Getting the word out:

Digital imaging, file formats, and ggsave

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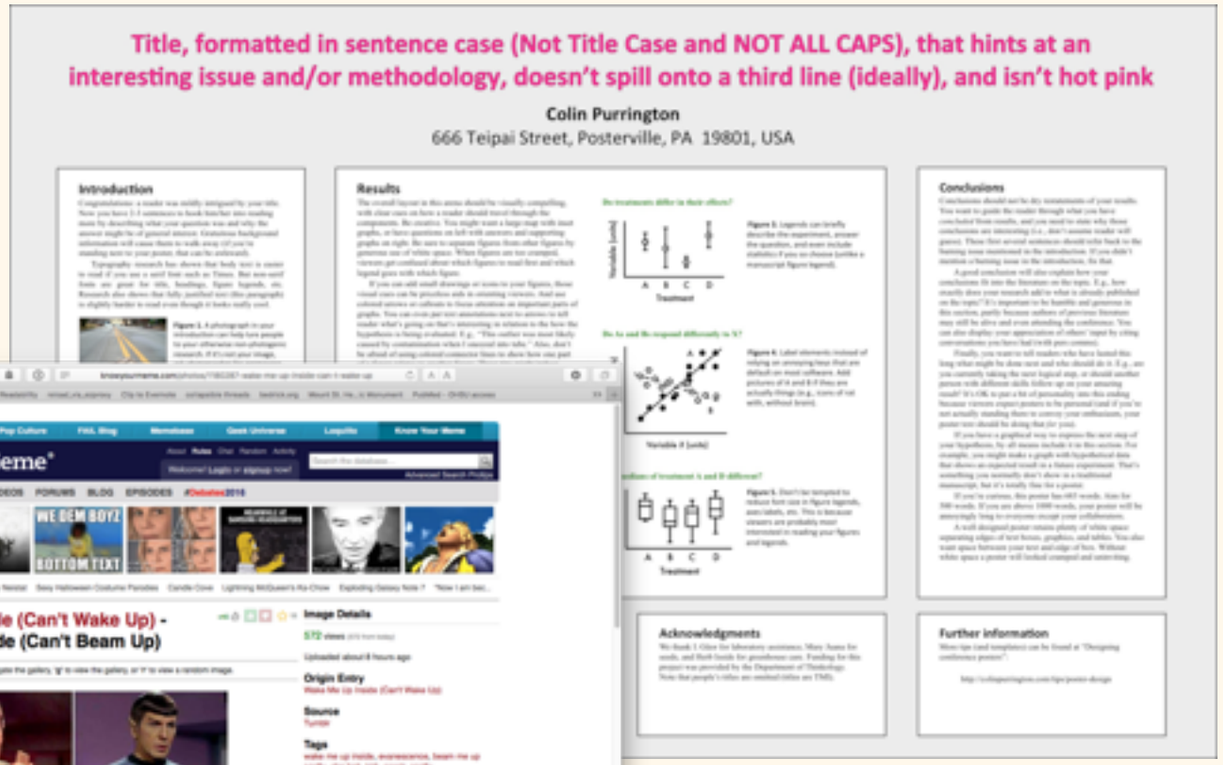
Figure: https://medievalbooks.nl/2013/11/05/where-are-the-scriptoria/

You've made your amazing visualization...

You've made your amazing visualization...

... now you've got to get it out there!



http://colinpurrington.com/wp-content/uploads/2011/09/scientific-poster-advice-purrington.jpg

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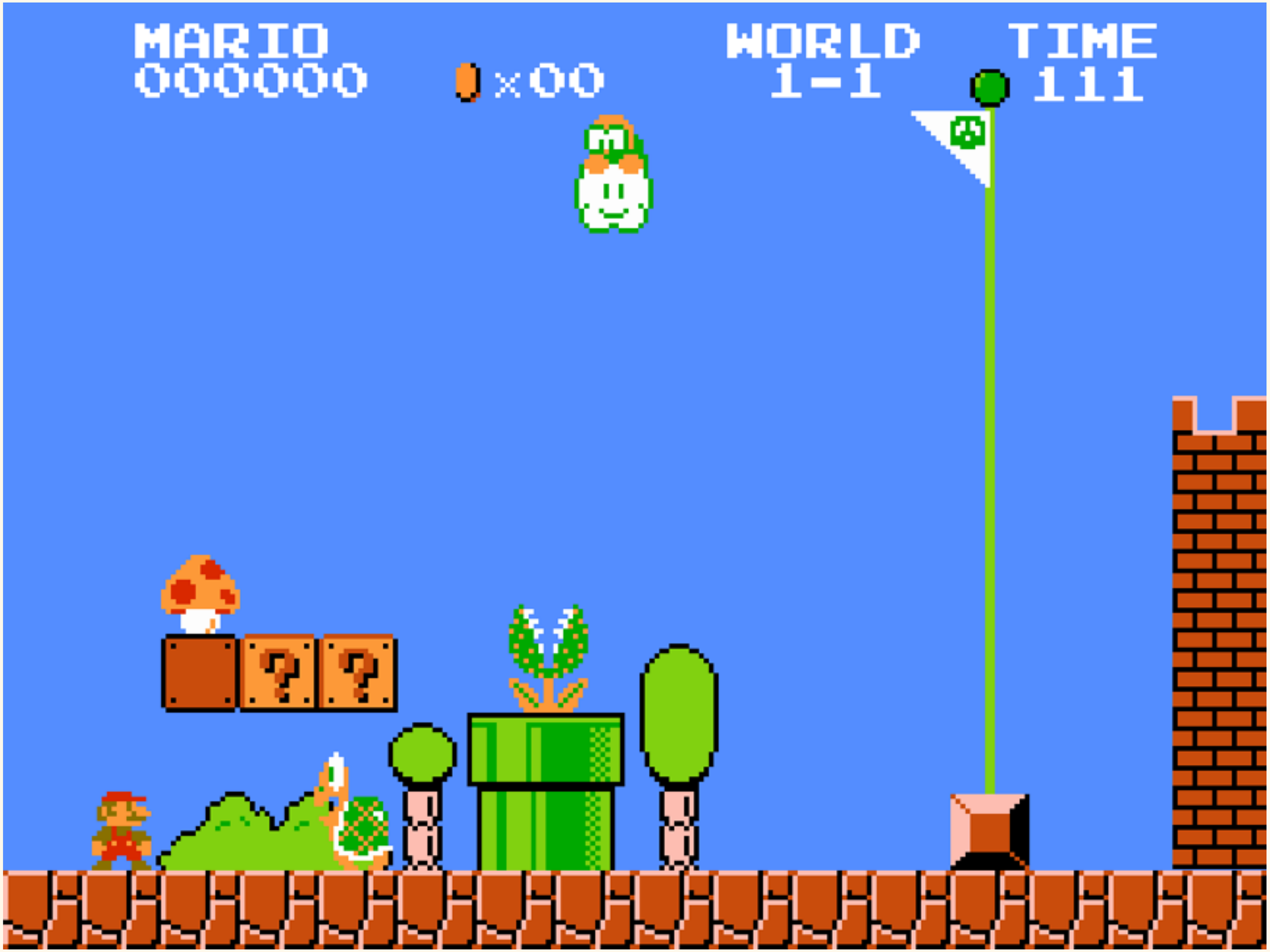
Computers (mostly) *display* images as a grid of individual colored squares:

The fundamental unit (square) is a *pixel*.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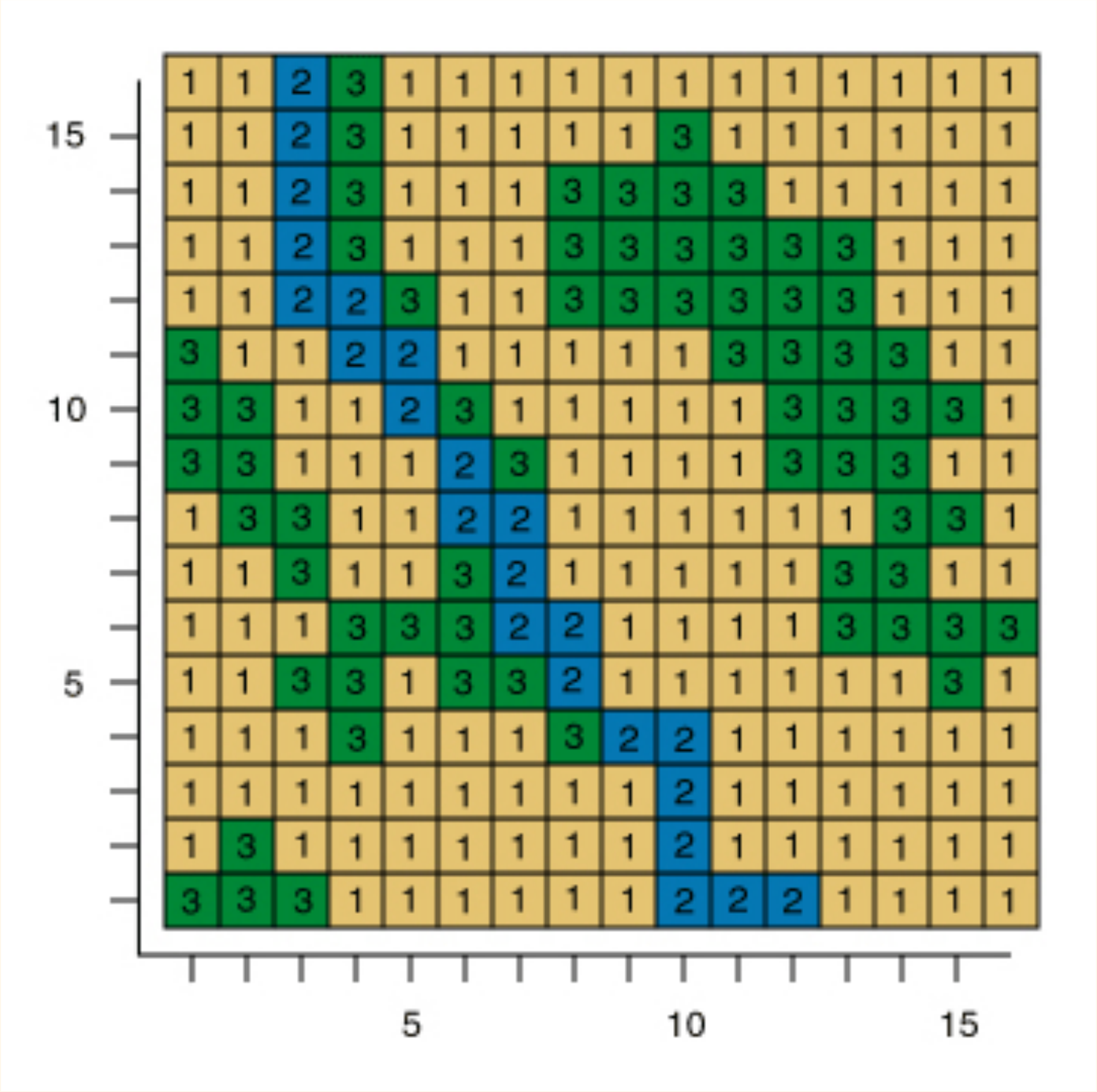
That's for *displaying* images...

What about *storing* images?

There are two main ways to store images:

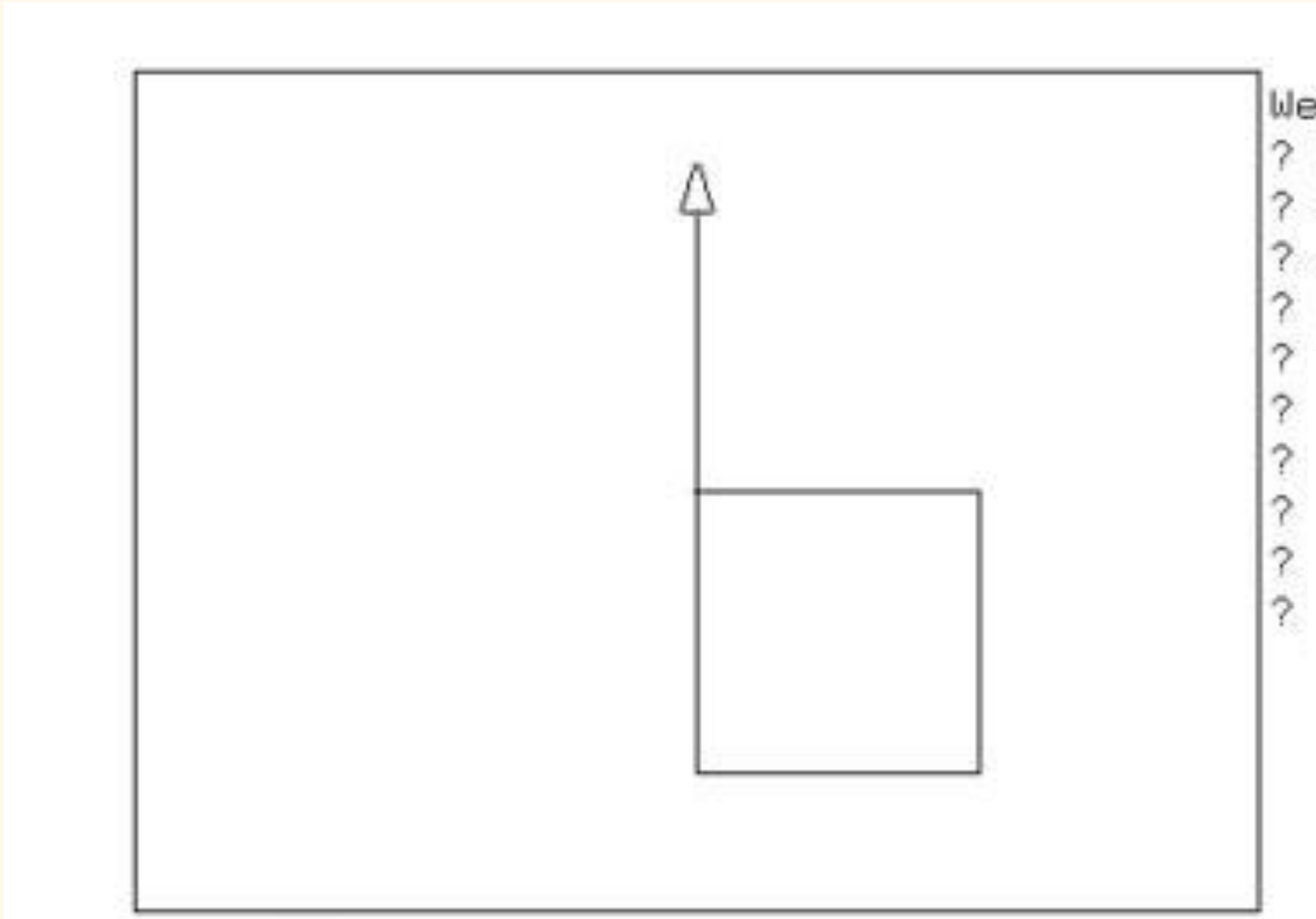
Raster files and *Vector* files.

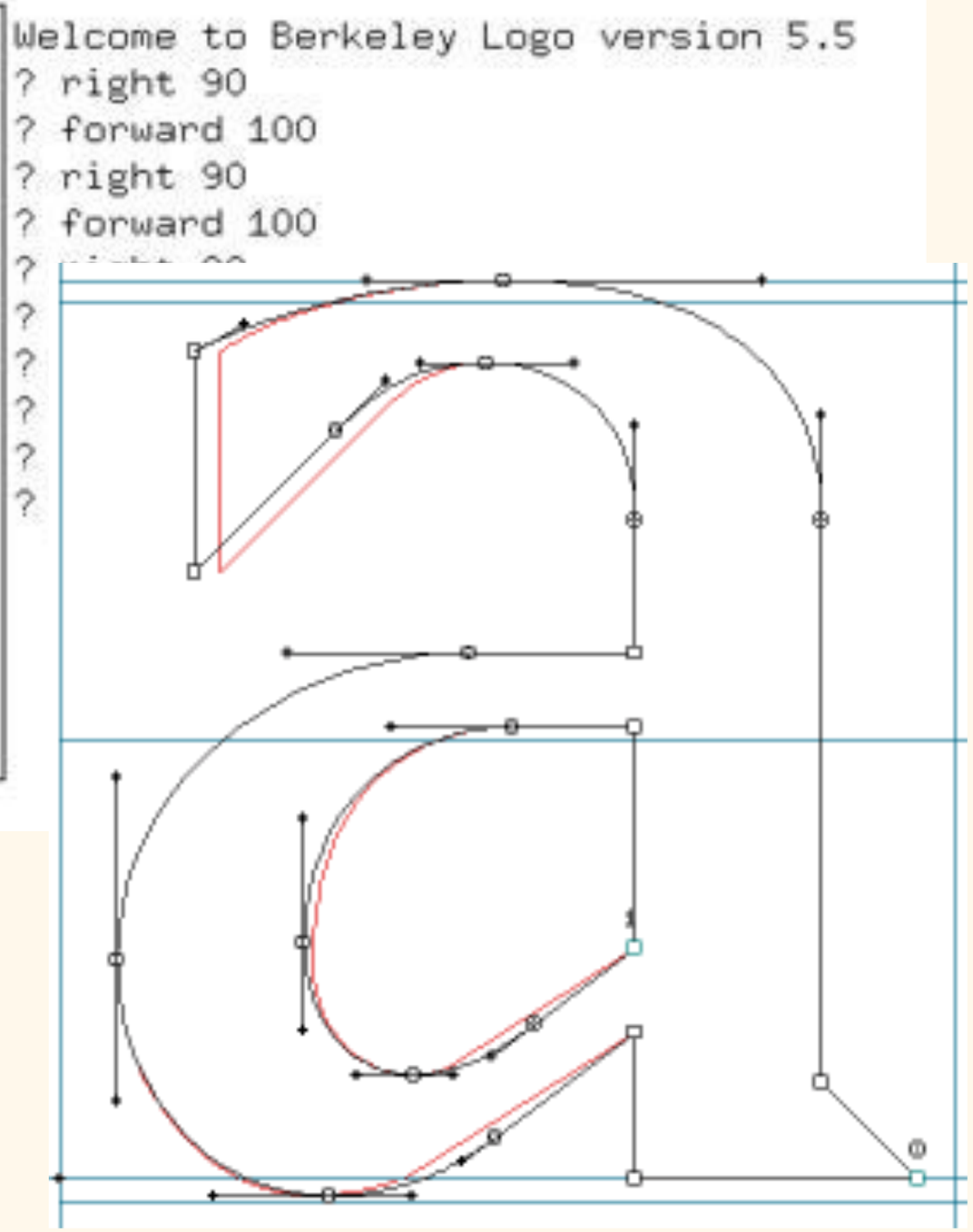
Raster files store the actual values of the pixels comprising the image:



https://www.e-education.psu.edu/geog486/node/1879

Vector files store mathematical instructions to recreate the image:

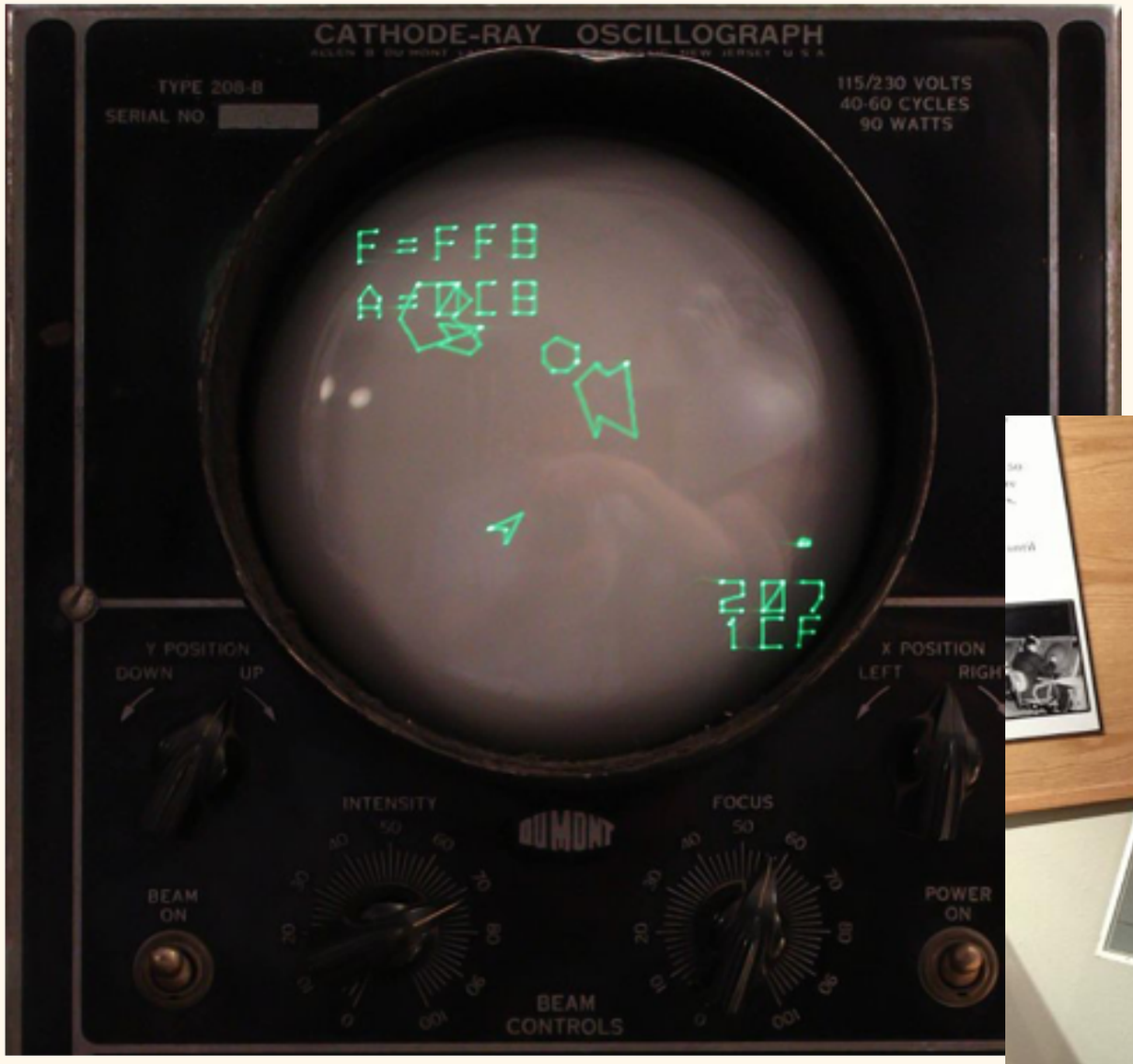


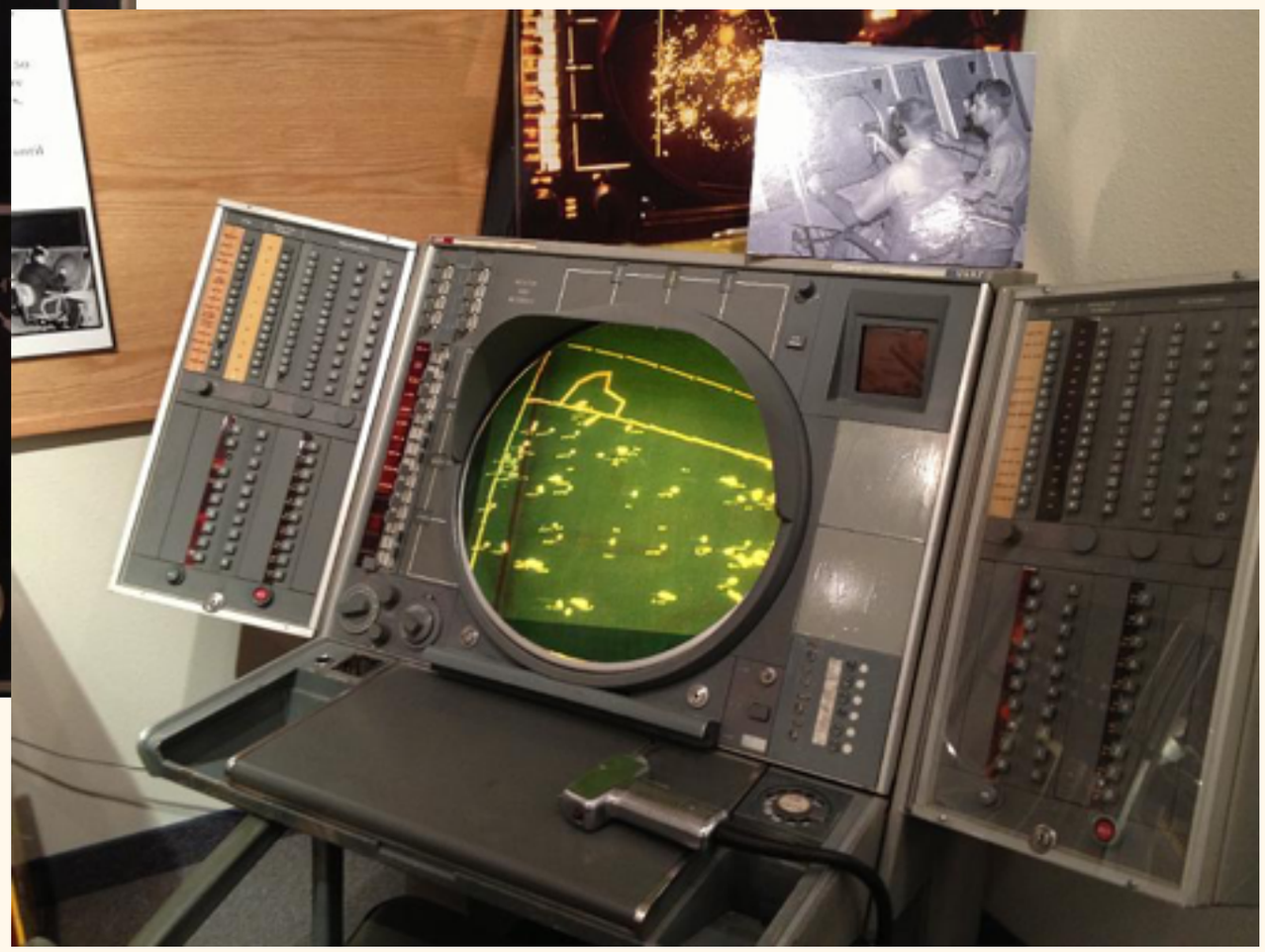


http://www.emigre.com/FF/MATRIX7.gif

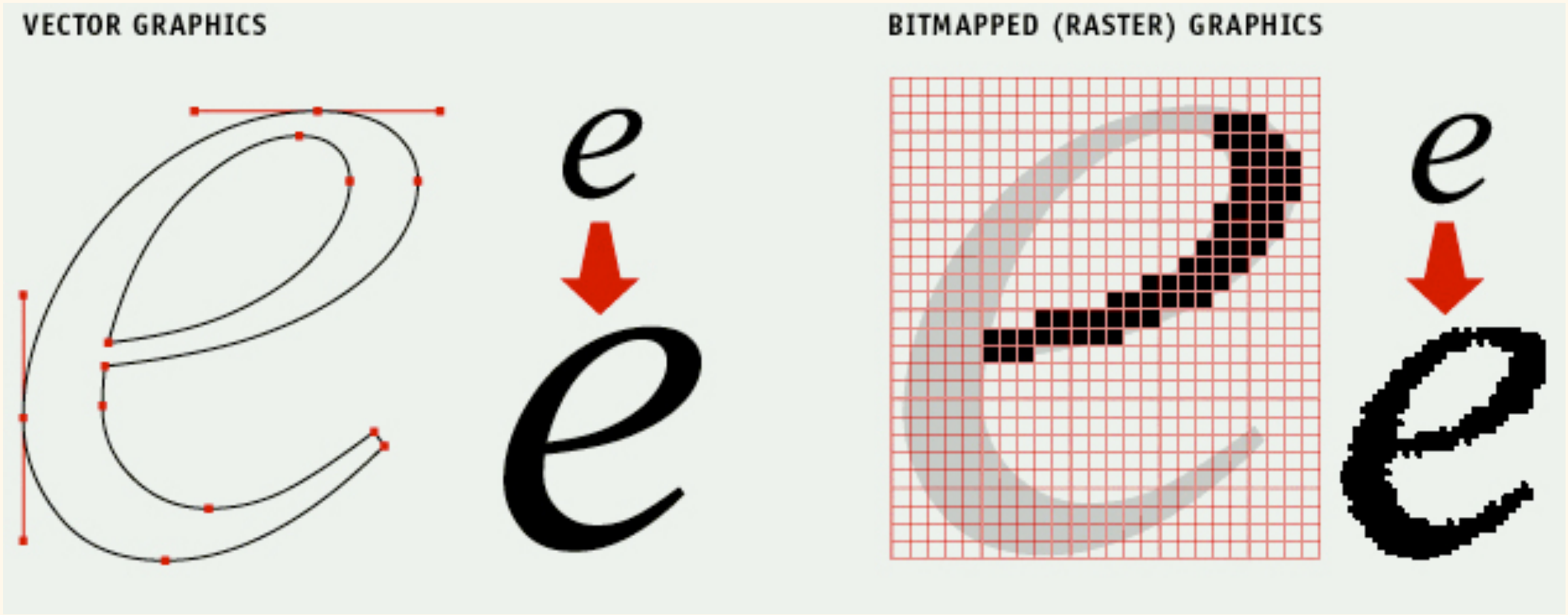
https://www.csee.umbc.edu/courses/201/spring10/assignments/proj_recursion.shtml#(6)

Fun fact: the first computer graphics systems used *vector* displays!



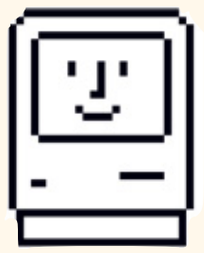


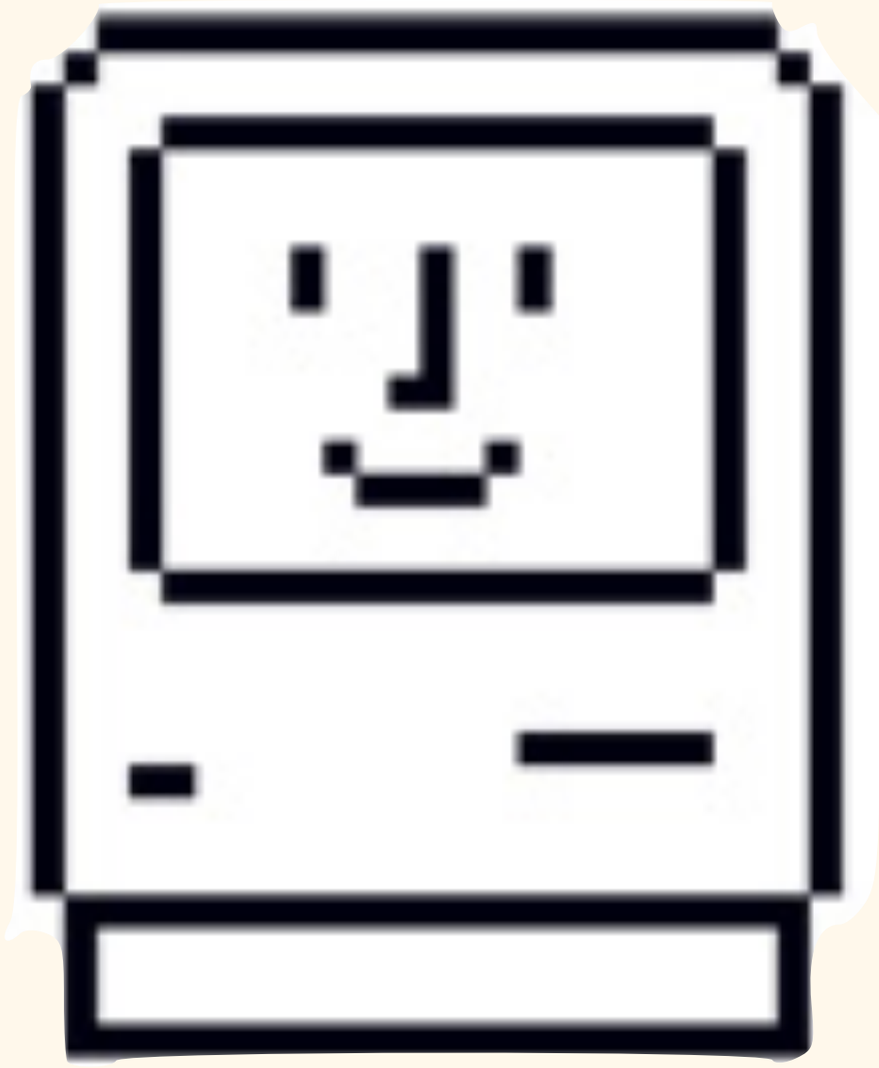
Raster images contain a finite amount of information:

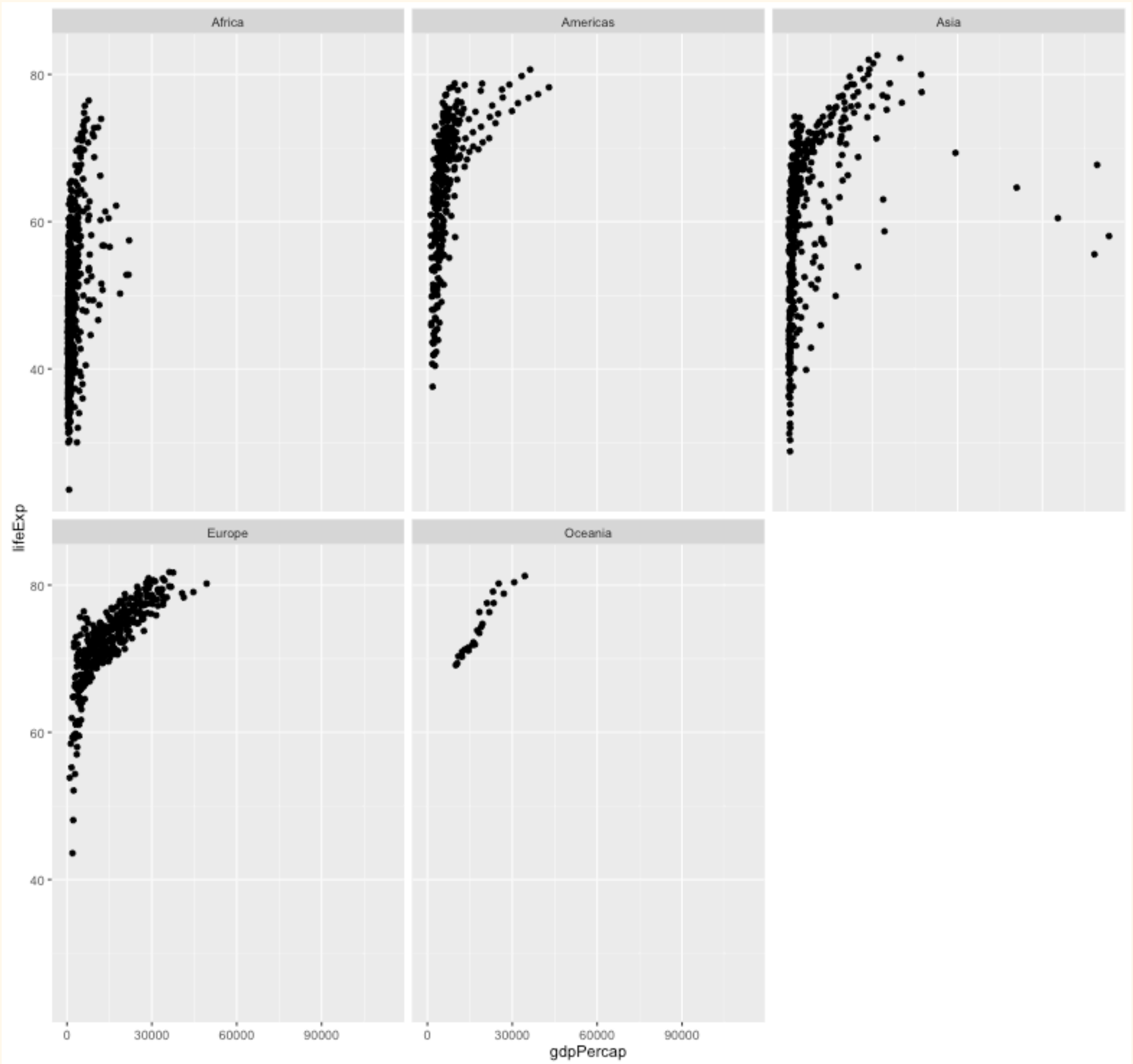


http://www.amywaggs.com/wp-content/uploads/2015/02/vector-raster.jpg

Raster images contain a finite amount of information:



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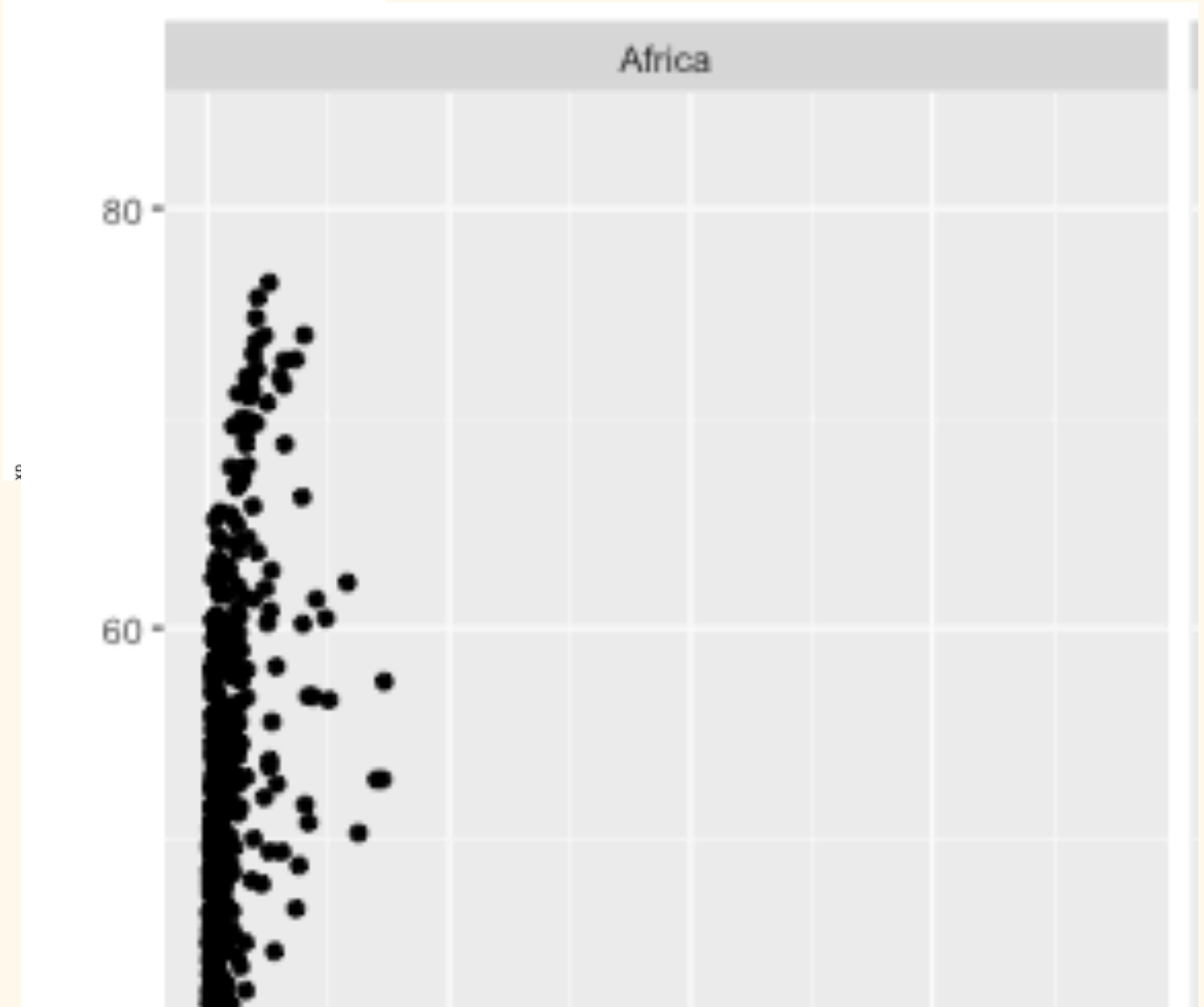
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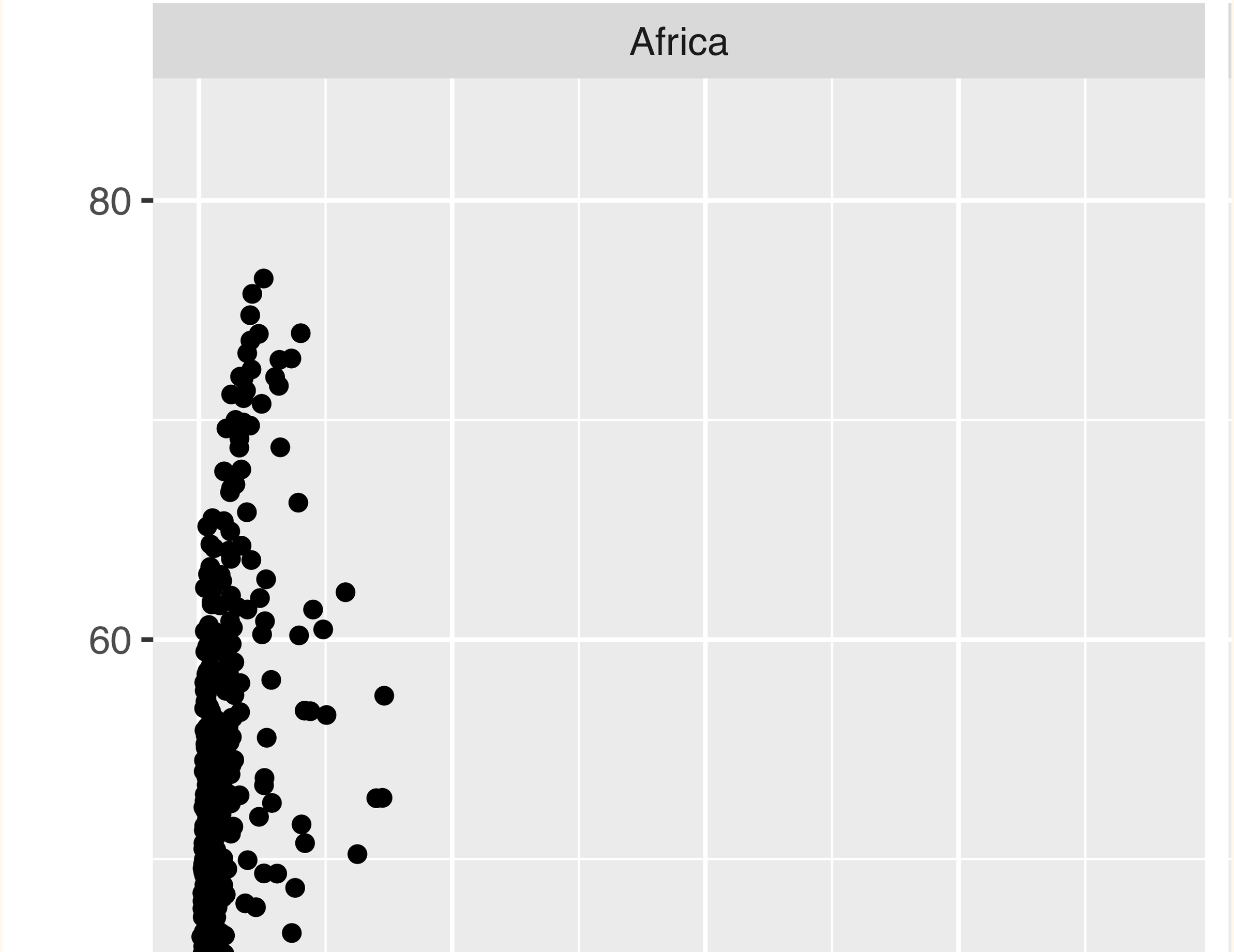
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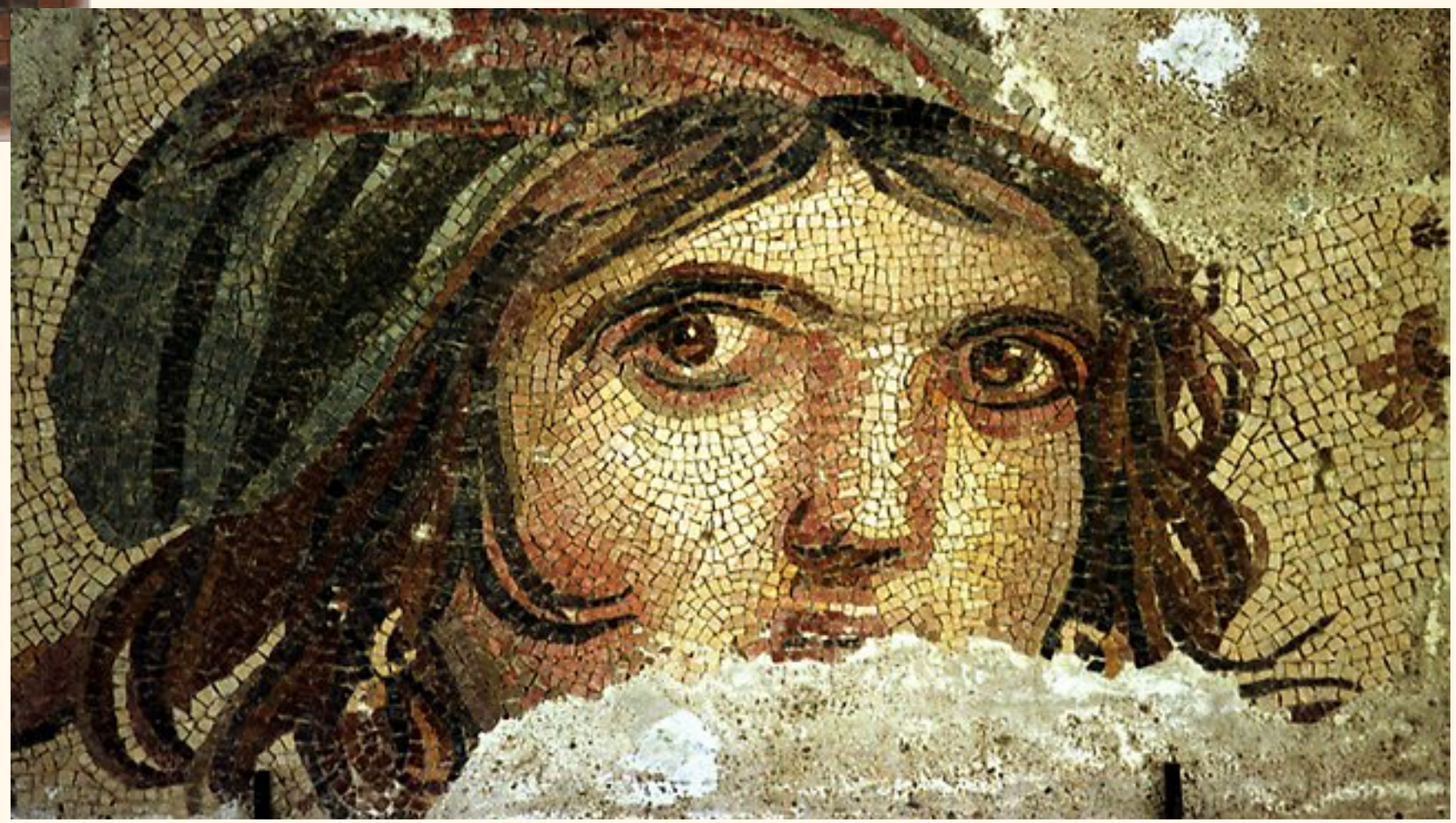
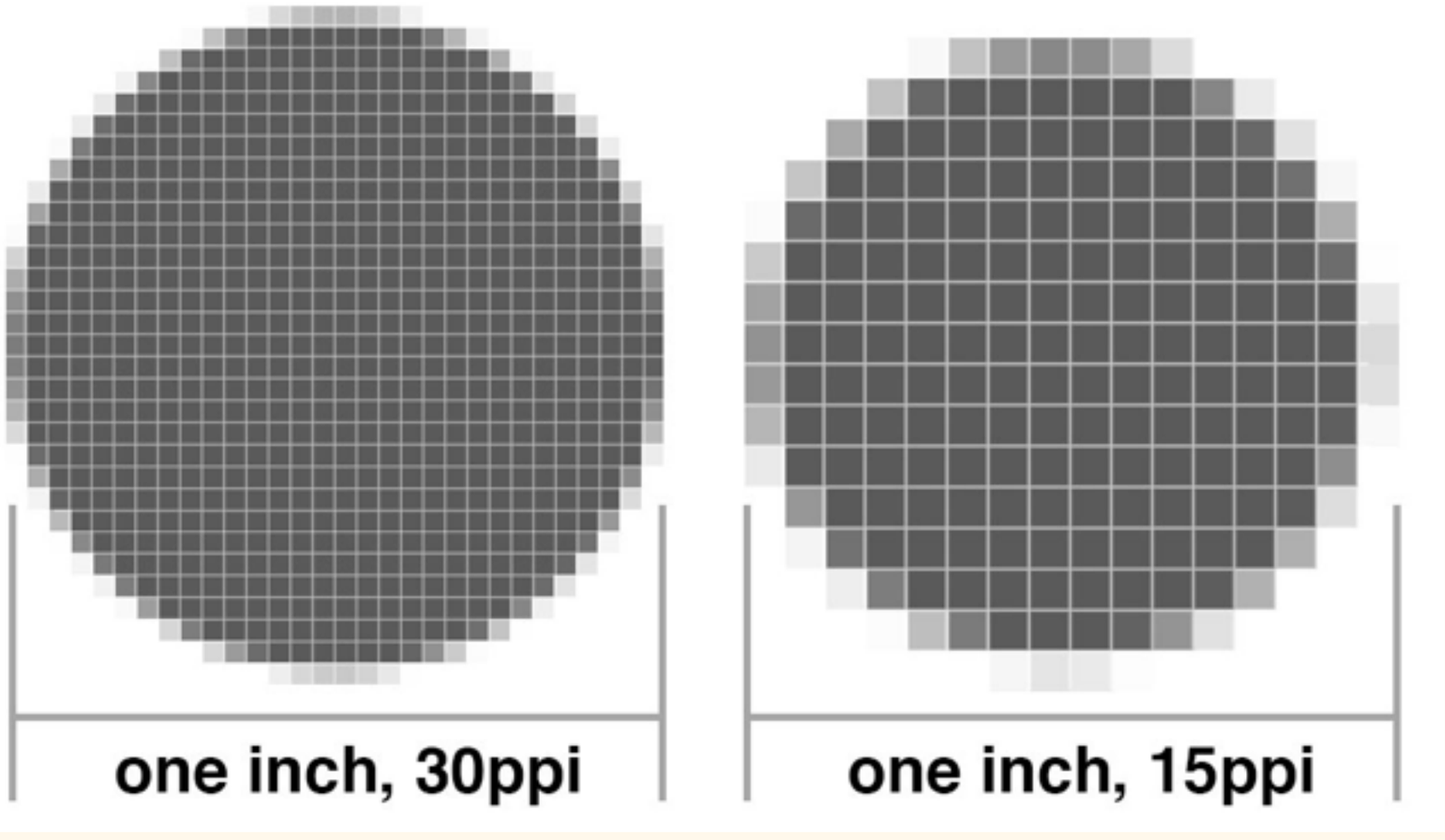
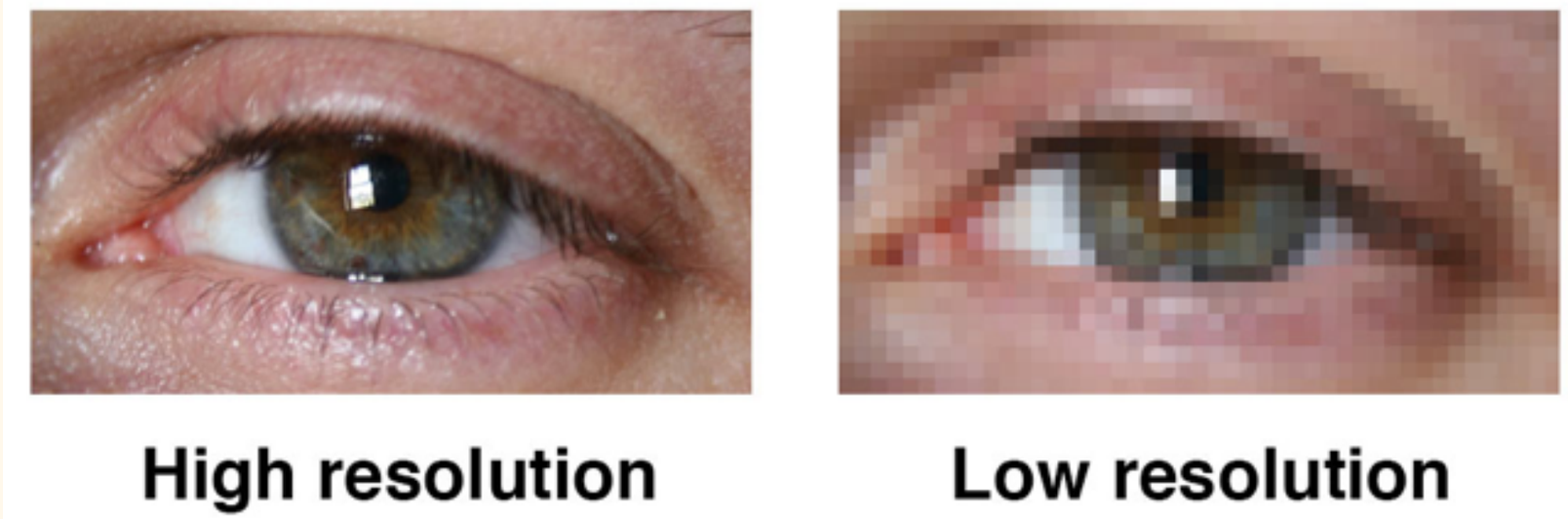
An image's *resolution* refers to the amount of space represented by each pixel.

"Higher resolution" → "Smaller" pixels

More information per unit of real space.







http://art.nmu.edu/groups/cognates/wiki/8962d/Resolution_PPIDPI.html

Print dimensions and resolution are related:

Important notes:

Many raster formats *do not* inherently specify DPI or print dimensions!

Some operating systems and layout programs *try to be clever* about figuring out DPI and size.

Others *do not*.


SMOKEY
ONLY YOU

Raster file formats:

BMP, TIFF, JPEG, GIF, PNG, etc.
Usually larger files
Good for: photographs, screen display*

Vector file formats:

PS, EPS, PDF, SVG, etc.
Usually smaller files
Good for: diagrams, graphs, print

Rules of thumb:

When possible, stick to vector images...

When you have to rasterize:

- 150 DPI or higher (300 preferred)
- For diagrams, PNG or TIFF file format

Wait as long as possible to rasterize!

Once resolution is lost, you can’t get it back.

Demo time!

Meet the ggsave() command:

```
>>> plt <- ggplot(...)

>>> ggsave(“my_file.pdf”, plt)

>>> ggsave(“my_file.png”, plt)

>>> ggsave(“my_file.pdf”, plt, width=7, height=5)

>>> ggsave(“my_file.png”, plt, width=7, height=5, dpi=300)
```