

## Texinfo visits a garden

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### Abstract

Texinfo [6] offers PDF, HTML, and Info output formats from a single source file. This feature appealed to me because I wanted to produce both HTML and PDF files to describe the plant list for the Huntington's Herb Garden in San Marino, CA. Although used primarily to document GNU software, Texinfo offers a simple framework for publishing enumerated lists that can be manipulated with shell scripts to provide information about 400 plants in 25 beds in this one-quarter to one-half acre garden.

### 1 Introduction

The Herb Garden (Figure 1) is one of the smaller gardens at the Huntington Library, Art Collection, and Botanical Gardens located in San Marino, California ([huntington.org](http://huntington.org)). There is a Curator and full-time Gardener for the Herb Garden. In addition, about 60 docents and volunteers help maintain the Garden and interact with visitors. I have been a volunteer in this Garden for about five years.

There have always been plant lists for the Garden, but the mix of plants changes by season and a greater variety of plants is being introduced. Having an up-to-date plant list helps docents and volunteers learn the Garden and be able to inform visitors on a plant's identity, history, and uses.

### 2 File formats and file hosting

I initially thought an HTML version of the plant list would give users access to the plant list in a familiar web interface and the printed PDF version would be available in the Garden. I later learned that a web server hosted at the Huntington was not available for volunteers to upload files, but hosting PDF files for docents and volunteers has been available for several years. Huntington staff uploads PDF files as needed. Today, docents can view the PDF file on the Huntington's Volunteer web site, hard copy in the Garden, and look at the PDF file on their tablets or smart phones. I send the Plant List to docents and volunteers in an email attachment.

### 3 Texinfo: Simple markup, full-featured documents

In addition to the multiple output formats possible from a single source, another attractive feature of Texinfo is the simple markup scheme. Enumerated lists, `@enumerate`, are used in every bed. Each item in the list uses `@item` for a list item, `@i{italicized botanical name}`, and `@uref{web link}` for each

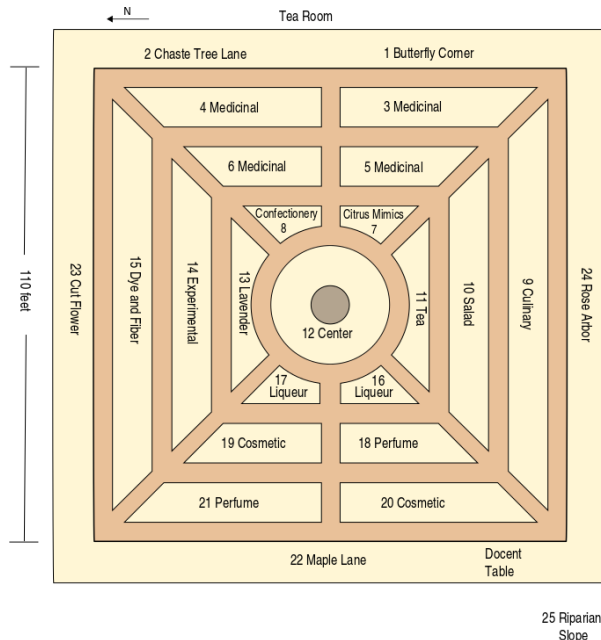


Figure 1: Herb garden map

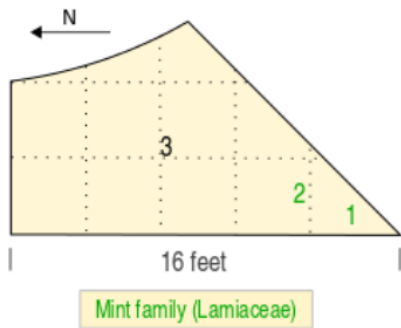
of the approximately 400 plants on the list. Common names and family names are not italicized for plants. A plant's names, family, and web links are placed on the same line. This is important for the shell scripts I wrote since counting plants is equivalent to counting lines. A table of contents, `@contents`, with entries from `@chapter` or `@unnumbered`, and an index, `@printindex`, are similarly straightforward.

With a list of plants done, I wondered how many there were in the list and how many were distinct in the Garden, which has 25 beds containing some duplicates. A botanically distinct plant appears only once in a list of plants for a specific bed even though its copies in that bed are indicated on a map drawn in Inkscape [4]. For example, there are two Bay trees in the Culinary bed and two in the Dye and Fiber bed. We count only one of them in each bed and only one as a distinct plant summarizing across the Garden. Since we captured plant families, I wanted to know how many families were represented in the Garden and how many distinct plants were members of each family.

### 4 Plant list summary

Attempting to answer these questions by manual counting would be error-prone and tedious. But writing a shell script [2] to calculate this information directly from the Texinfo source file was a matter of applying classic Unix tools [5] and piping them together to process each line in the Plant List. I was surprised by the results.

## 16 Liqueur, south



1. Wood Rosemary, *Rosmarinus officinalis* 'Wood', Lamiaceae, [pfaf](#), [wiki](#)
2. Clary Sage, *Sabia sclarea*, Lamiaceae, [pfaf](#), [wiki](#)
3. Centennial Hops, *Humulus lupulus* 'Centennial', Cannabaceae, [pfaf](#), [wiki](#)

Updated July 1, 2014

**Figure 2:** Bed 16 Liqueur page, output

In the Preliminary Plant List of July 15, 2014, there are 394 plants in the list of which 333 are distinct. These 333 distinct plants are distributed among 59 plant families. Five of these plant families contain 63 percent of the distinct plants in the Garden. They are the mint, sunflower, rose, geranium, and nightshade families. This represents a concentration of plants probably typical of herb gardens with their emphasis on edible, scent, and medicinal plants. Equally surprising to me was that 28 of the 59 families contain only one distinct plant. For example, the Henna Tree, Jojoba, and Caper bush. This represents diversity in the Garden. This concentration and diversity of plants gives docents many opportunities to develop histories, stories, and plant relationships to inform and entertain visitors. Each plant in the list has one or two web links that docents can use as starting points for developing their own information.

### 5 Web links

In an early discussion with the Gardener about requirements for this list, we talked about adding a few sentences about some of the plants. This had been a feature with plant lists in the past when web access was limited and resources like Wikipedia ([en.wikipedia.org](http://en.wikipedia.org)) and Plants for a Future ([www.pfaf.org](http://www.pfaf.org)) were not available. Trying to maintain these comments in a changing plant list seemed like a headache for both the Gardener and me. Besides, the authors at Wikipedia and Plants for a Future are

```
@node Liqueur (16)
@chapter Liqueur, south

@image{./graphics/16_liqueur070114, 4in, }

@sp 1
@enumerate
@item Wood Rosemary, @i{Rosmarinus officinalis} 'Wood',
  Lamiaceae, @uref{http://www.pfaf.org/..., pfaf}, ...
@cindex @i{Rosmarinus officinalis} 'Wood' (Rosemary, Wood)
@cindex Rosemary, Wood (@i{Rosmarinus officinalis} 'Wood')
@cindex Lamiaceae (Mint family)
@cindex Mint family (Lamiaceae)

@item Clary Sage, ...
...
@item Centennial Hops, ...
...
@end enumerate

@sp 1
@noindent Updated July 1, 2014
```

**Figure 3:** Bed 16 Liqueur page, Texinfo source

already knowledgeable, filter the information they present, and update their pages regularly.

### 6 Index

The Texinfo manual offers advice on creating indices that will be useful for a variety of readers. Many persons know a plant's common name, but not its botanical name, and may not know its family. Furthermore, a variety of common names may be used. In this Index, a plant's botanical name and common name are cross-referenced as are the plant's family name with its common name if it has one. That's four index entries for each of about 400 plants. Editorial judgment is also needed when redundancy in an alphabetized index is caused by the similarity of a common name and its botanical name, for example, Jasmine and *Jasminum*.

A shell script [3] is one way to reduce this effort, while adding accuracy and consistency. Since both botanical, common, and family names are available in the line describing each plant, it is, in theory, easy to create four index entries and write them directly into the Texinfo source file. Exceptions need to be made for names that are similar, or that have unusual common names (Vick's Plant, Jupiter's Beard). Each time the plant list is revised, I run the script to create index entries. Since this script takes the names from the list item, it is important to check for spelling errors that would ripple through the main document and Index. Figure 2 shows the page in the list about Bed 16 Liqueur, and Figure 3 the corresponding Texinfo source (abridged), after the index entries have been added.

## 7 Plant ranks

The Plant List Summary offers a glimpse into family memberships. That suggests that we should publish a list of all the plant families, the genera in each family, and the species in each genera. This information is already available in the `@item` line, but needs to be consolidated in its own hierarchy. The Unix `sort` utility organizes the hierarchy alphabetically, but Texinfo markup needs to be added to indicate sections and subsections. Again, a shell script works through the sorted plant hierarchy to add `@section` and `@subsection` markup and then writes this revised hierarchy to a file. This file is then integrated into the Texinfo source file with an `@include` statement before the Index.

Making the taxonomic hierarchy accessible raises awareness of relationships in the Garden and can help docents summarize information they provide to visitors. At a recent docent and volunteer meeting, one of the docents talked about the uses of plants in the ginger family. And, many docents are pleased to know that madder, dyer's woodruff, gardenia, and coffee are in the same family (Rubiaceae).

## 8 Hybrid plants

*The Chicago Manual of Style* [1] recommends using the mathematical times symbol to identify a hybrid plant, as in Sweet Lavender or *Lavandula* × *heterophylla*. In earlier versions of the Plant List, I used the familiar lower case roman 'x'. I was able to change it to the × symbol in the Texinfo source file, but could not get it to appear in the Index. How to do this turned into a question to Karl Berry by email and Karl replied with a `TEX` macro that worked. This adjustment to hybrid plants in the source files, Texinfo and plant ranks, is done with a one-line `sed` script after the other scripts have been run and just before processing the Texinfo file to PDF output. The typographical quality of the Plant List has improved. Thank you Karl.

## 9 Recap and next steps

The Gardener for the Herb Garden selects plants, supervises volunteers, and interacts with docents, volunteers, and visitors. She revises the designs of various beds as the Garden evolves. The diversity of plants and ongoing changes to the Garden make an accurate plant list an asset for the Curator, Gardener, docents, volunteers, and visitors who often ask for help identifying plants and are interested in the history and uses of these plants. Each of the

25 beds in the Garden contains plants used for a particular purpose, for example, perfume, dye and fiber, cooking, and medicine.

Each of these 25 beds appears in the Plant List with a diagram showing the location of each of the plants growing in that bed. The diagram is produced in a SVG format in Inkscape and then imported by Texinfo as a PNG graphic file and placed at the top of the PDF page for that bed.

Before this project, the Plant List was the responsibility of the Curator or the Gardener. This project has been a productive effort between a Huntington staff member and a volunteer. The Gardener has told me she would like to take over the maintenance of this list and I will work with her over the next year to make this transition successful.

The Huntington and the Gardener use MS Windows on their computers. Moving to Windows versions of Inkscape, Texinfo, and `TEX` should not be difficult. I also don't anticipate difficulties using a plain text editor for the Texinfo source and entering a few commands in some shell. The difficulty may come from having to move the scripts from my GNU/Linux (Ubuntu) machine to a Windows machine. The Unix-like environment Cygwin ([cygwin.com](http://cygwin.com)) is one option. Another is to rewrite the scripts in Perl.

We will work through these alternatives in the coming months; comments are welcome.

## References

- [1] *The Chicago Manual of Style*, Sixteenth edition, University of Chicago Press, 2010, ISBN-13: 978-0-226-10420-1.
- [2] *Classic Shell Scripting*, Arnold Robbins and Nelson H. F. Beebe, O'Reilly, 2005, ISBN: 978-0-596-00595-5.
- [3] *Effective awk Programming*, Third edition, Arnold Robbins, O'Reilly, 2001, ISBN: 978-0-596-00070-7.
- [4] Inkscape. <http://www.inkscape.org/en>.
- [5] *sed & awk*, Second edition, Dale Dougherty and Arnold Robbins, O'Reilly, 1997, ISBN-13: 978-1-565-92225-9.
- [6] Texinfo. <http://www.gnu.org/software/texinfo>.

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