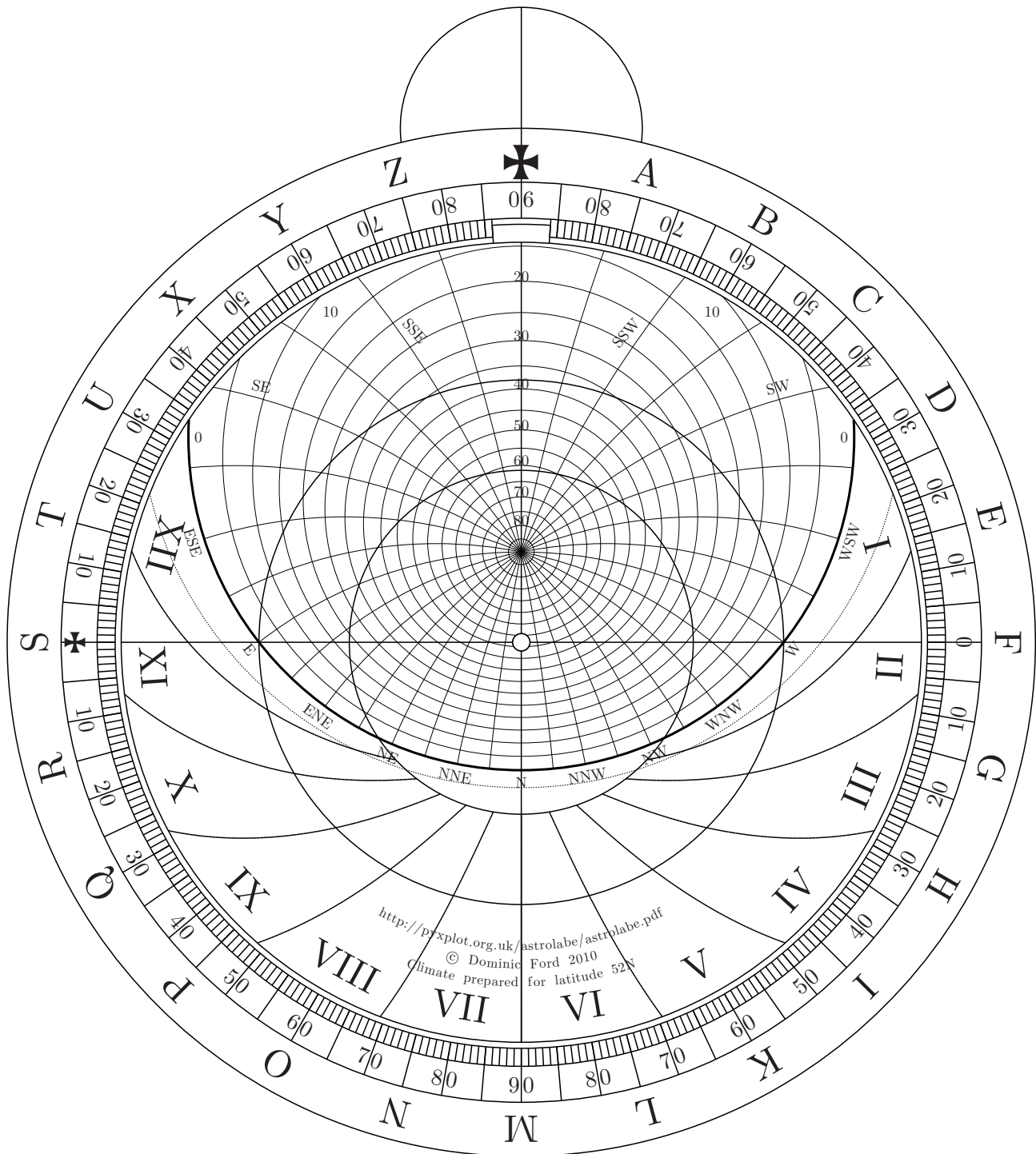Figure 2: The front of the mother of the astrolabe, with combined climate prepared for a latitude of 52°N. Should a climate for a different latitude be required, the accompanying file archive should be downloaded. This include separate images of the front of the mother, and of climates for any latitude on the Earth at 2° intervals.
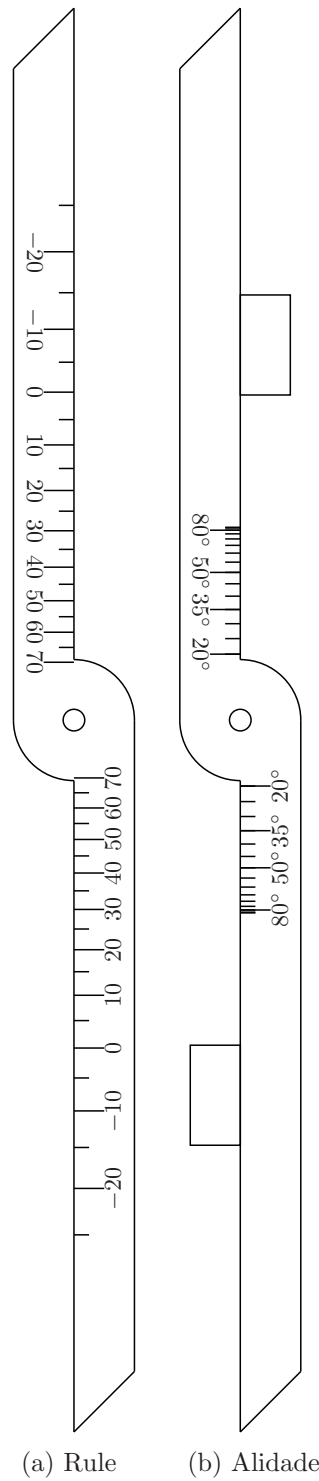
(a) Rule   (b) Alidade

Figure 3: Left: The rule, which should be mounted on the front of the astrolabe. Right: The alidade, which should be mounted on the back of the astrolabe.
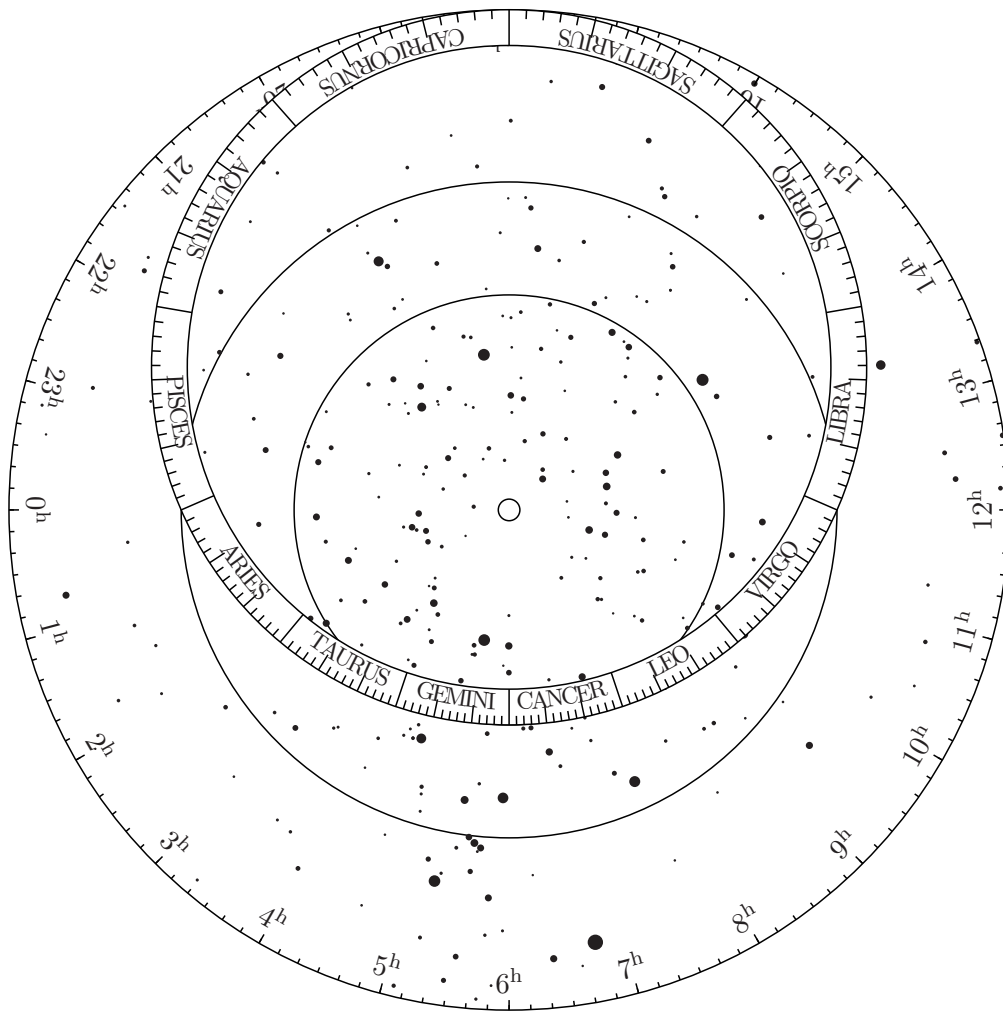
Figure 4: The rête of the astrolabe, showing the stars of the northern sky. This should be printed onto a piece of transparent plastic; most stationers should be able to provide acetate sheets for use on overhead projectors, which are ideal for this purpose. Should a southern-hemisphere astrolabe be required, the accompanying file archive should be downloaded.