WHAT IS GIS?

Geographic Information Systems (Science)

GIS allows you to process, analyze and visualize information about the Earth's surface. GIS is utilized to know "what is where,when" and is a flexible system that allows you to study spatial relationships, PAST AND PRESENT.

It is NOT the software that we use to map data.

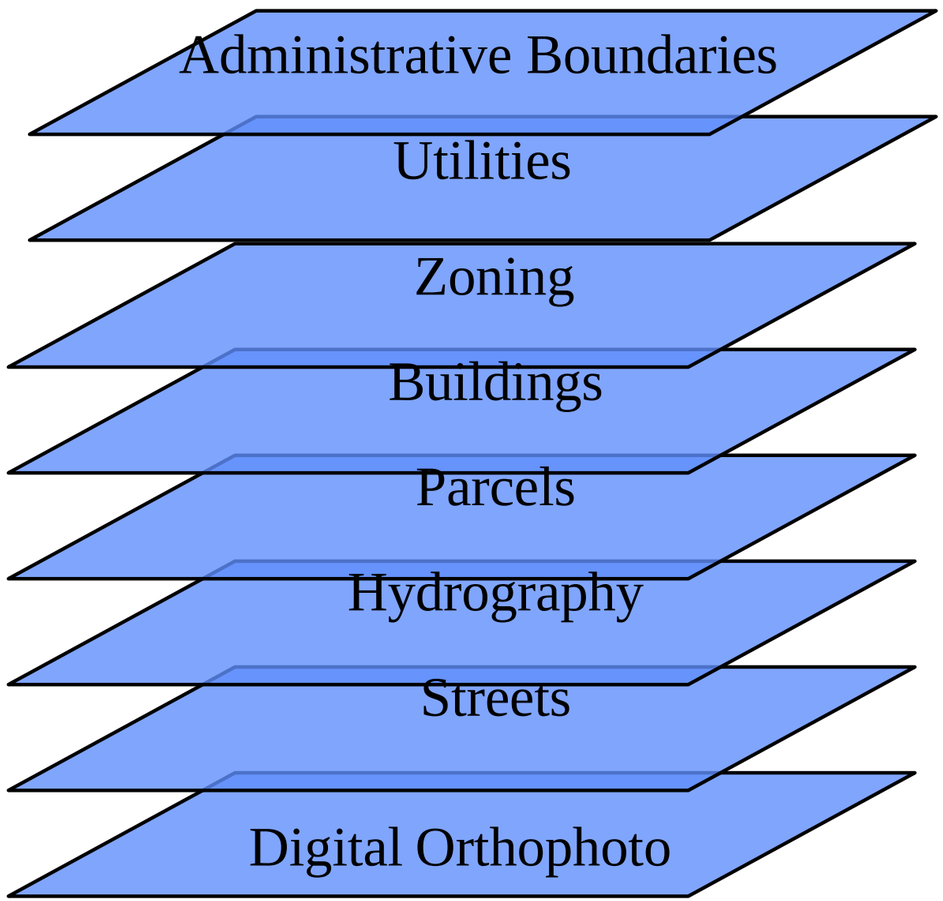
"Everything is related to everything else, but near things are more related than distant things."
(First law of geography, Waldo Tobler)

ASKING

- Location
  - Where is it?
  - Why is it here or there?
  - How much of it is here or there?
- Geographic association
  - What else is near it?
  - What is absent in its presence?
- Geographic change
  - Has it always been here?
  - How has it changed over time and space?

GEOGRAPHIC QUESTIONS

GIS MODEL



Data is organized in layers, that can be overlayed, compared, and used to represent thematic, quantitative, qualitative, narrative or conceptual information about the world.

These layers can be generated from historical maps, document and satellite images, as well as field notes, surveys, etc.

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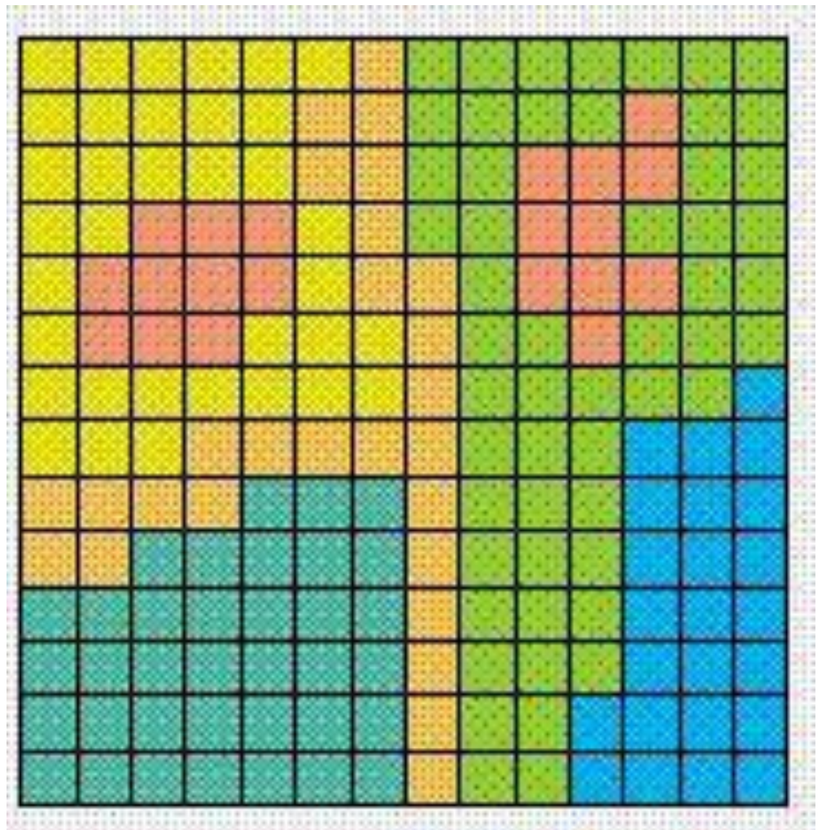
WHY IT MATTERS

- Where to create new hospitals
- What routes to use to deliver packages
- Where to develop new highways
- Decide which areas will be affected by weather conditions to figure out who needs to evacuate
- Determine if areas have access to resources
- Understand how cities have developed
- How to manage forests, where to cut/plant trees, where to locate roads

...and many more

SPATIAL DATA

VECTOR

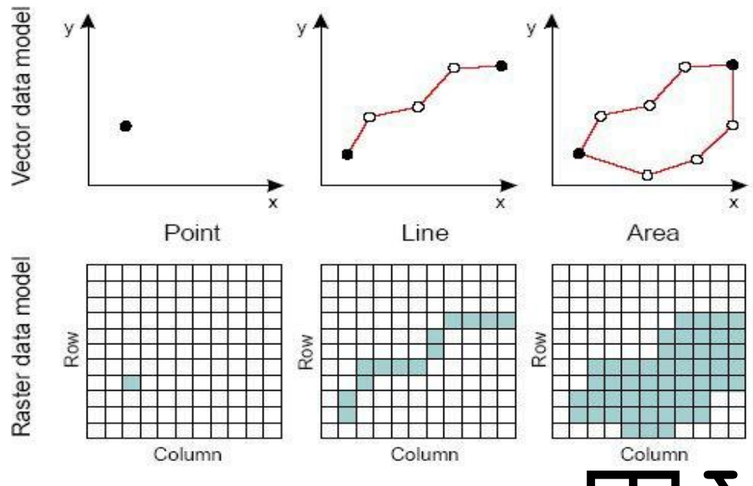


RASTER

SPATIAL DATA

specifies where (location) and what kind of feature (shape)

STORED AS GEOGRAPHIC DATA EITHER IN VECTOR OR RASTER FORMAT



ATTRIBUTE DATA

specifies characteristics for that location information, like how much, when, what , etc.

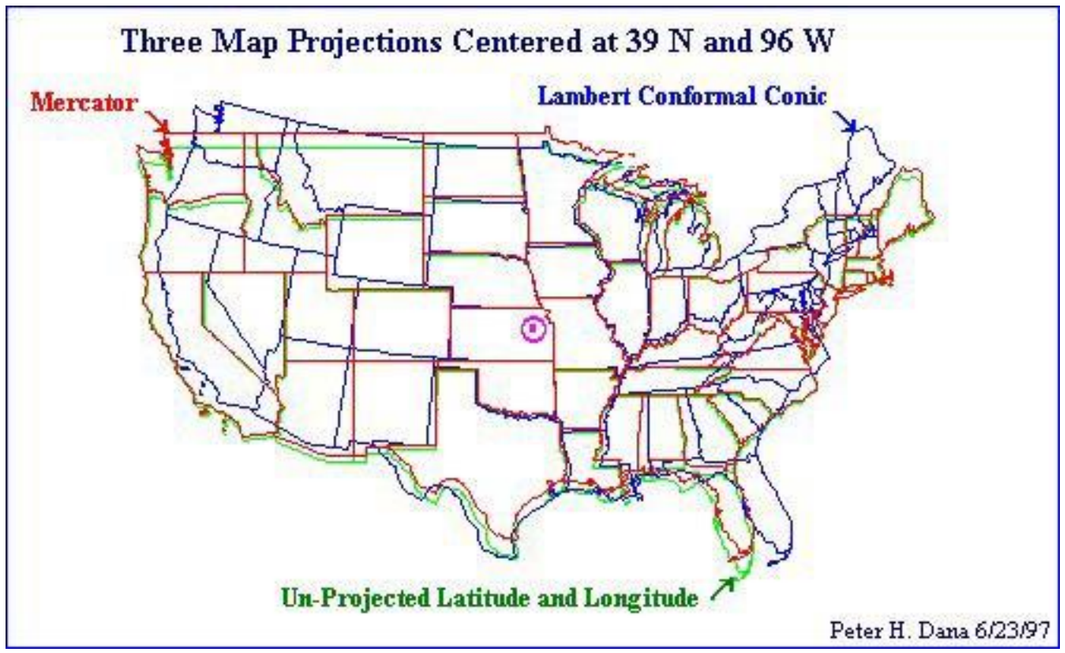
STORED AS TABULAR DATA

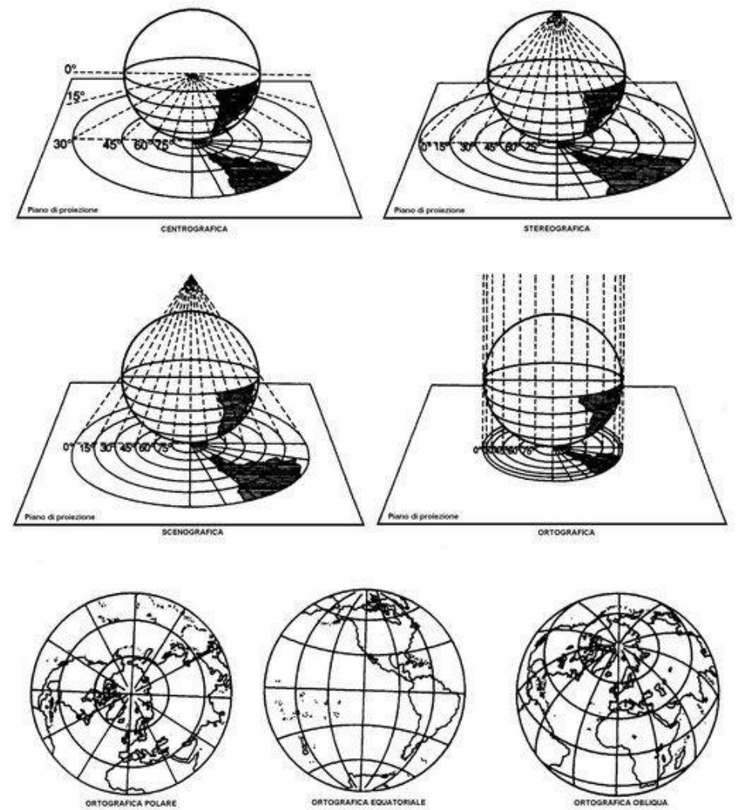
Attribute table - Streets :: Features total: 41825, filtered: 41825, selected: 0

	LEFTLOW	LEFTHIGH	RIGHTLOW	RIGHTHIGH	STREETNAME	STREETDESI
13520	14301.00000000...	14305.00000000...	14300.00000000...	14302.00000000...	COPPER	AV
13581	14301.00000000...	14323.00000000...	14300.00000000...	14324.00000000...	STALGREN	CT
13805	14301.00000000...	14309.00000000...	14300.00000000...	14308.00000000...	MEL SMITH	DR
34181	14301.00000000...	14339.00000000...	14300.00000000...	14340.00000000...	BAUER	RD
34192	14301.00000000...	14321.00000000...	14300.00000000...	14320.00000000...	ENCANTADO	RD
34229	14301.00000000...	14321.00000000...	14300.00000000...	14320.00000000...	PIEDRAS	RD
34241	14301.00000000...	14335.00000000...	14300.00000000...	14334.00000000...	SKYLINE	RD
34255	14301.00000000...	14331.00000000...	14300.00000000...	14330.00000000...	OAKWOOD	PL
34293	14301.00000000...	14317.00000000...	14300.00000000...	14318.00000000...	ARCADIA	RD
34275	14297.00000000...	14331.00000000...	14296.00000000...	14314.00000000...	WINDSOR	PL
13153	14227.00000000...	14233.00000000...	14226.00000000...	14232.00000000...	GRAND	AV

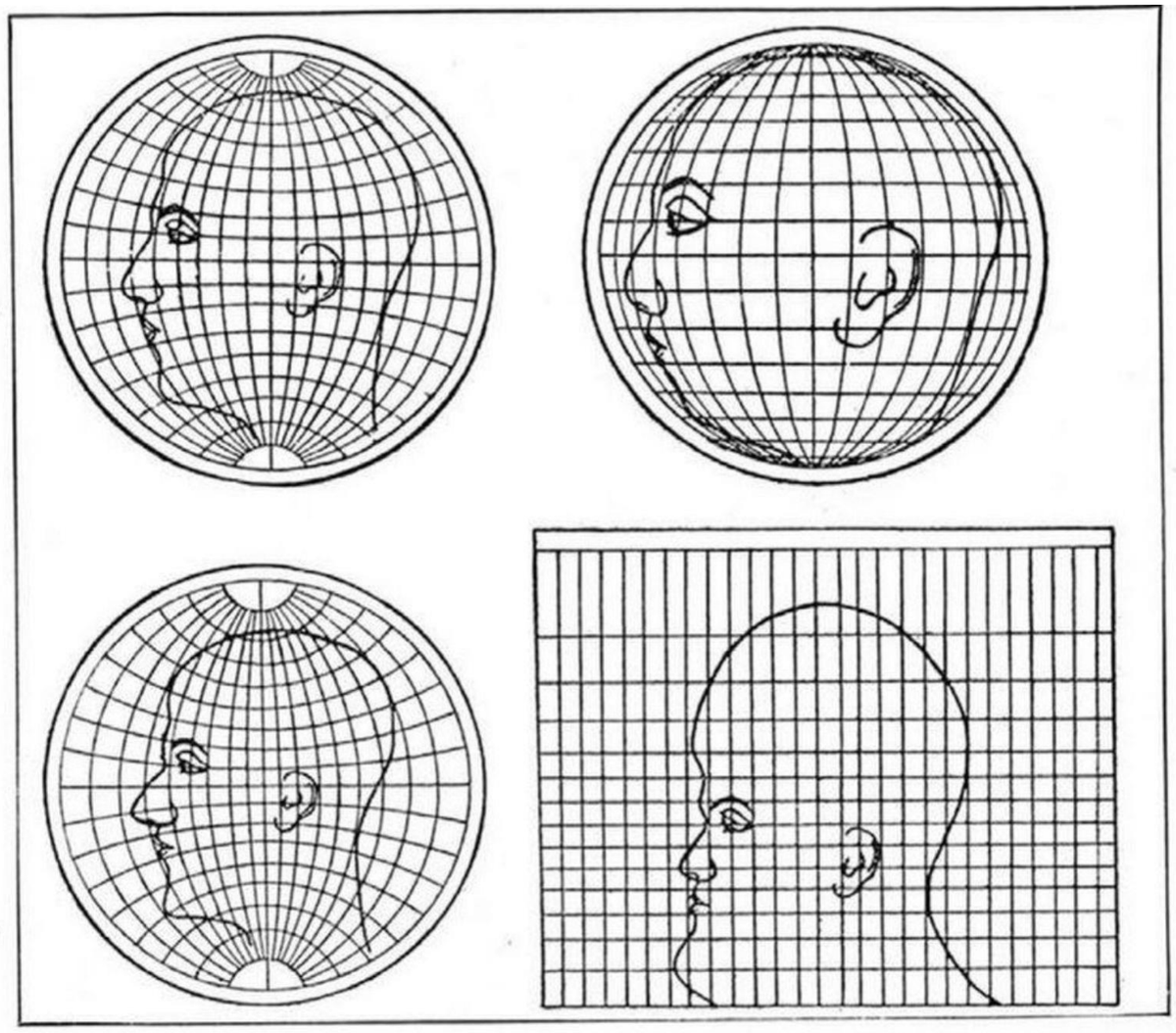
TYPES OF DATA

PROJECTIONS &

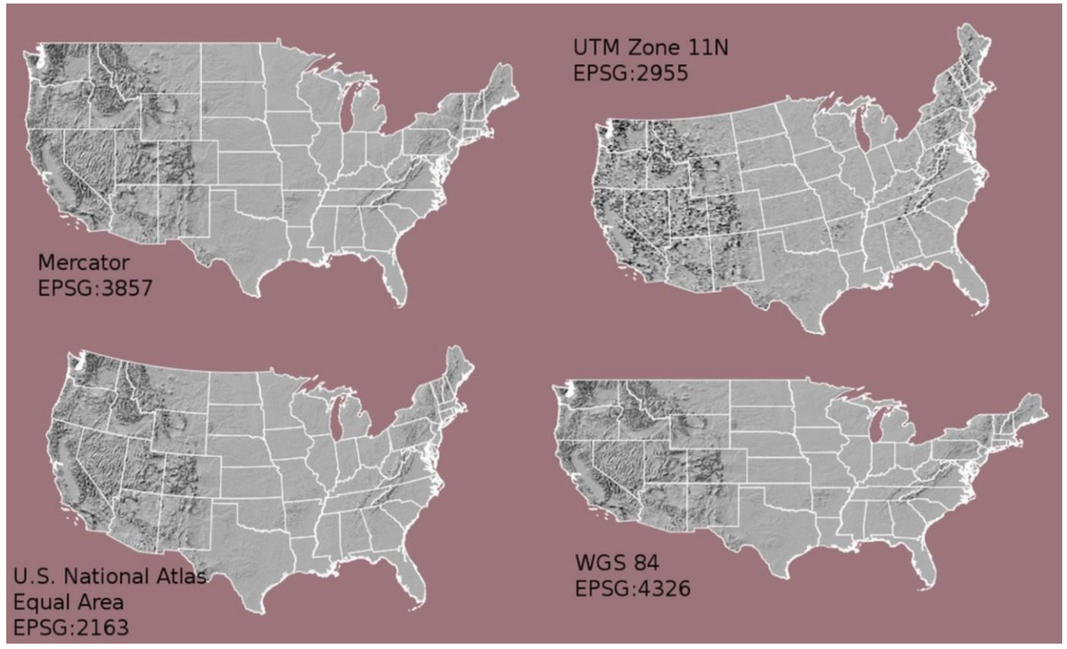




COORDINATE SYSTEMS



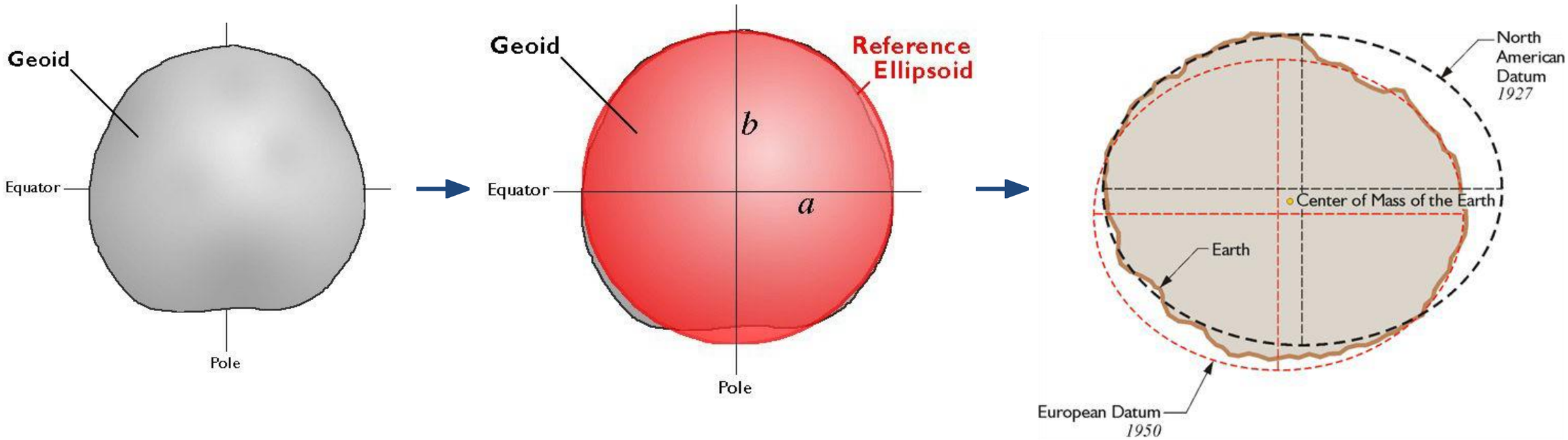
Upper left: Globular. *Upper right:* Orthographic. *Lower left:* Stereographic.
Lower right: Mercator



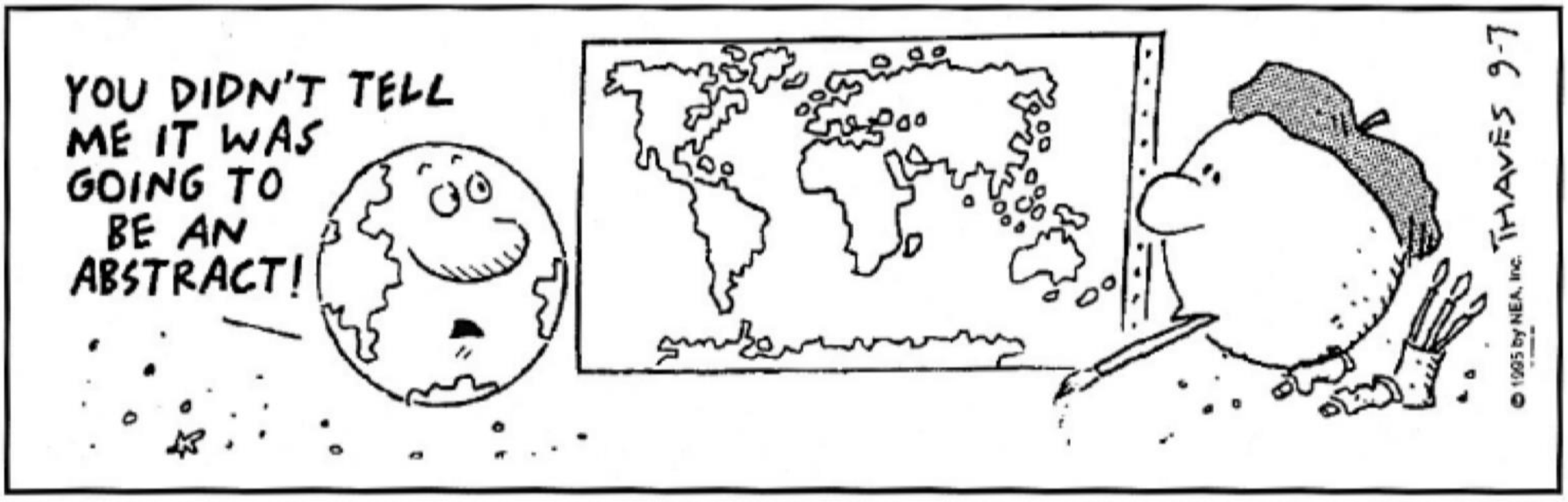
TRUE SIZE

PROJECTIONS

- Geoid -> Ellipsoid -> Datum

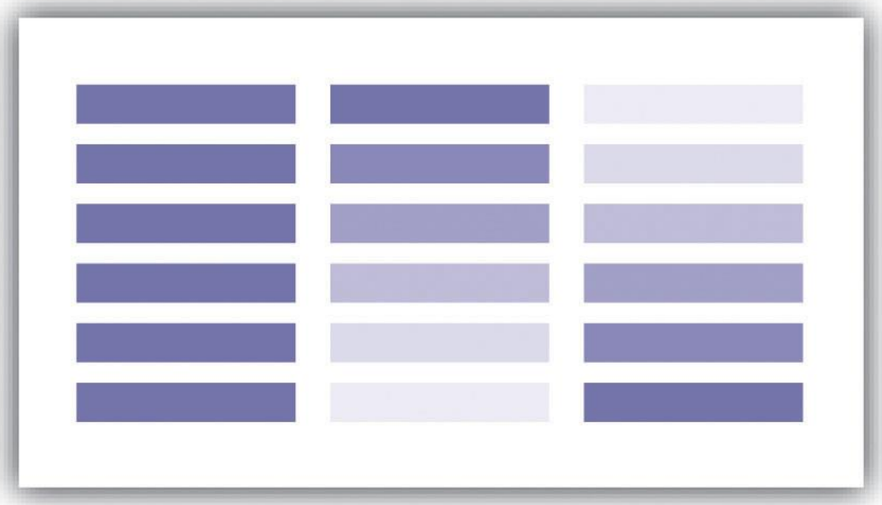


FRANK & ERNEST by Bob Thaves



VISUAL

- Color
  - Hue: color/wavelength
  - Value: amount of white or black
- Color to convey meaning
  - Temperature
  - Political affiliation
- Accessibility



DESIGN PRINCIPLES

Population Trend

Bad Harmony Map