

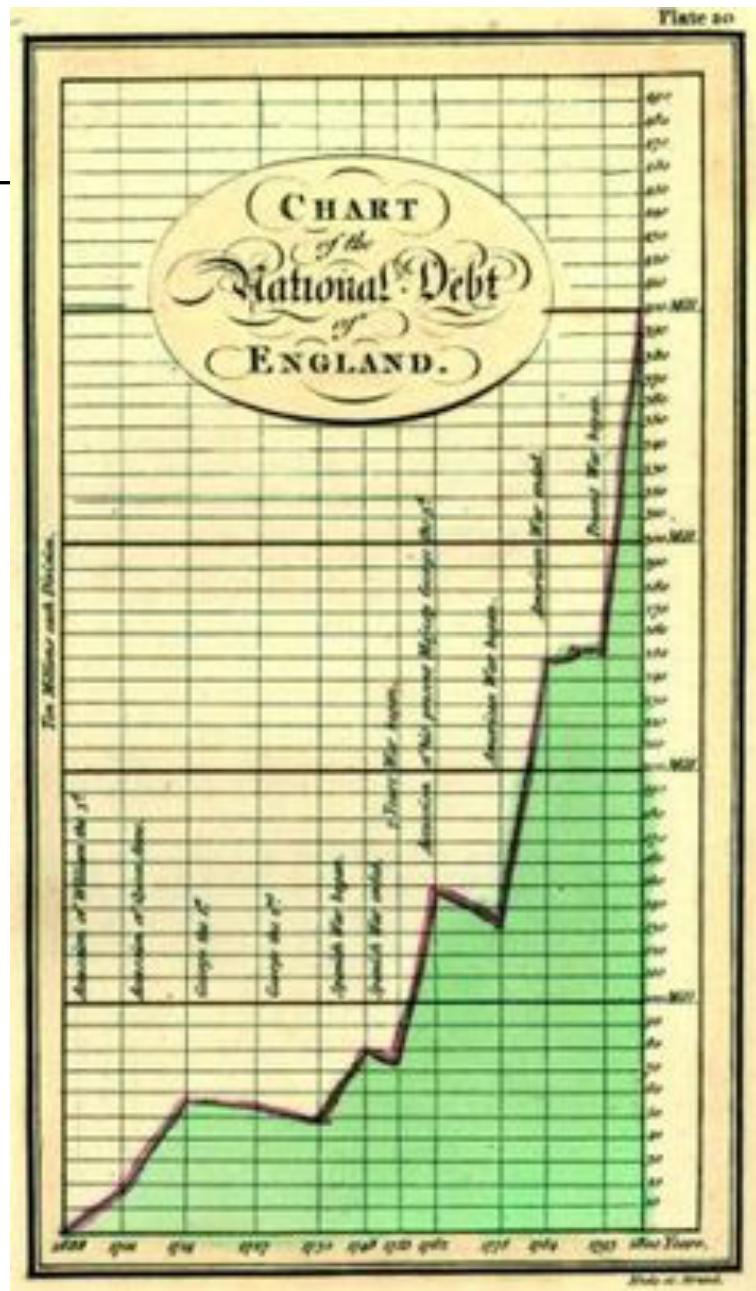
An Evolution of Visualization

The First Data Vis



Playfair

“Golden era” of modern graphics



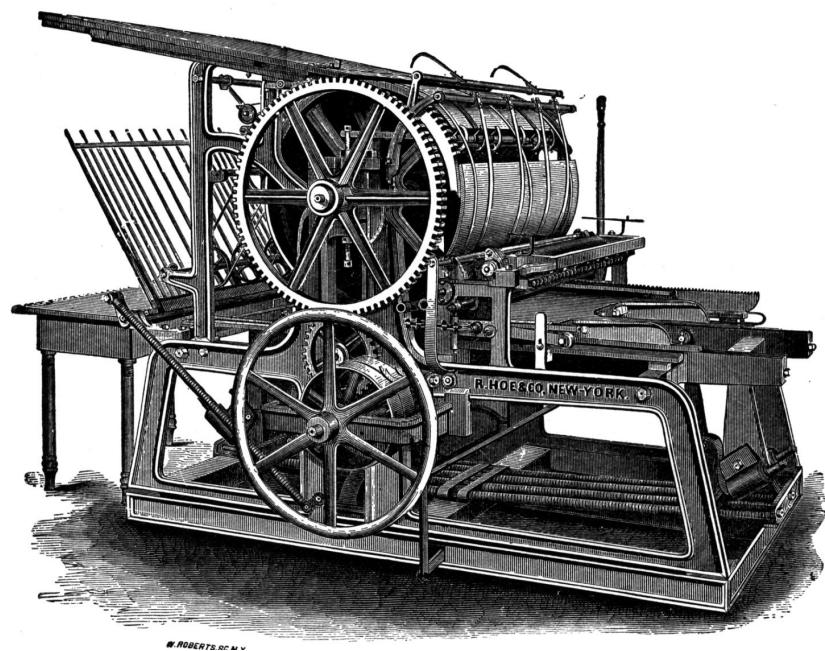
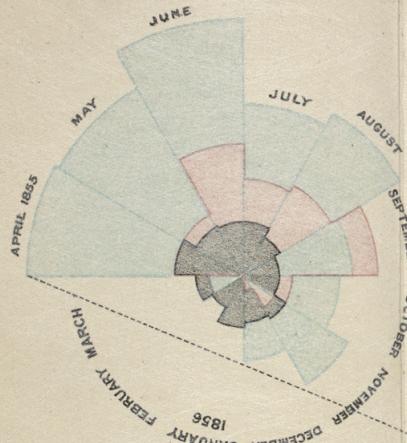
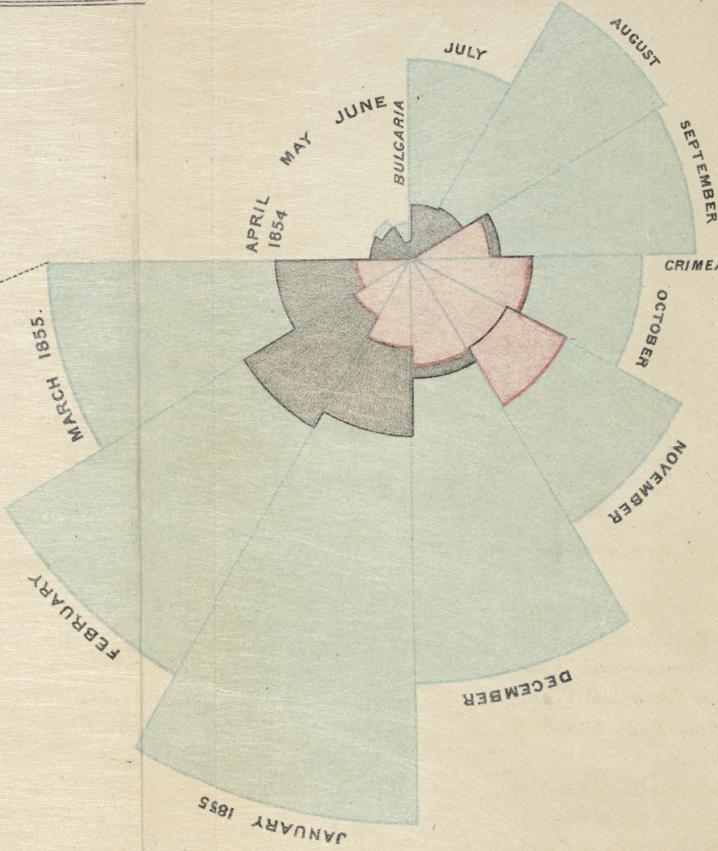


DIAGRAM OF THE CAUSES OF MORTALITY
IN THE ARMY IN THE EAST.

2.
APRIL 1855 to MARCH 1856.



1.
APRIL 1854 to MARCH 1855.



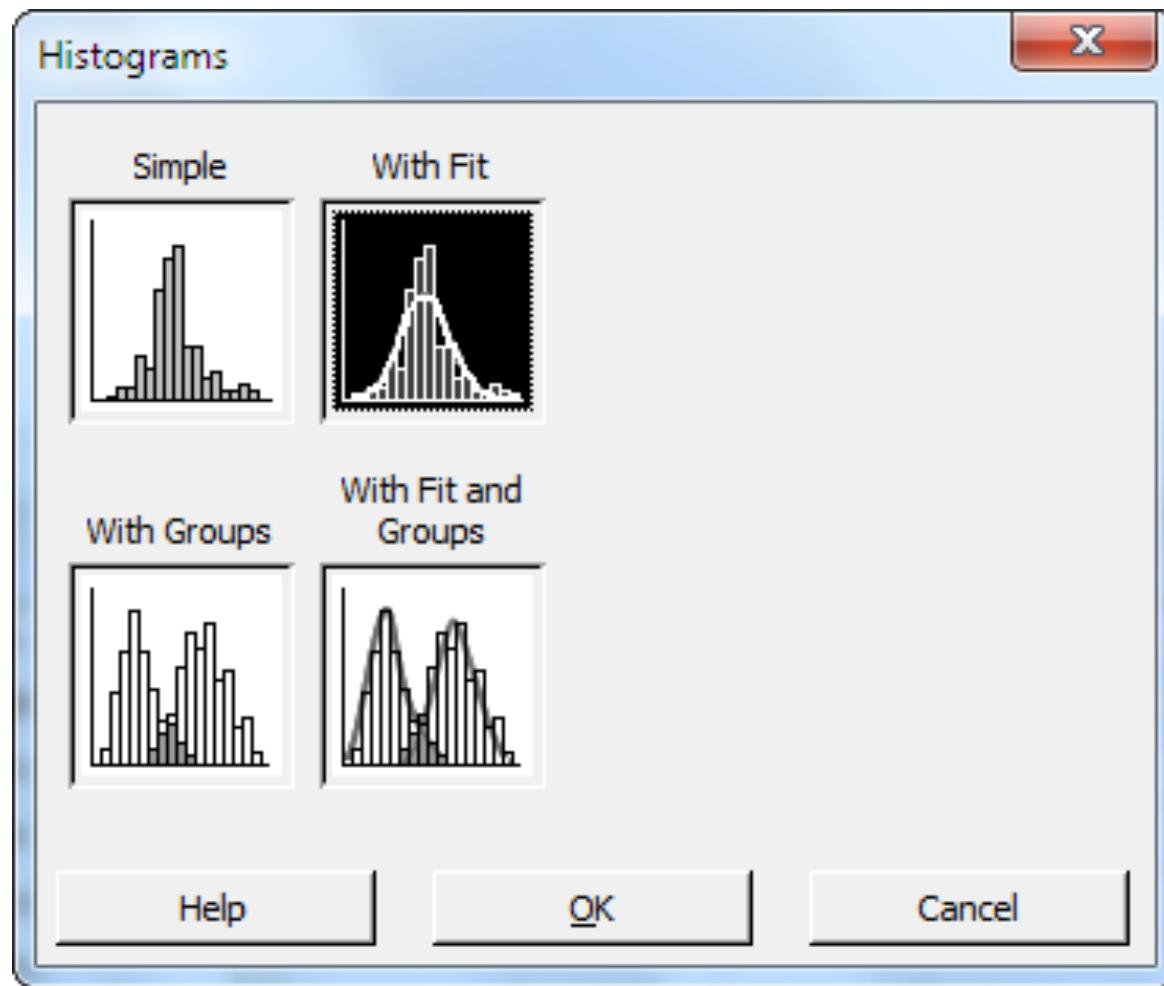
The Areas of the blue, red, & black wedges are each measured from the centre as the common vertex.

The blue wedges measured from the centre of the circle represent area for area the deaths from Preventible or Mitigable Zymotic diseases, the red wedges measured from the centre the deaths from wounds, & the black wedges measured from the centre the deaths from all other causes.

The black line across the red triangle in Nov^r 1854 marks the boundary of the deaths from all other causes during the month.

In October 1854, & April 1855, the black area coincides with the red; in January & February 1855, the blue coincides with the black.

The entire areas may be compared by following the blue, the red & the black lines enclosing them.



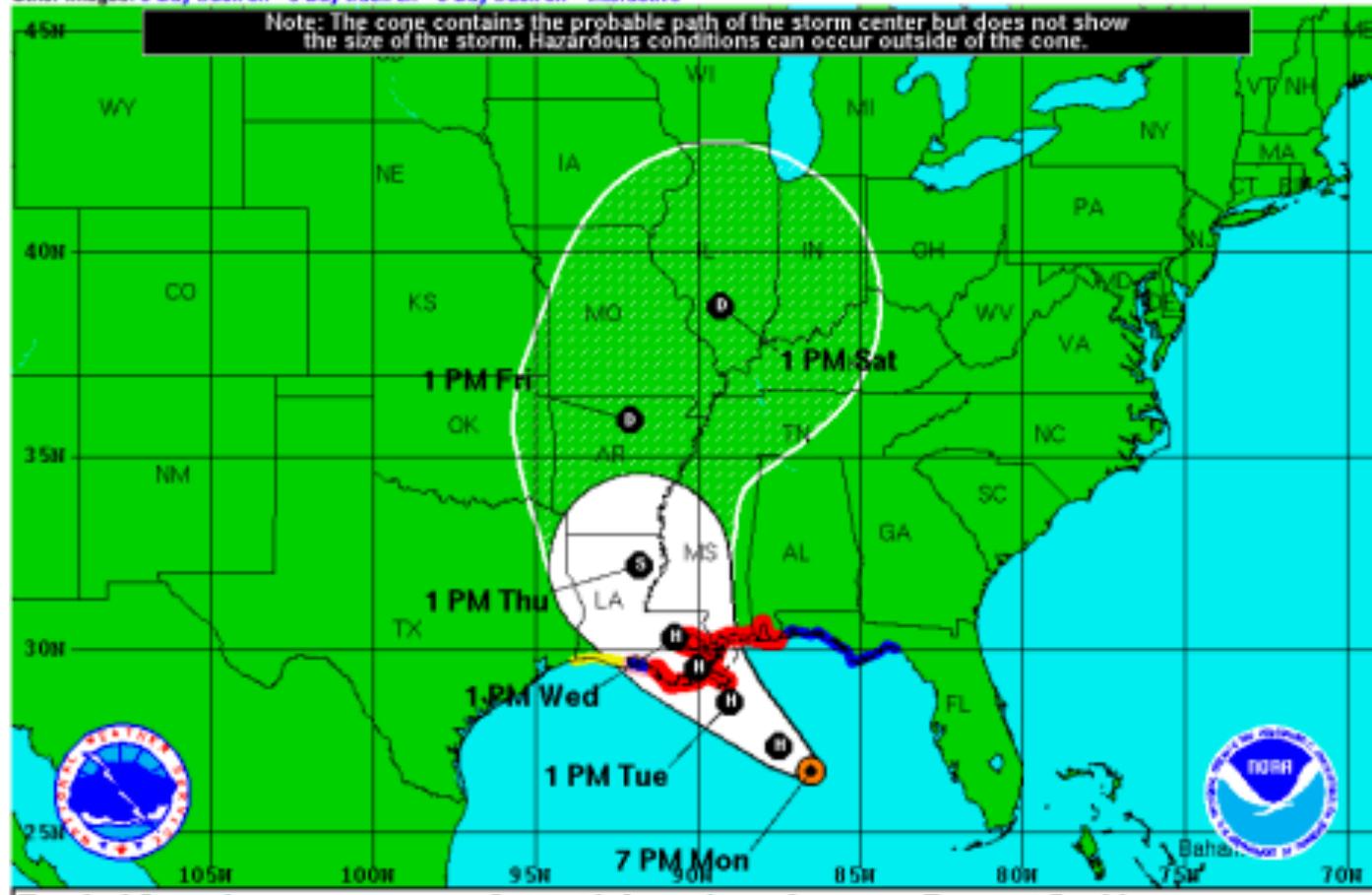
Outreach & Education
Prepare
Storm Surge
About Cyclones
Cyclone Names
Wind Scale
Most Extreme
Forecast Models
Breakpoints
Resources
Glossary | Acronyms
Frequent Questions
Our Organization
About NHC
Mission | Staff
Visitors | Virtual Tour
Library Branch
NCEP | Newsletter
Contact Us
Comments



Coastal Watches/Warnings and 5-Day Forecast Cone for Storm Center

Click image to zoom out – Download GIS data

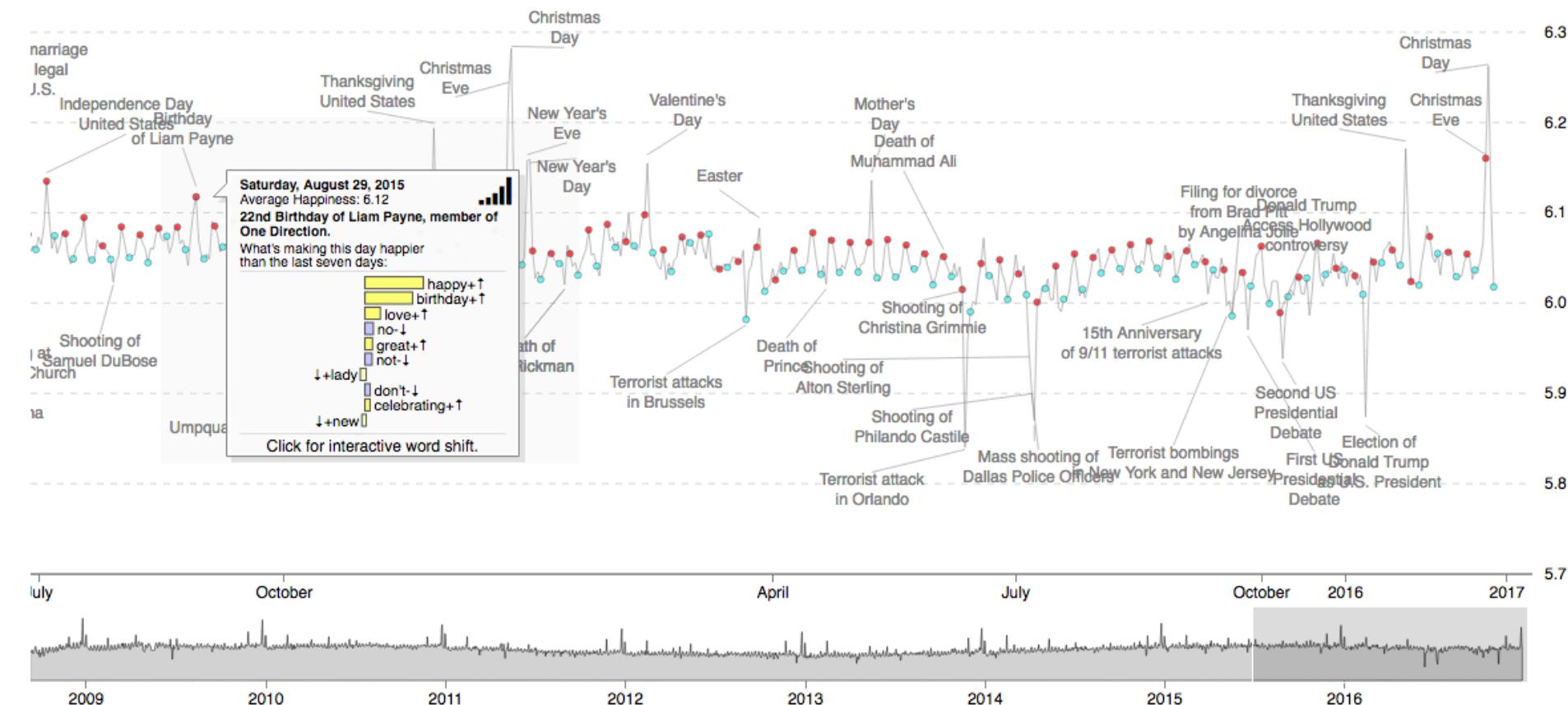
Other Images: [5-Day track on](#) – [3-Day track on](#) – [3-Day track off](#) – [Interactive](#) New!



Average Happiness for Twitter

Sun Mon Tue Wed Thu Fri Sat All on/off

Jump to: → 2009 2010 2011 2012 2013 2014 2015 2016 Full Last 18 mo



Modern Tools of the Trade

- Microsoft Excel
- Adobe Illustrator
- Tableau
- R's ggplot, Python's matplotlib
- Plotly
- D3

Trade-Offs

- Scriptable
- Speed of iteration
- Customizability
- Support vector graphics
- Interactive
- Handle big data
- Lines of code needed

Changing Frameworks

Engraving, sketching/painting

Rendered pixel-based graphic (rasters)
(PNG, JPG, BITMAP)

Vector graphics
(PDF, SVG, AI)

Interactive (QTK, Web browser)

Visualization Backend Summary

- Paper
- ASCII
- QTK
- PNG
- SVG
- PDF
- WebGL

Rasters vs. Vectors

File size
(many points)

Resizing

Portability

Powering Interactivity

Operating system–specific libraries

Web browsers

Grammar of Visualization

Software Implies the Model

- Tableau/Excel: choose a chart
- Illustrator: layout and alignment
- Matplotlib/ggplot: plot() for time series
- D3: data bound to visual elements

Grammar of Visualization

`plt.plot(x, y)`

`qplot(x, y)`

Grammar of Visualization

`plt.plot(time, sales)`

`qplot(time, sales)`

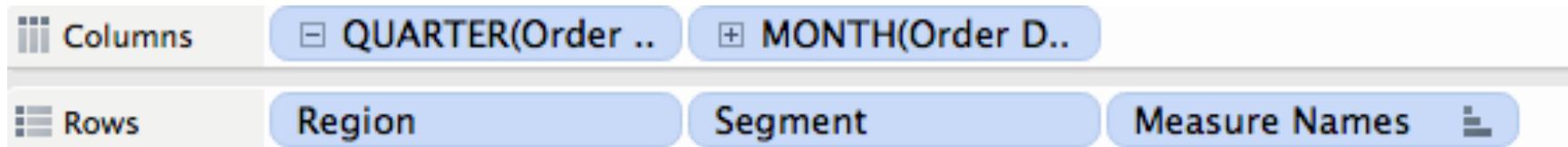
Grammar of Visualization

```
plt.plot(time, sales, profit)
```

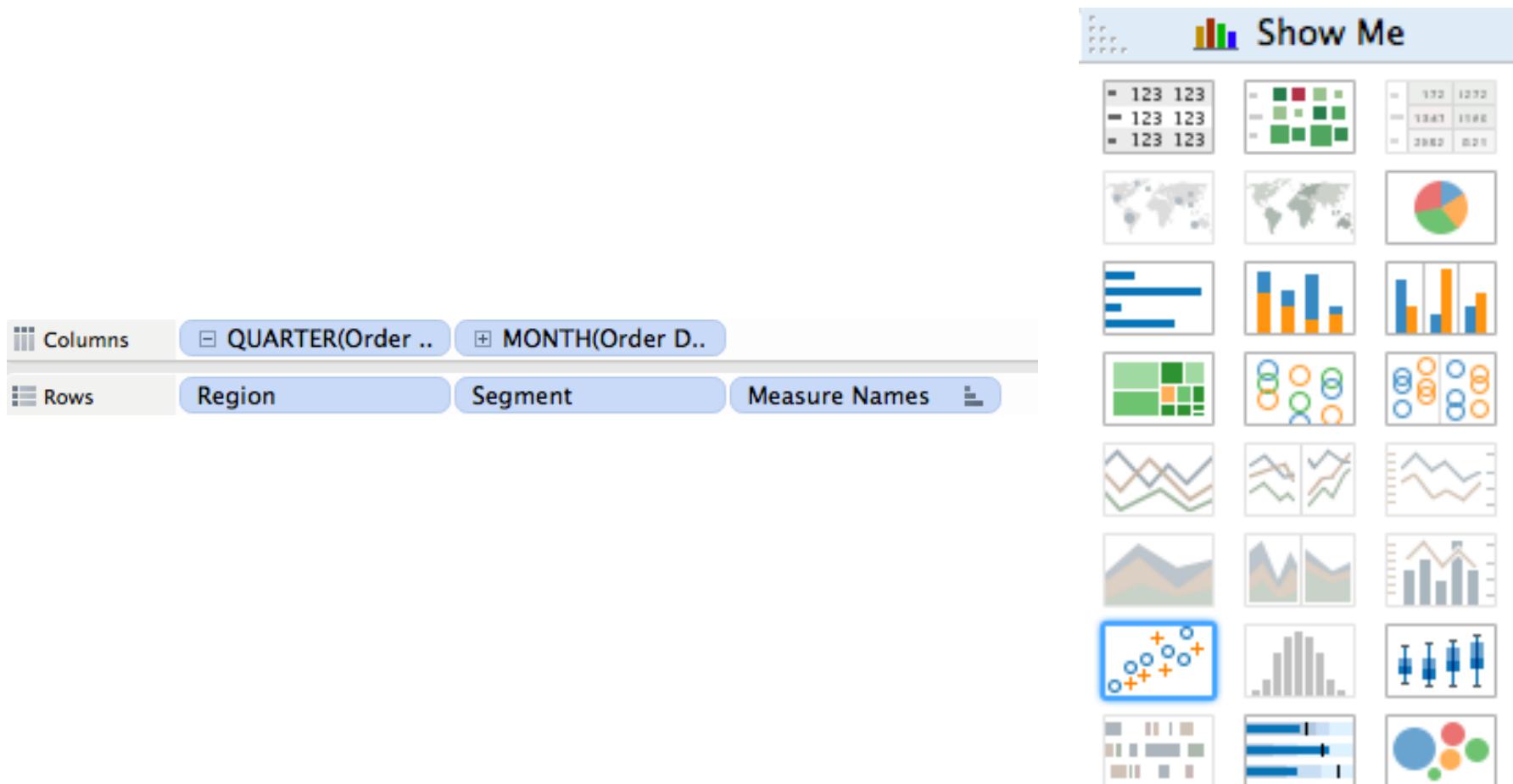
Grammar of Visualization

```
plt.scatter(sales, profit)
```

Grammar of Visualization



Grammar of Visualization



For **scatter plots** try
0 or more dimensions
2 to 4 measures

Grammar of Visualization

Columns QUARTER(Order ..) MONTH(Order D..)

Rows Region Segment Measure Names

Marks

Abc Automatic

Color Size Text

Detail Tooltip

Measure Na..

Measure Values

AGG(SUM([Sale..

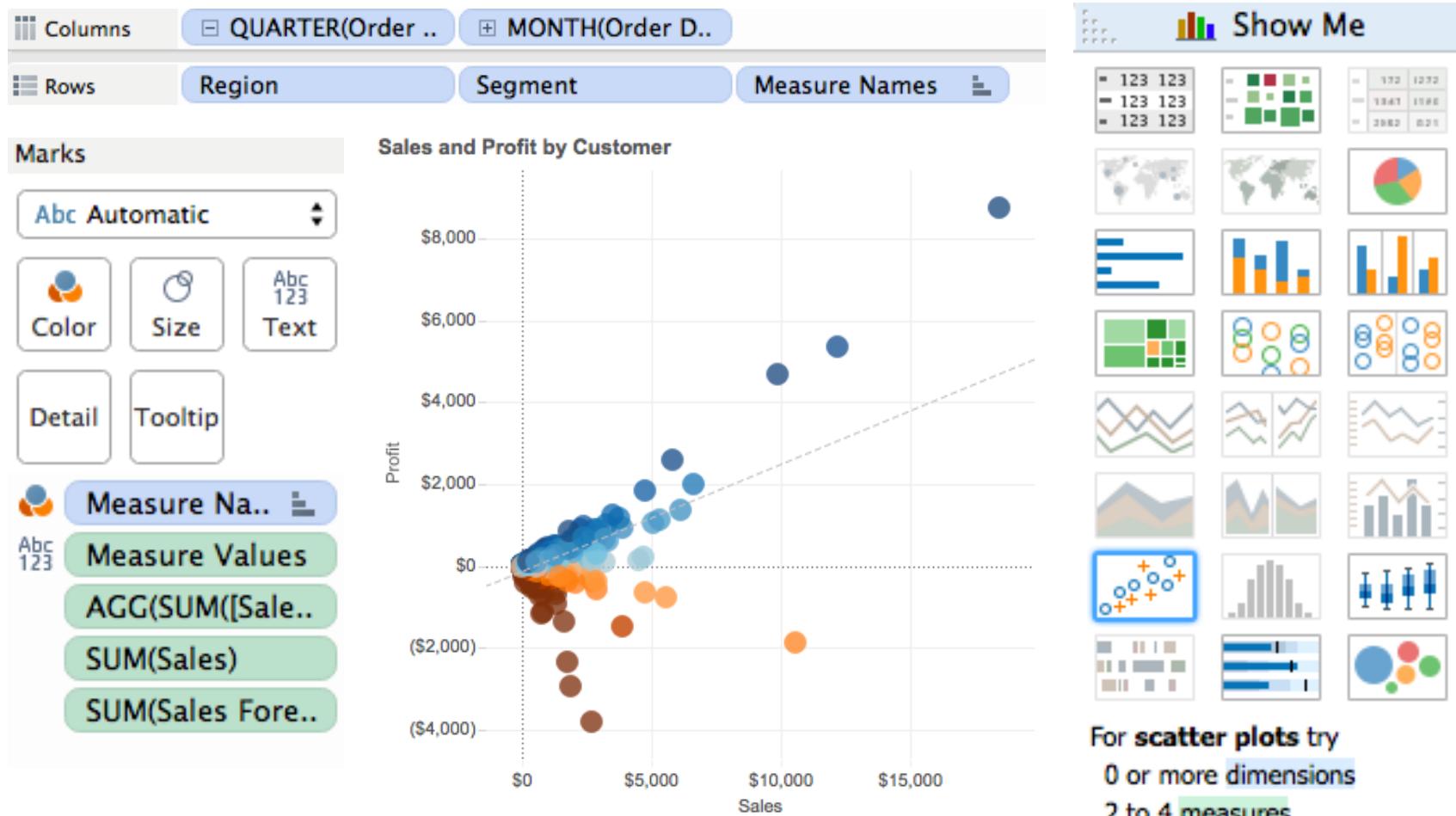
SUM(Sales)

SUM(Sales Fore..

Show Me

For **scatter plots** try
0 or more dimensions
2 to 4 measures

Grammar of Visualization



Grammar of Visualization

```
new pv.Panel()
  .data([[1, 1.2, 1.7, 1.5, .7]])
  .width(150)
  .height(150)
  .add(pv.Wedge)
    .data(pv.normalize)
    .left(75)
    .bottom(75)
    .outerRadius(70)
    .angle(function(d) d * 2 * Math.PI)
  .root.render();
```

Grammar of Visualization

```
d3.select("body").append("svg:svg")
  .data([[1, 1.2, 1.7, 1.5, .7]])
  .attr("width", 150)
  .attr("height", 150)
  .selectAll("path")
    .data(d3.layout.pie())
  .enter().append("svg:path")
    .attr("transform", "translate(75,75)")
    .attr("d", d3.svg.arc().outerRadius(70));
```

Berkeley

SCHOOL OF
INFORMATION