

Revisiting two charts of the Statistical Atlas 1874

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Abstract

This is the abstract.

It consists of two paragraphs.

Introduction

Three times in the past, the US Census Bureau published a Statistical Atlas to map the state of the Union based on data collected in the 9th, 10th, and 11th US census (in 1870, 1880, and 1890). Each of these atlases represents a masterpiece in science and technology.

XXX What we are planning on doing here

The Chart

Figure 1 shows a miniature of the chart published as plate #32 in the Statistical Atlas of 1874 (Walker 1874) produced from data collected in the 9th US Census. The chart is set-up in form of small multiples, also known as lattice or trellis plots (Becker, Cleveland, and Shyu 1996), one for each state and an enlarged plot as with an overview of the nation-wide aggregates. States are represented by squares of the same size, representing “the total population over 10 years of age”, as detailed in the zoom-in in Figure 2, which shows the description at the top of the plate.

With the help of the description and the legend of Figures 2 and 3, we can interpret the details of each of the squares at the example of Figure 4. This figure shows an overview of type of occupation by gender across the US in 1870. It is essentially a mosaicplot (Hartigan and Kleiner 1981) of type of occupation (horizontal) and gender (vertical), but with a twist: the grey band around each one of the states’ squares is proportional to the number of population “unaccounted” for, i.e. the difference between the total population over the age of ten and the population gainfully employed or attending school. The choice to show this part of the population by a band around is somewhat unfortunate, as it breaks the overall metaphor of the mosaicplot and thereby prevents any direct comparisons across charts except for area comparisons, which are cognitively harder and more error prone than comparisons of lengths (Cleveland and McGill 1984).

The Data

Data retrieved from Minnesota Population Center (2016).

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Maps

The R package `USAboundaries` (Mullen 2016) provides historical US state borders. This is used to map the US in 1870 in Figure ??.

```
##  
## Attaching package: 'maps'  
  
## The following object is masked from 'package:purrr':  
##  
##      map
```

References

- Becker, Richard A., William S. Cleveland, and Ming-Jen Shyu. 1996. “The Visual Design and Control of Trellis Display.” *Journal of Computational and Graphical Statistics* 5 (2): 123–55.
- Cleveland, William S., and Robert McGill. 1984. “Graphical Perception: Theory, Experimentation and Application to the Development of Graphical Methods.” *Journal of the American Statistical Association* 79 (387): 531–54.
- Hartigan, J. A., and B. Kleiner. 1981. “Mosaics for Contingency Tables.” In *Computer Science and Statistics: Proceedings of the 13th Symposium on the Interface*, 268–73. Fairfax Station, VA: Interface Foundation of North America, Inc.
- Minnesota Population Center. 2016. “National Historical Geographic Information.” doi:[10.18128/D050.V11.0](https://doi.org/10.18128/D050.V11.0).
- Mullen, Lincoln. 2016. *USAboundaries: Historical and Contemporary Boundaries of the United States of America*. <https://CRAN.R-project.org/package=USAboundaries>.
- Walker, Francis Amasa. 1874. “Statistical Atlas of the United States Based on the Results of the Ninth Census 1870 with Contributions from Many Eminent Men of Science and Several Departments of the Government.” digitized version provided through Library of Congress, <https://www.loc.gov/item/05019329/>.

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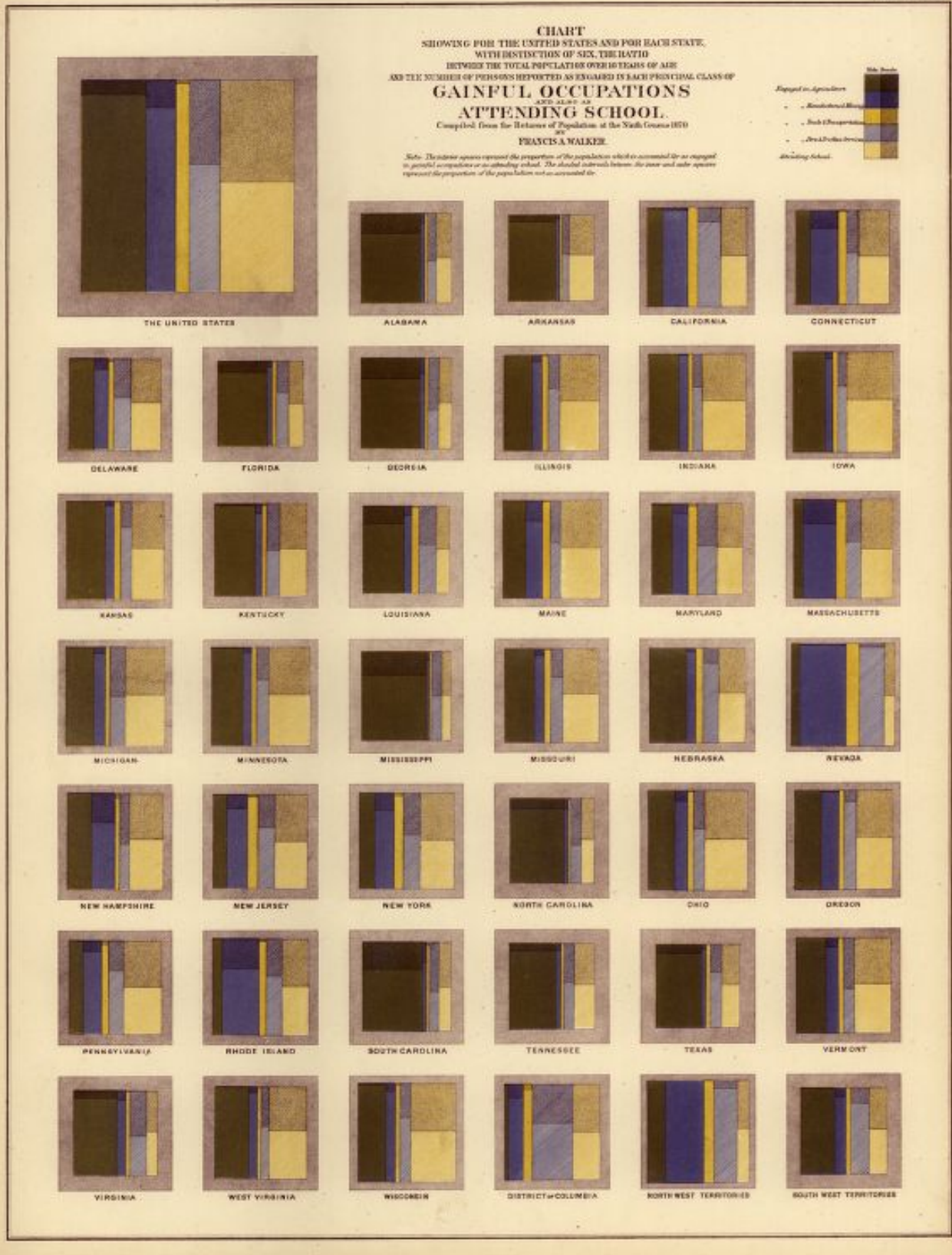


Figure 1: Plate #32 from the Statistical Atlas of 1874: Gender ratio of population over the age of 10 in different types of occupation.

CHART
SHOWING FOR THE UNITED STATES AND FOR EACH STATE,
WITH DISTINCTION OF SEX, THE RATIO
BETWEEN THE TOTAL POPULATION OVER 10 YEARS OF AGE
AND THE NUMBER OF PERSONS REPORTED AS ENGAGED IN EACH PRINCIPAL CLASS OF
GAINFUL OCCUPATIONS
AND ALSO AS
ATTENDING SCHOOL.
Compiled from the Returns of Population at the Ninth Census 1870
BY
FRANCIS A. WALKER.

Note: The interior squares represent the proportion of the population which is accounted for as engaged in gainful occupations or as attending school. The shaded intervals between the inner and outer squares represent the proportion of the population not so accounted for.

Figure 2: Zoom-in to the description section of plate #32

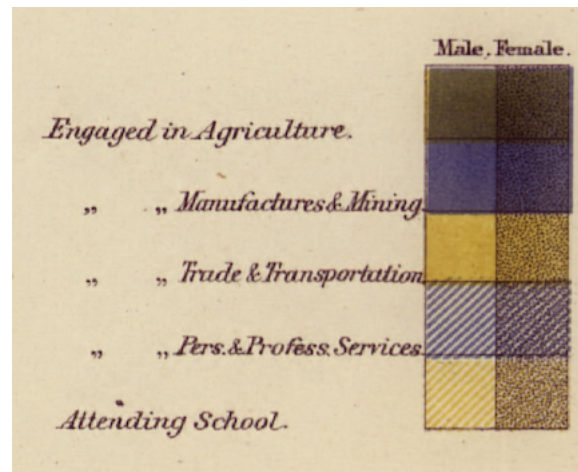


Figure 3: Zoom-in to the legend section of plate #32

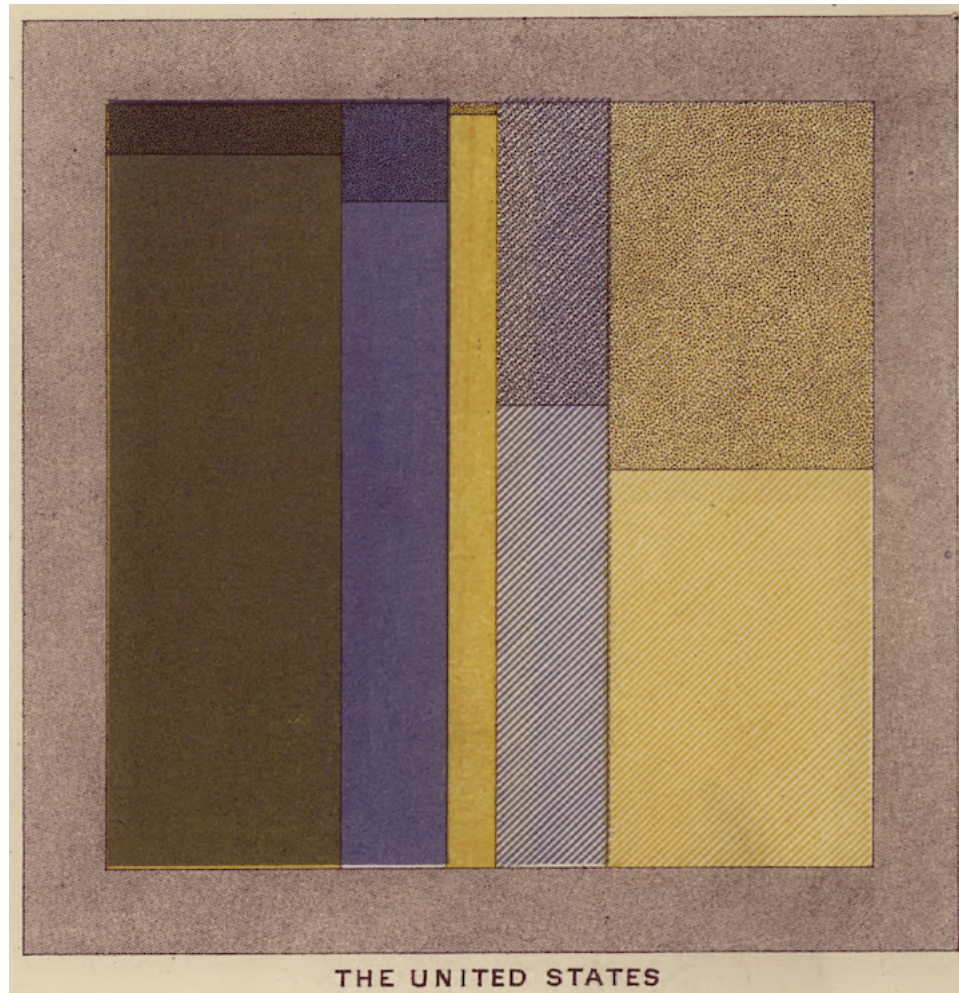


Figure 4: Zoom-in to the overview of the US wide distribution of genders across occupations.

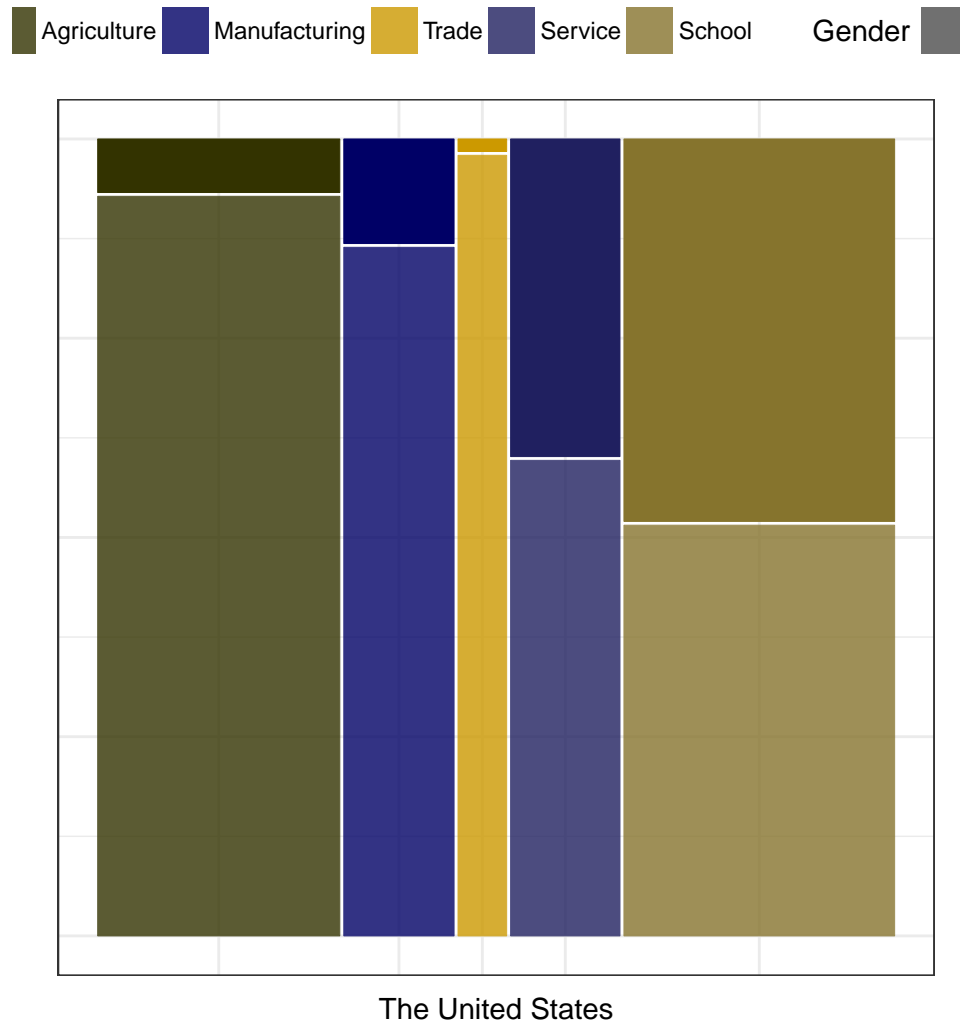


Figure 5: Recreation of the mosaicplot based on gainfully employed population over ten.

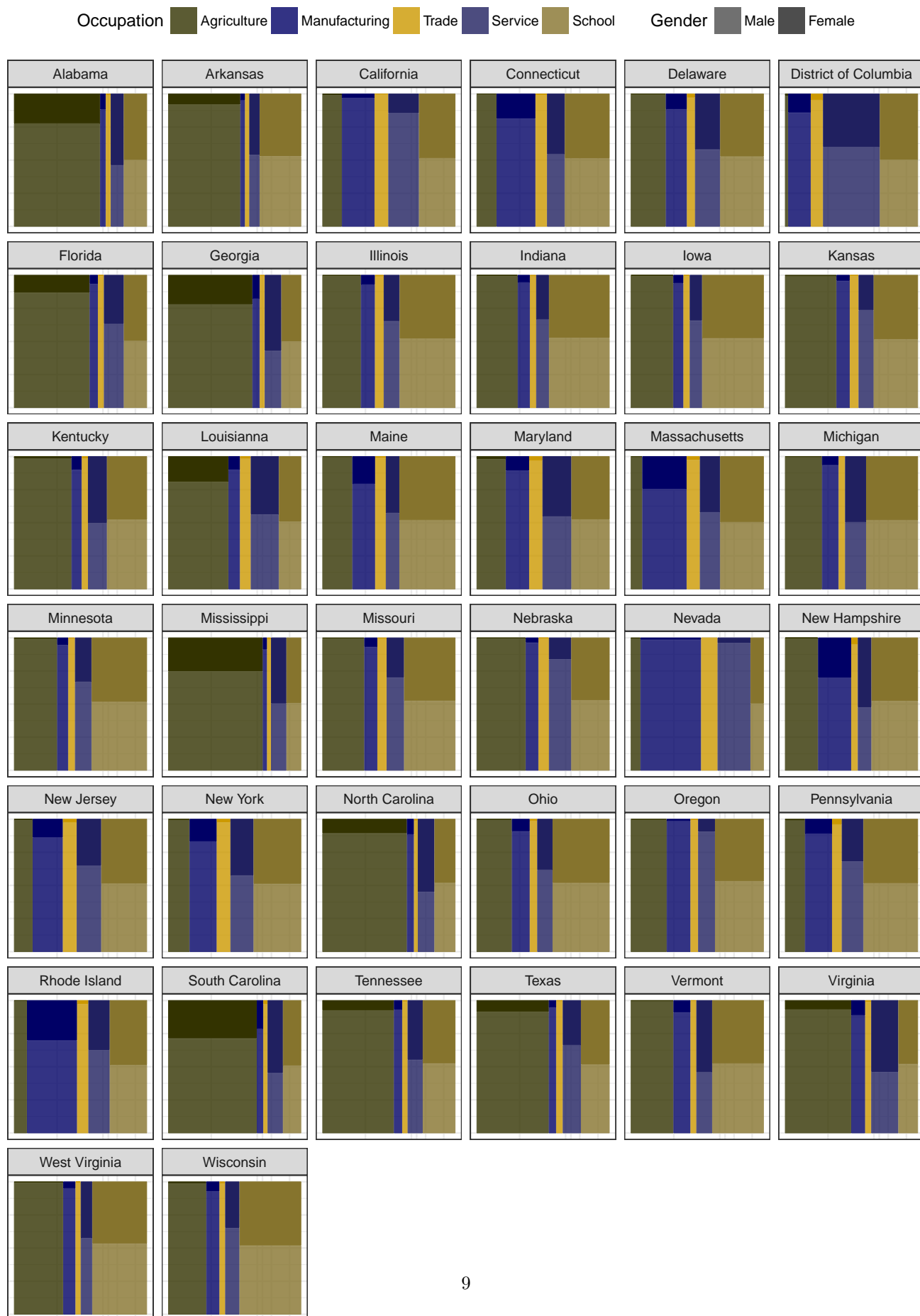


Figure 6: Recreation of mosaics of gainful occupation by states.

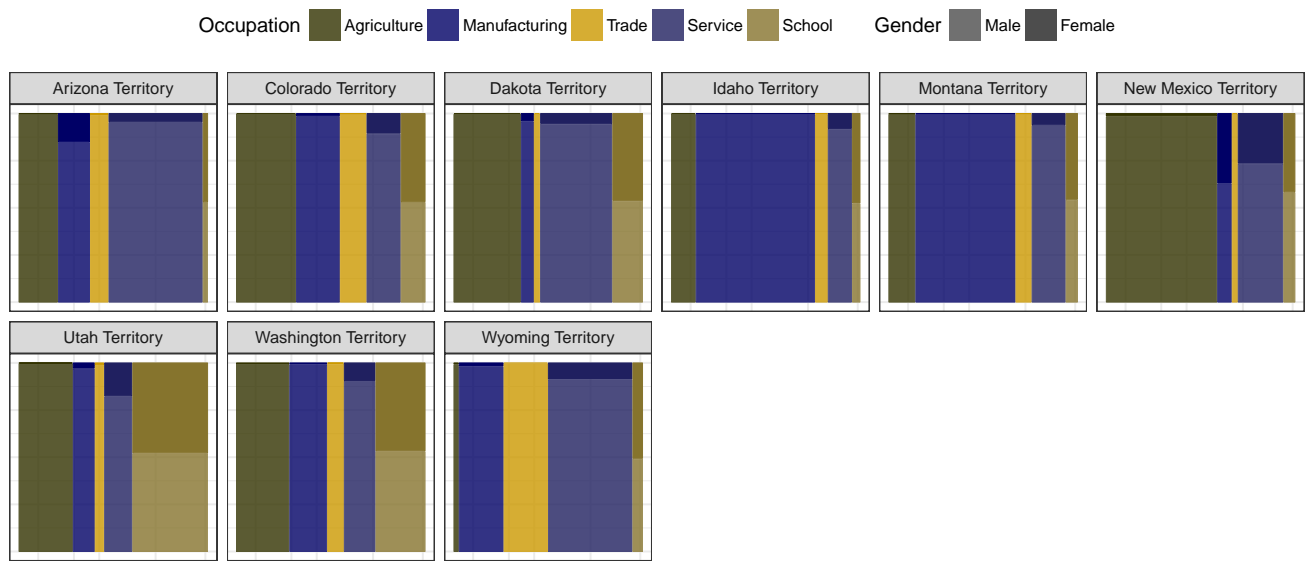


Figure 7: Mosaics of gainful occupation by territories.