

# Crafting with Data

Reality, Illusions, Truth & the Future

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Instructor: Rob Faludi

# Plan for Today

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- Exercise One: Map the Floor from Memory (10 minutes)
- present
- How to Lie With Maps
- Exercise Two: Map the Floor from Sight
- present
- How to Lie With Maps ...continued
- Readings & Assignments

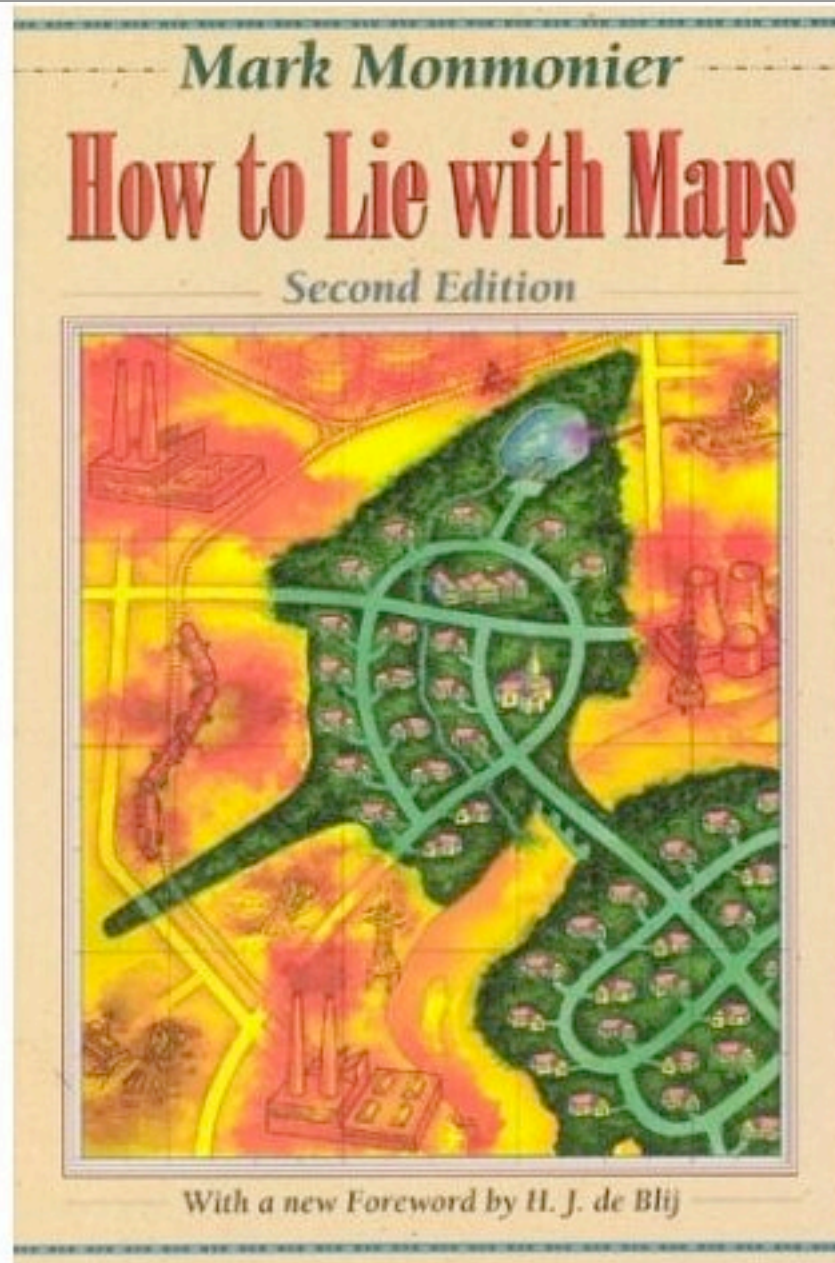
# Exercise One: Map the Floor from Memory

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- Take ten minutes and sketch a map of the ITP floor from memory
  - don't worry about your drawing skills,
  - just map out the floor as it appears in your mind
- You'll present your map to us briefly

# How to Lie With Maps

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# Maps

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- presentations of data
- sample of information available
- rough removed to show smooth
- tool for decision-making, prediction

# Lying

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- is essential
- selective, like data
- incomplete
- white lies, take care like in love
- now with computers, ourselves

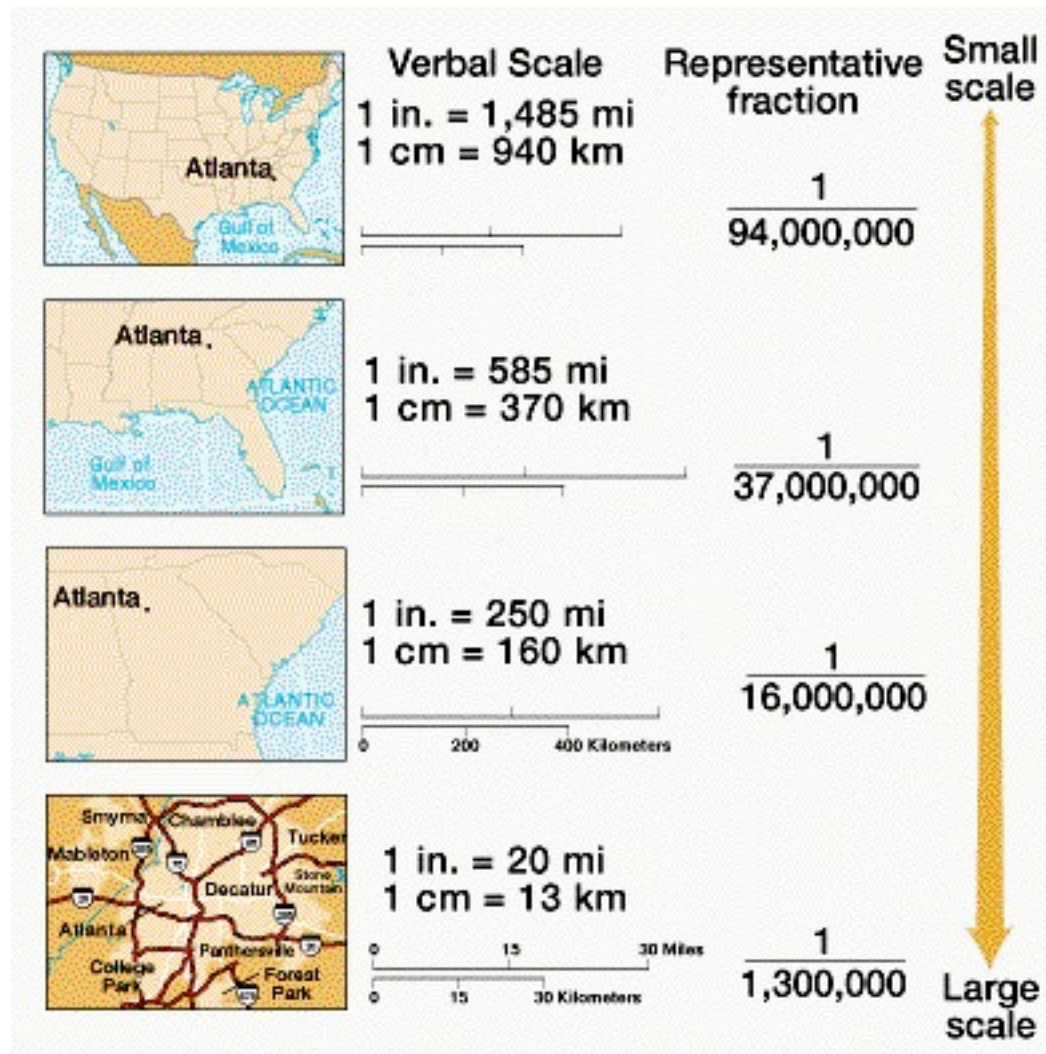
# Like Statistics, there's a defense

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- Who says so?
- How do they know?
- Excessive precision?
- Did someone change the subject?
- Does it make sense?
- What's missing?

# Map Basics: Scale

- with computers, all at our fingertips, but not all at once





# Map Basics: Projections

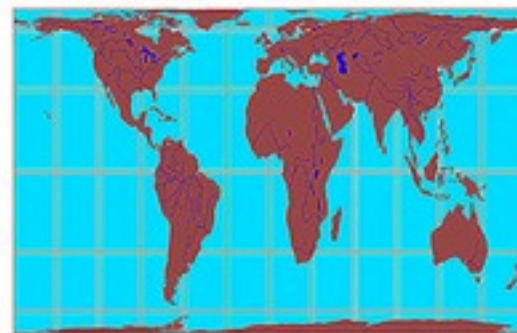
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- distance
- direction
- shape
- area





*Mercator Projection*



*Gall-Peters Projection*



*Miller Cylindrical Projection*



*Mollweide Projection*



*Goode's Homolosine Equal-area Projection*



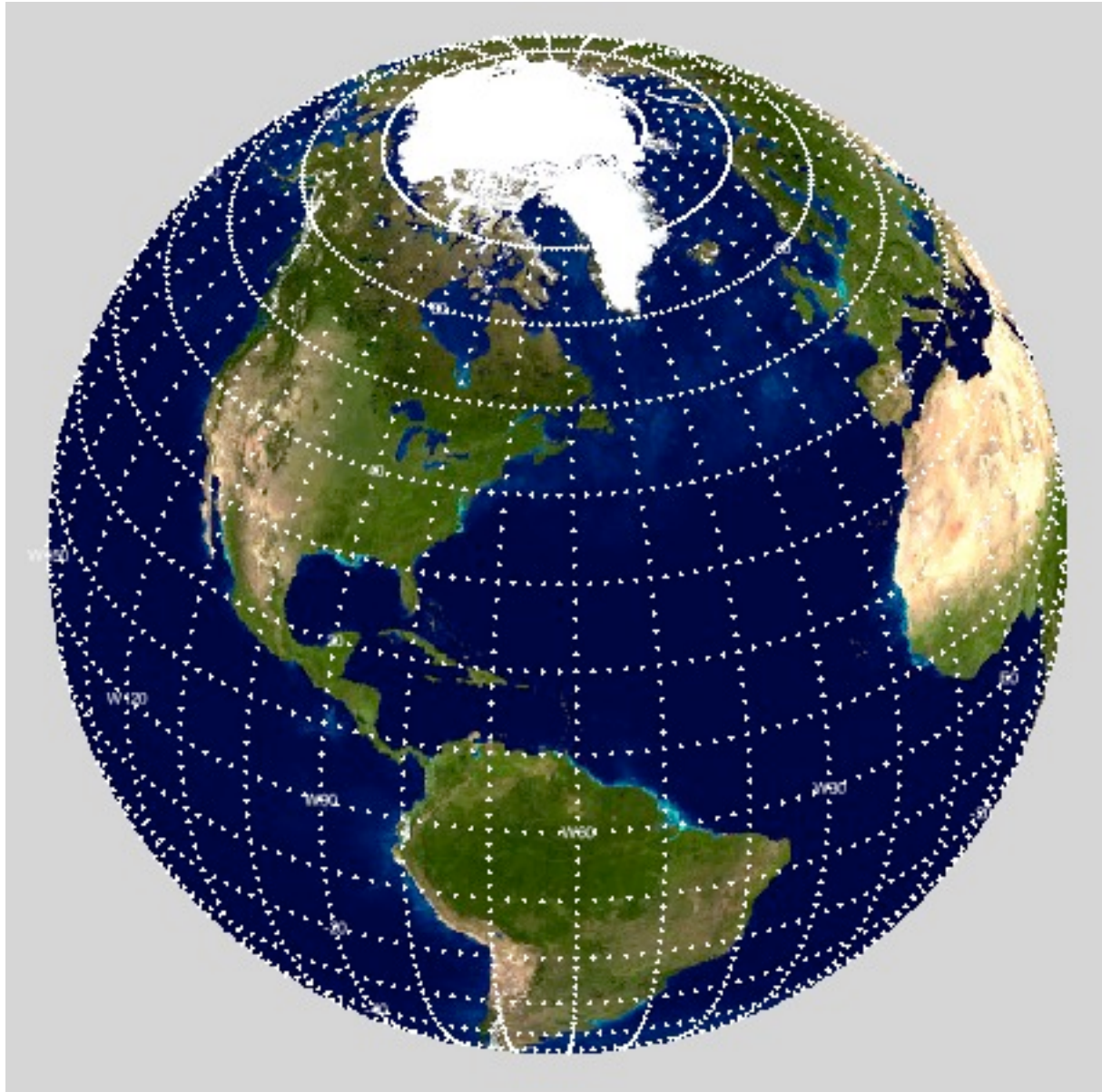
*Sinusoidal Equal-Area Projection*



*Robinson Projection*

# Best Projection

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# Map Basics: Symbols

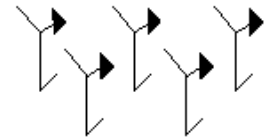
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Semaphore  
Signal



Essential  
Oil Plants



Whirlpool



Tank  
Trap

Common  
Grave



Trigonometrical  
Point on  
Burial Mound



Fog  
Station



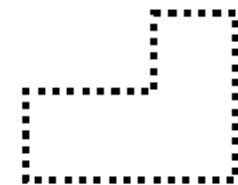
Cairn



Corduoy  
Road



Stone or Brick  
Wall

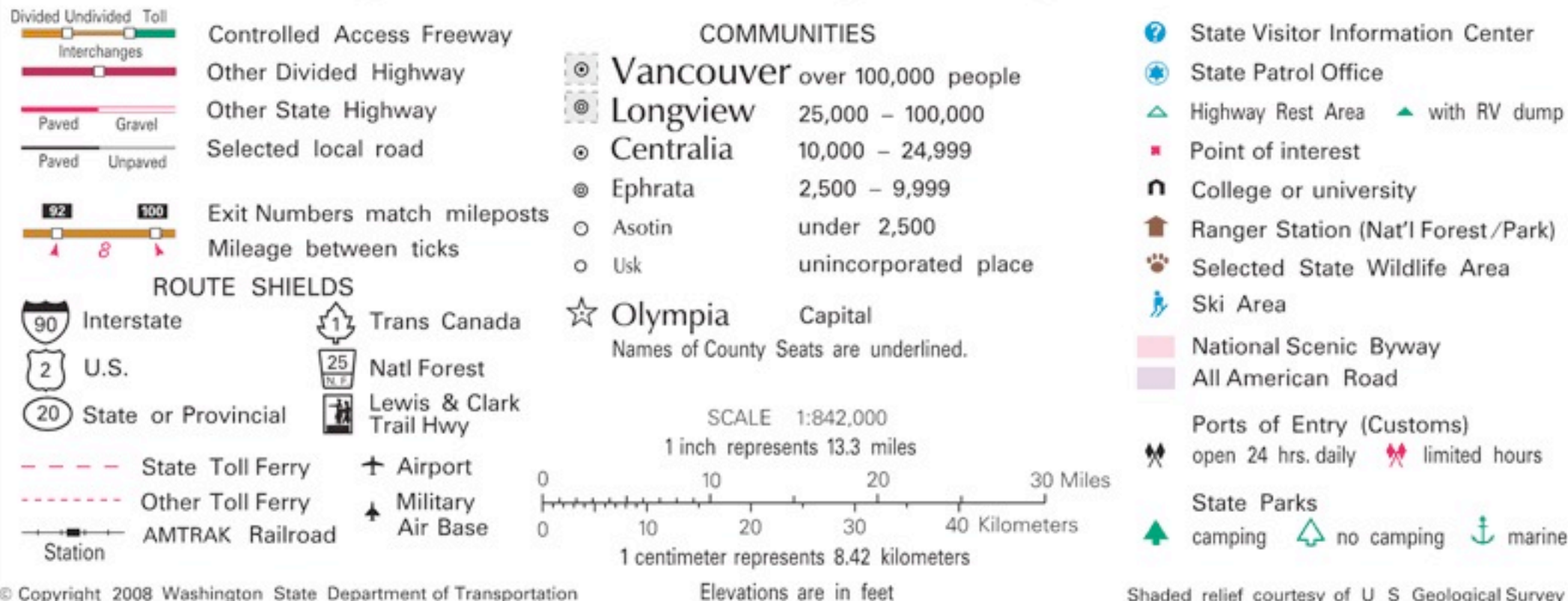


Ruins



# Symbols: highways

## Washington State Highways 2008-2009



# Symbols: topographic

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## Common Symbols:

Intermittent stream

Campground

River/stream

Building

Improved road

Benchmark

Four wheel drive road

Hiking trail

Braided stream

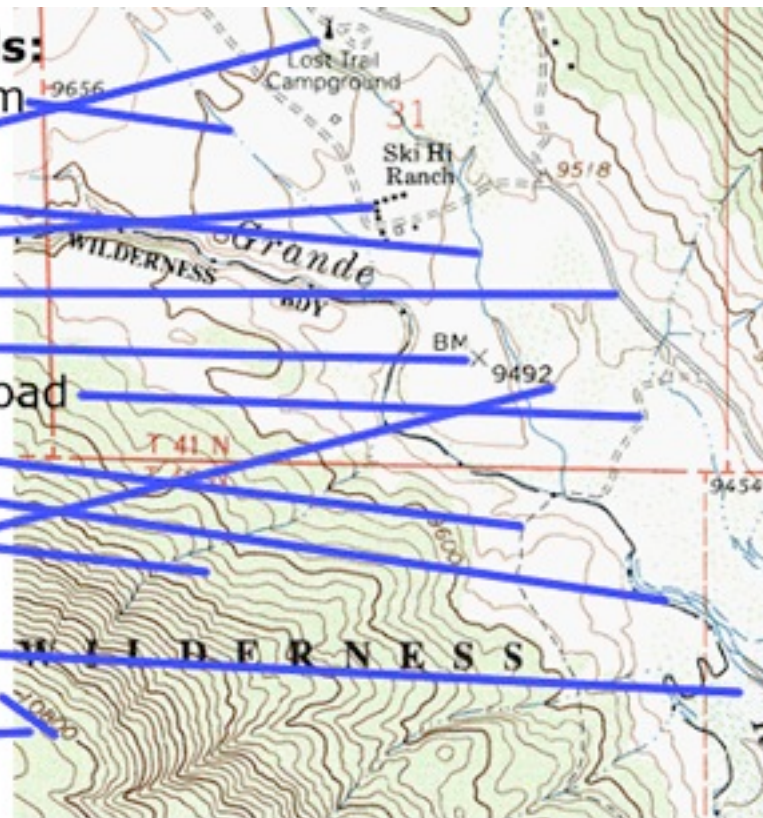
Forest/woodland

Scrub

Swamp

Contour index line

Elevation



# Geometric Operations

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- feature selection (and background to provide context)
- simplification (smooth)
- displacement (differentiate...t-test?)
- smoothing (de-simplification, in a way)
- enhancement (iconify features)

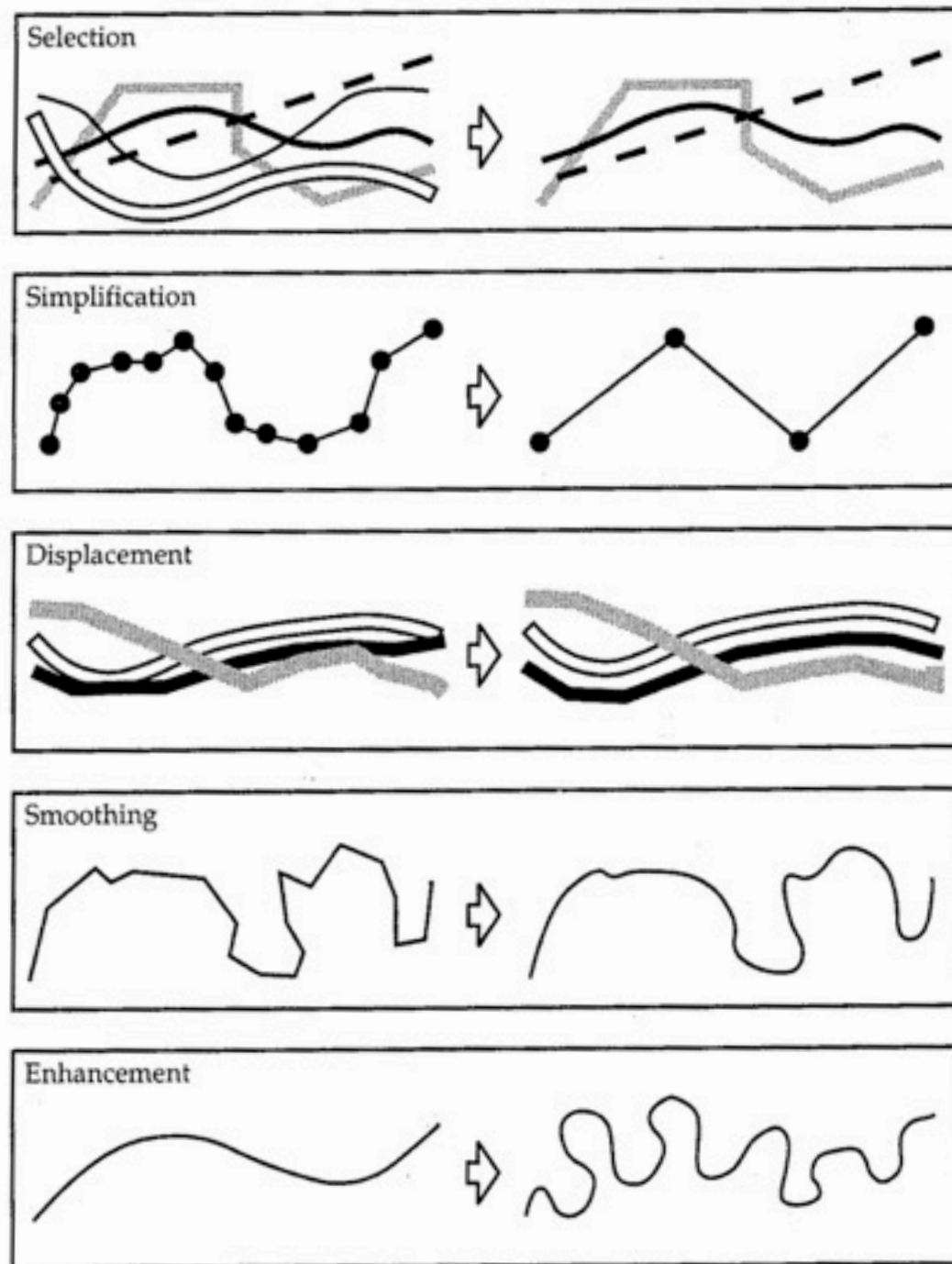


FIGURE 3.1. Elementary geometric operations in the generalization of line features.



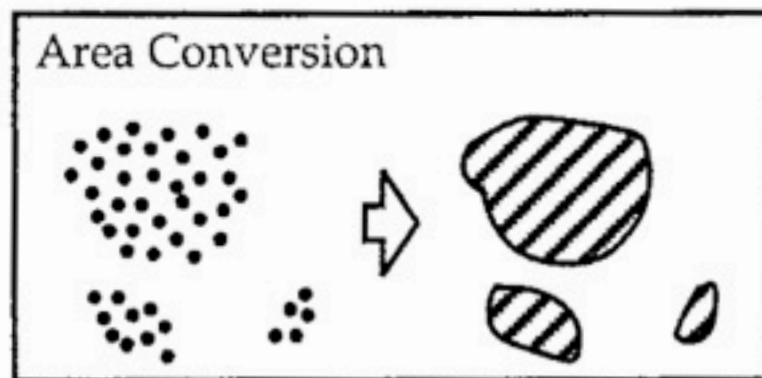
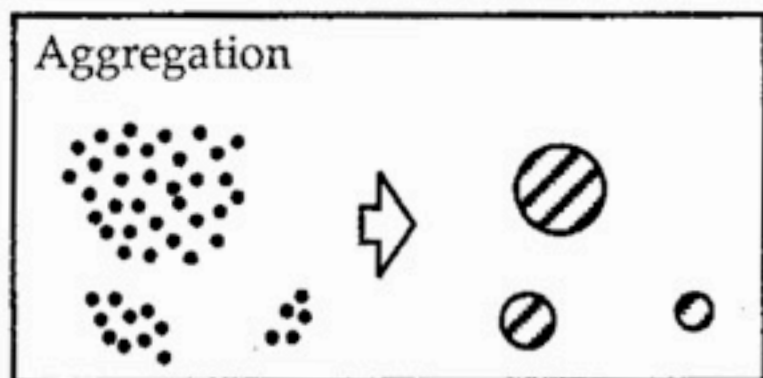
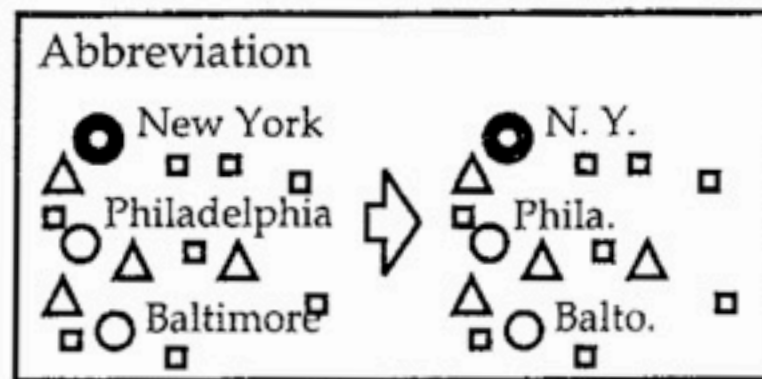
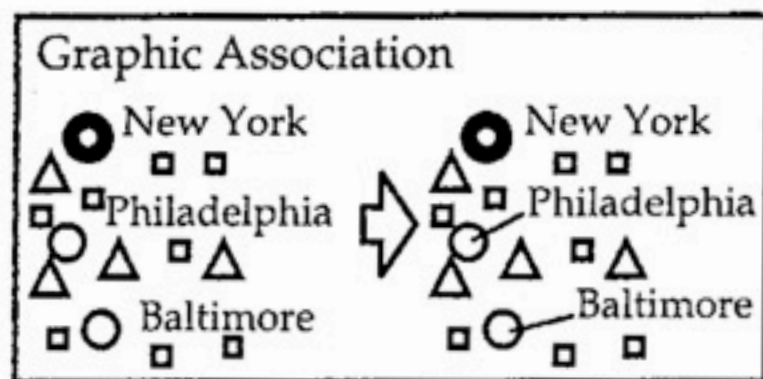
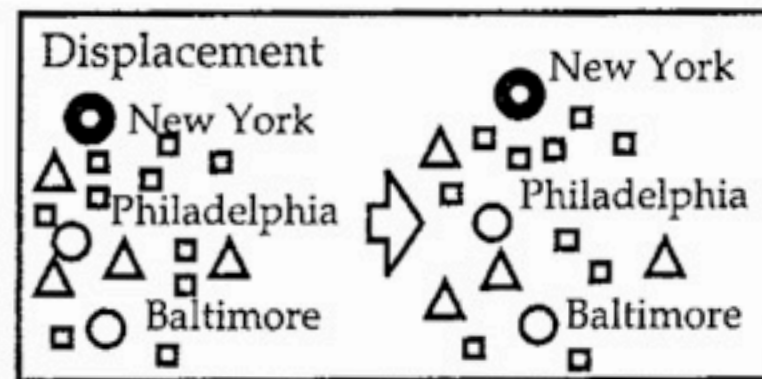
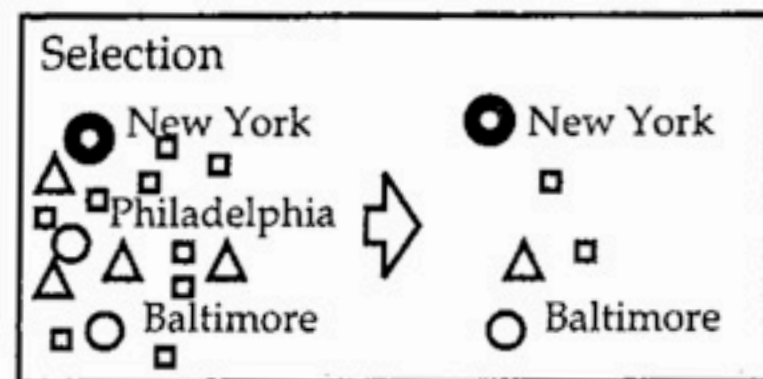


FIGURE 3.2. Elementary geometric operations in the generalization of point features and map labels.

# More Geometry

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- Association
- Abbreviation
- Aggregation
- conversion to area

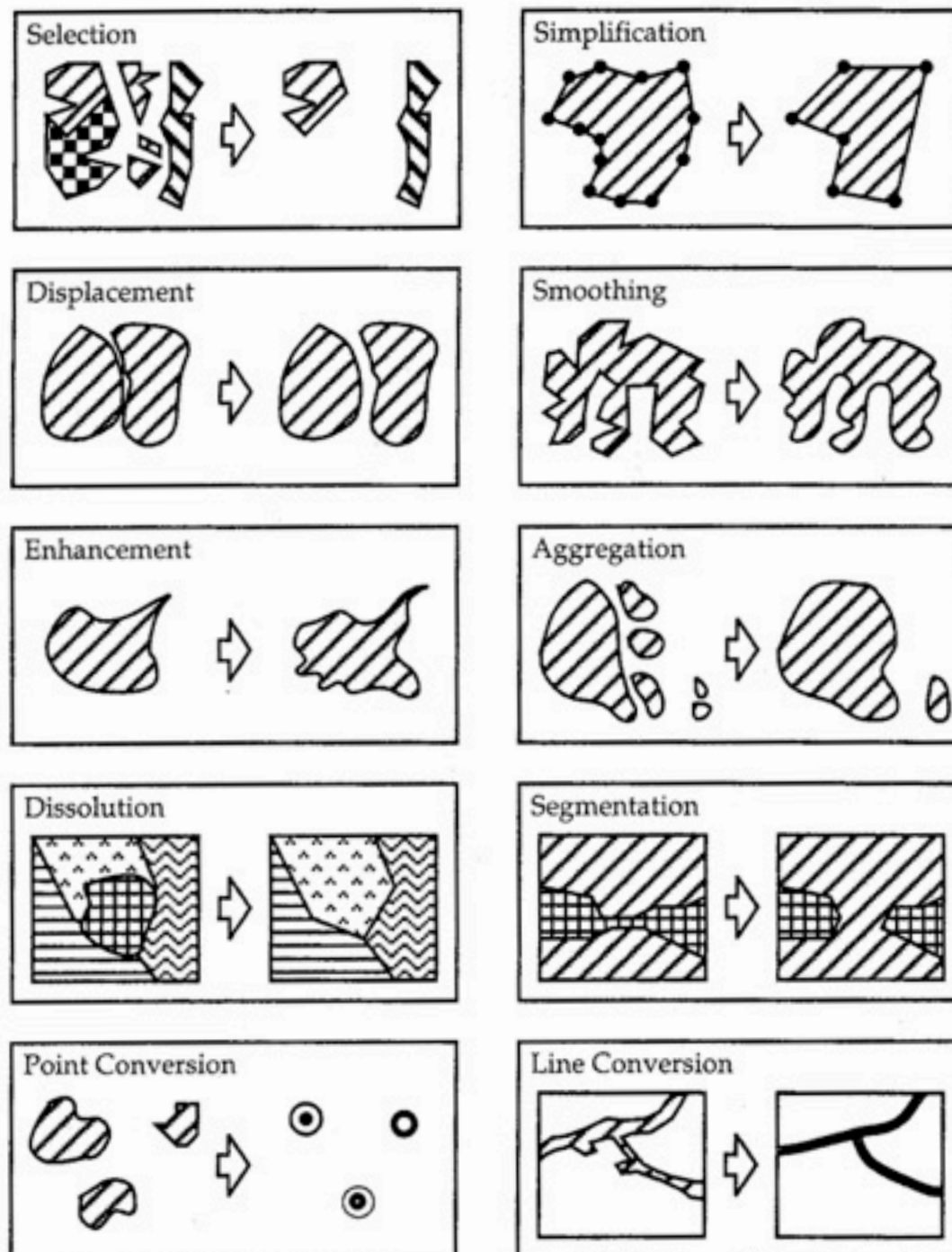


FIGURE 3.3. Elementary geometric operations in the generalization of area features.

# Planimetric Distance

- ...and displacement

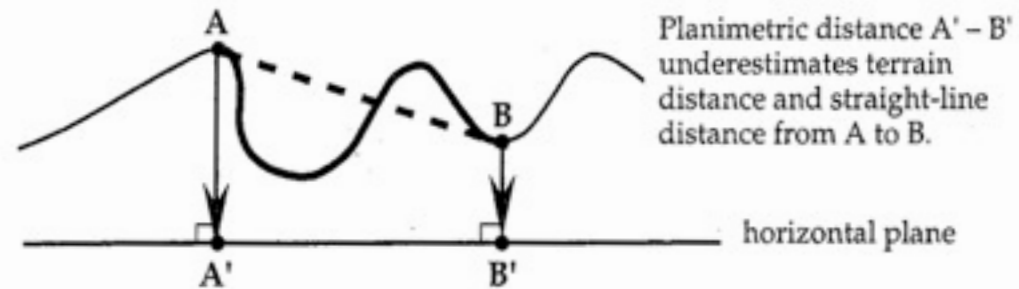


FIGURE 3.5. Planimetric map generalizes distance by the perpendicular projection of all positions onto a horizontal plane.

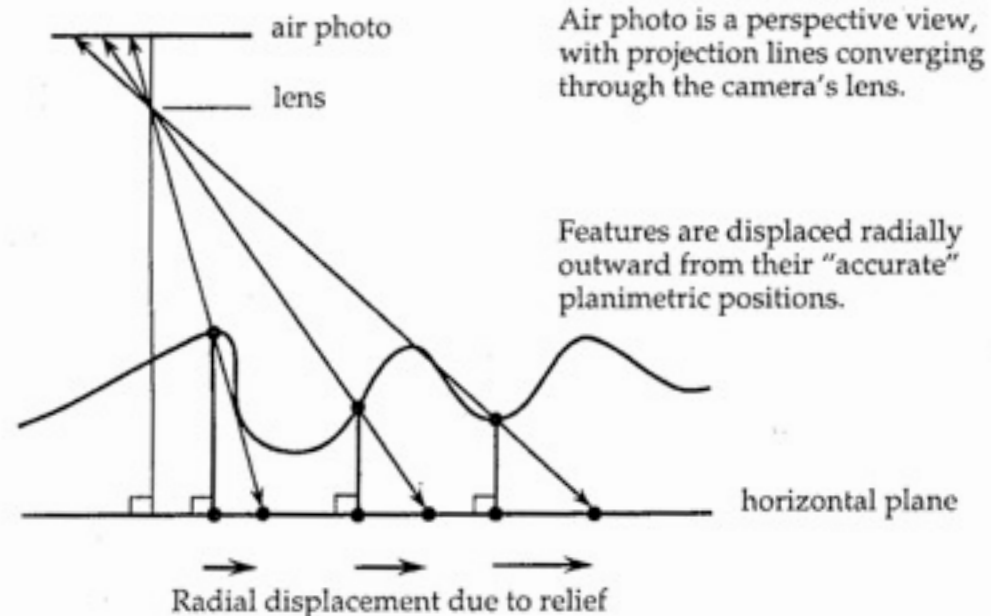
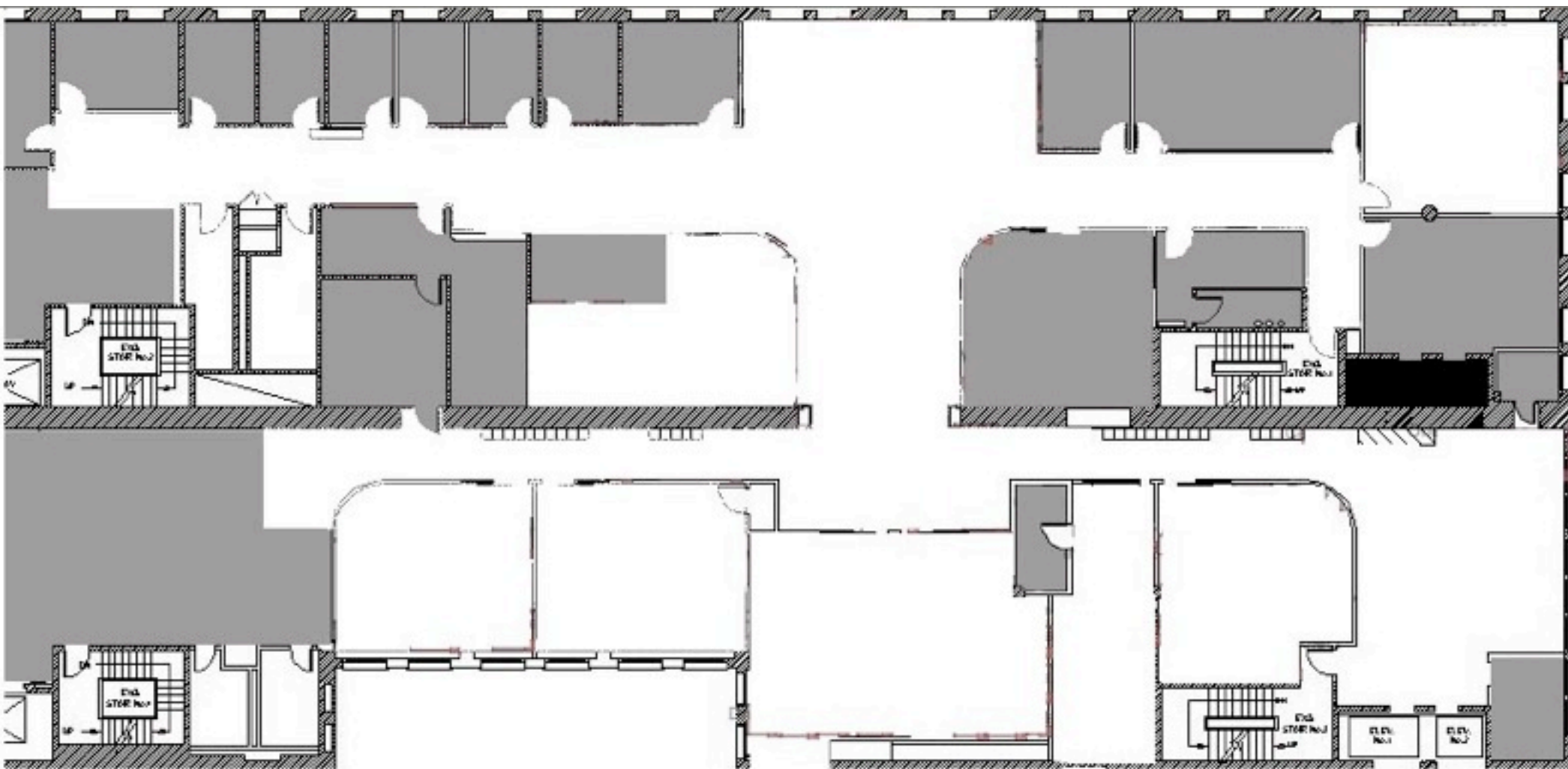


FIGURE 3.6. A vertical aerial photograph (and any map with symbols traced directly from an air photo) is a perspective view with points displaced radially from their planimetric positions.

# Exercise Two: Map the Floor from Sight

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- Take ten minutes and sketch a map of the ITP floor by walking it
  - don't worry about your drawing skills,
  - map out the floor as it actually is
  - make a list of things that were wrong on your first map
  - make a list of anything new you observed, that you'd never seen before
- You'll present your map to us briefly



# Cartograms

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- linkages, visual correlation (spatial)
- adjacency, help your cause
- order
- relativity

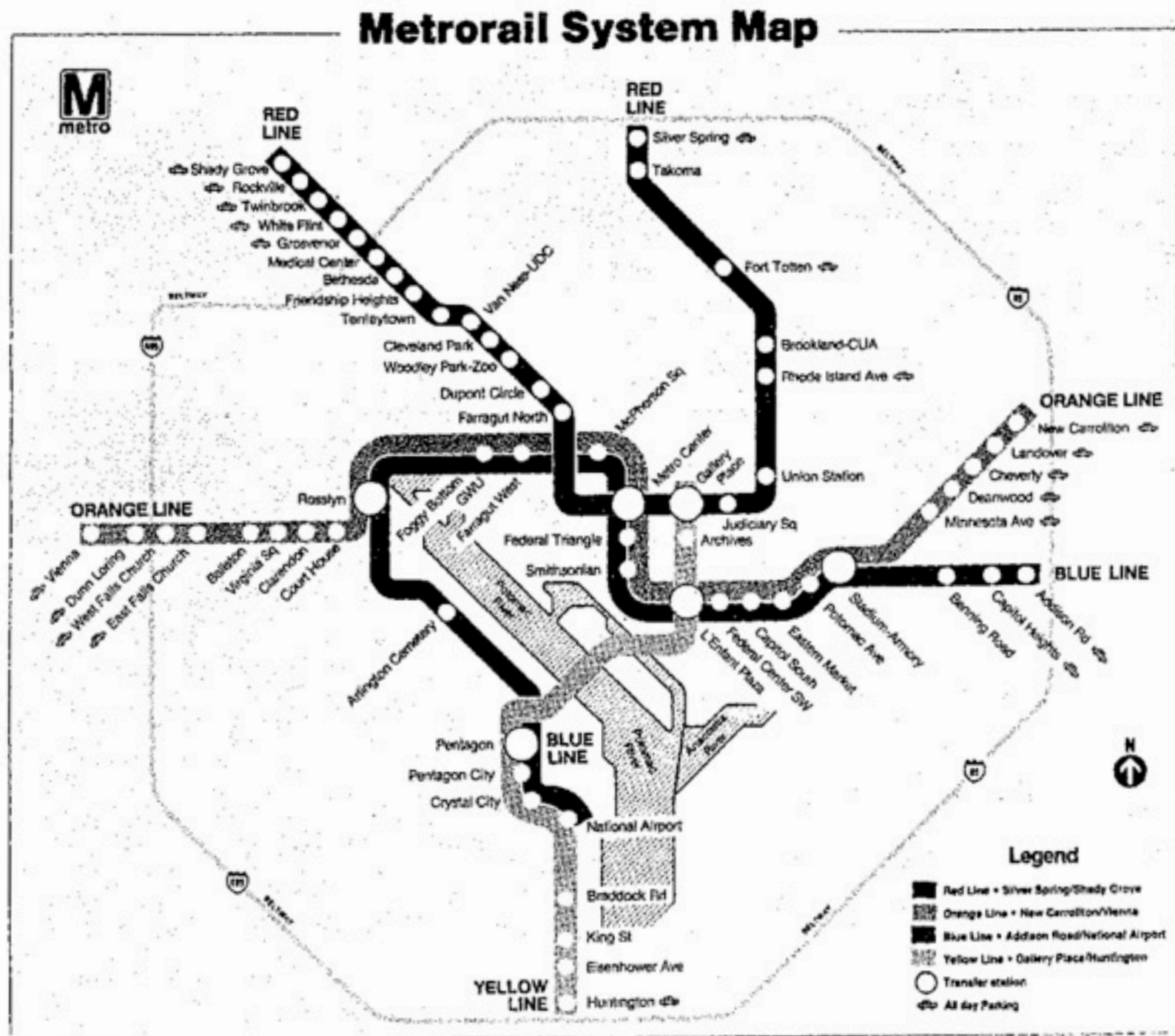


FIGURE 3.7. Linear cartogram of the Washington, D.C., Metro system.



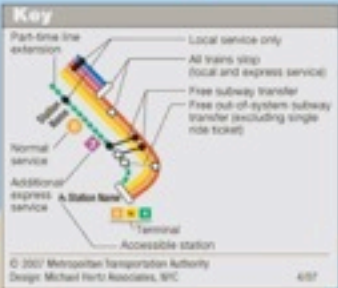


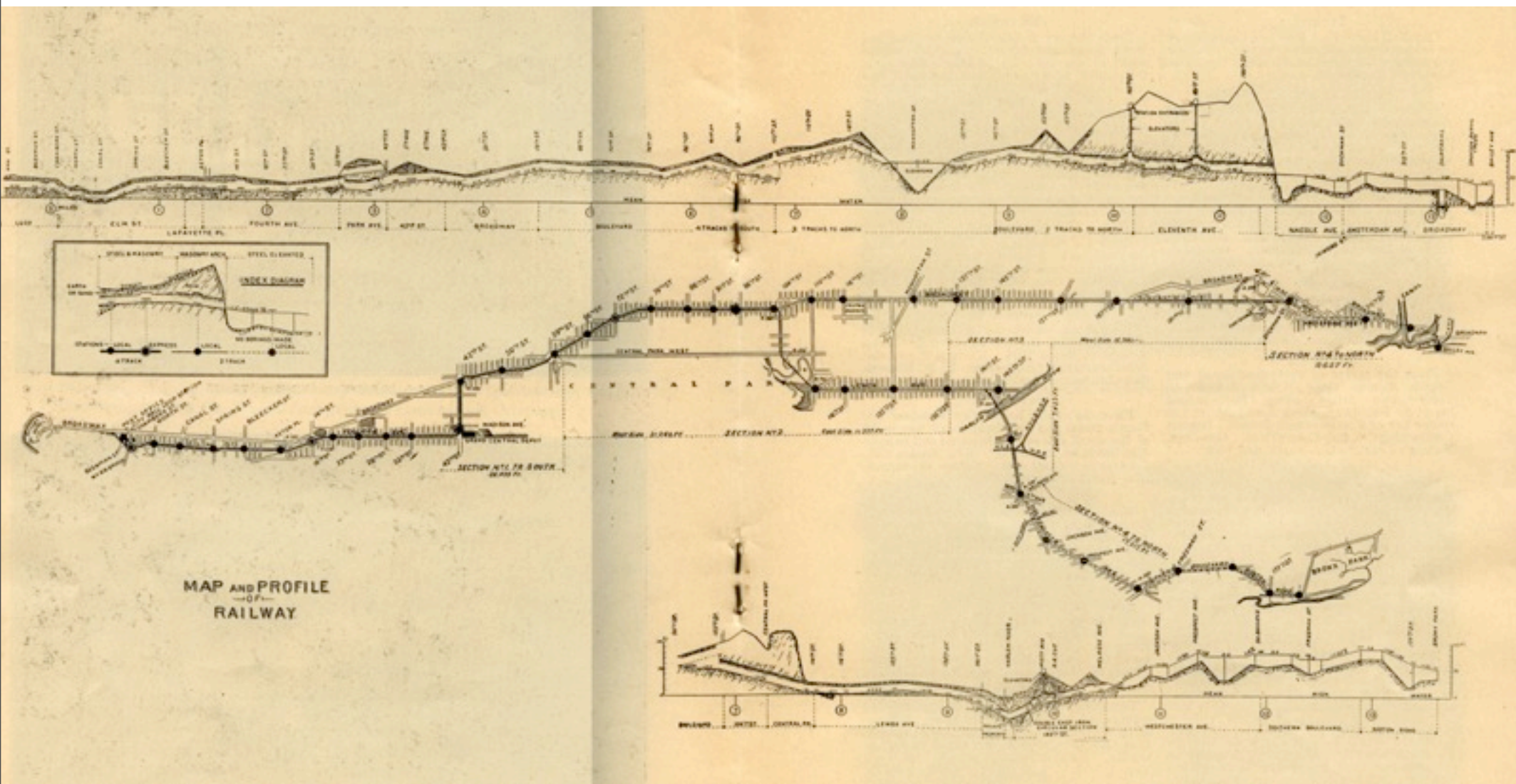
# Subway Interlude



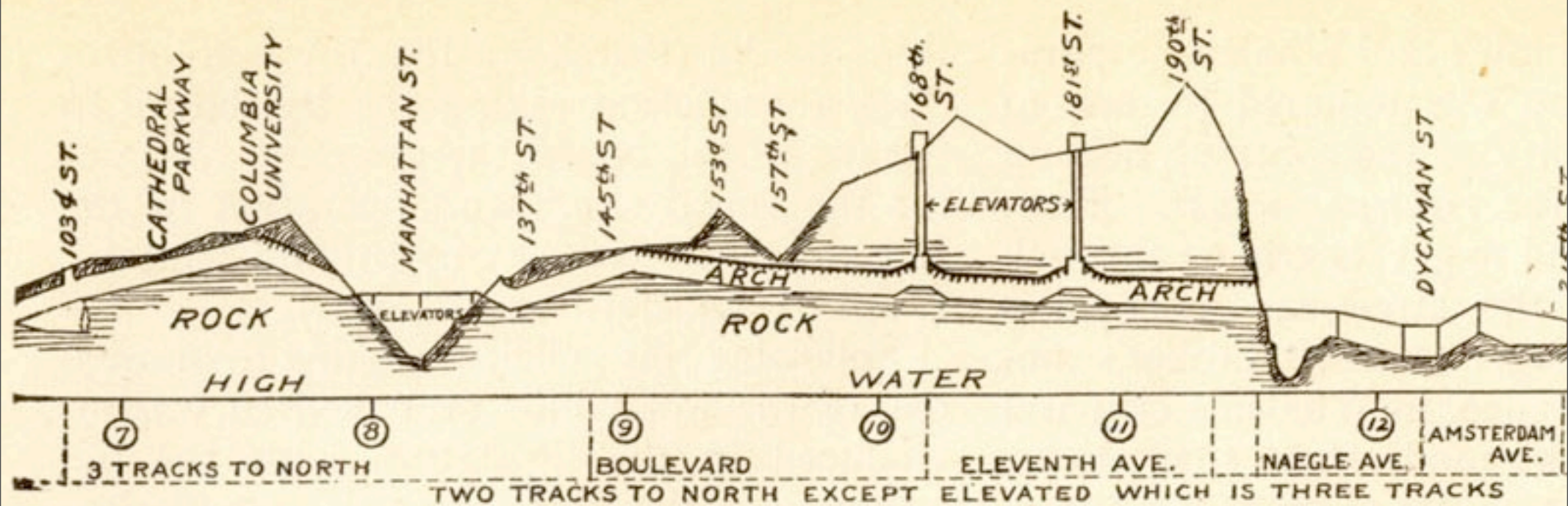












FROM BROOKLYN BRIDGE TO THE BRONX

# CARTE FIGURATIVE des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite.

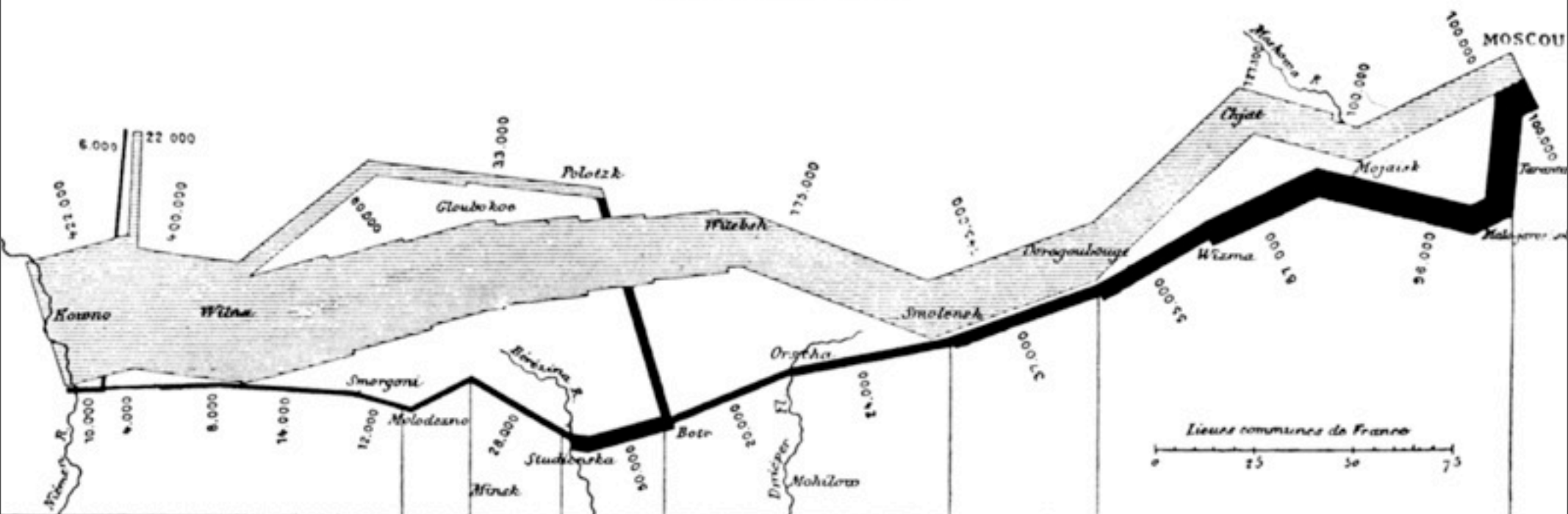
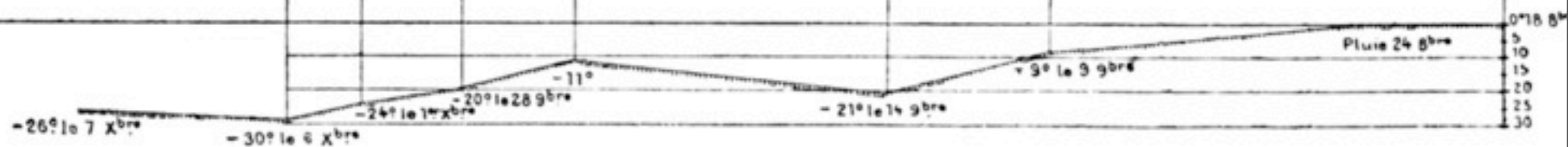
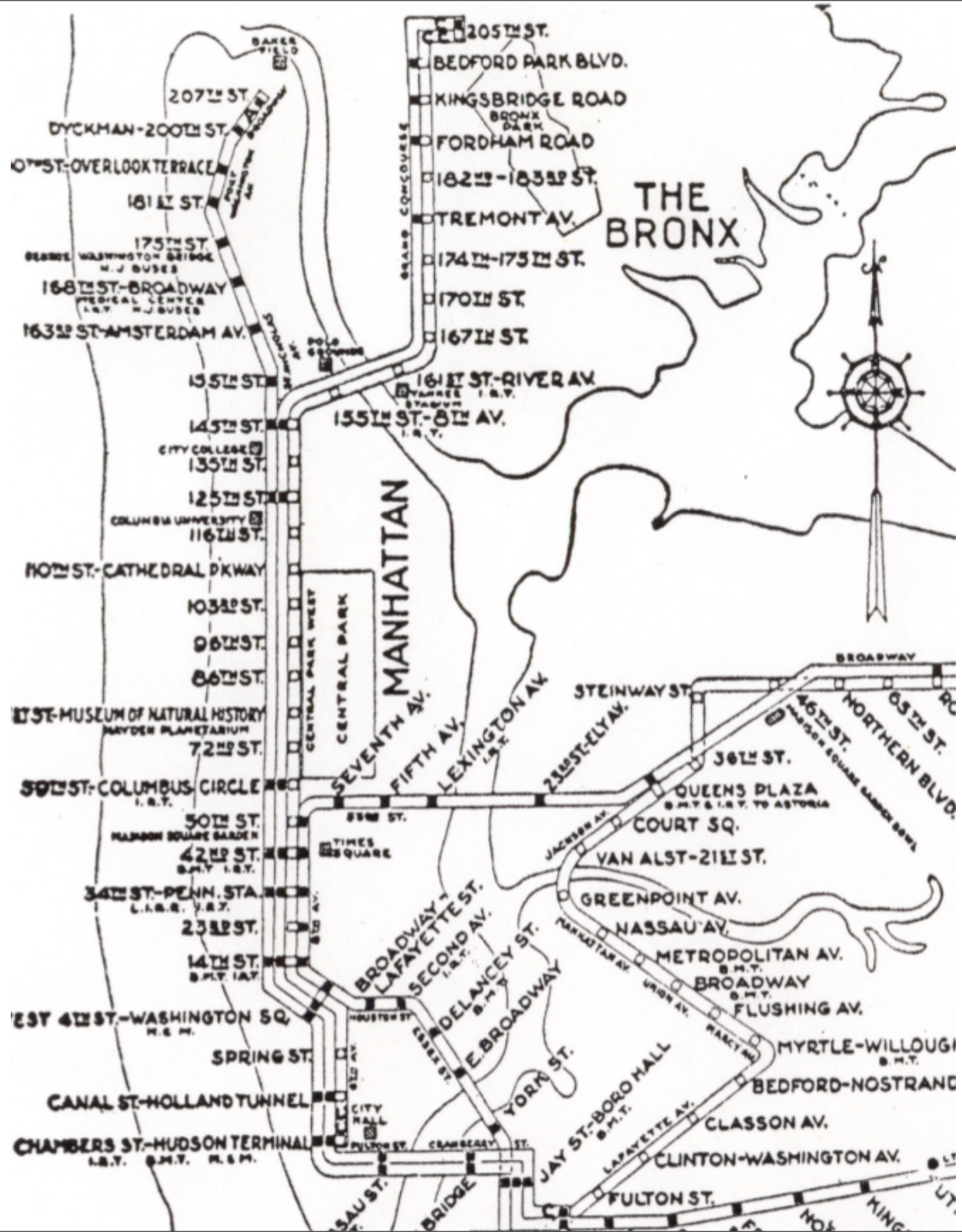


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro







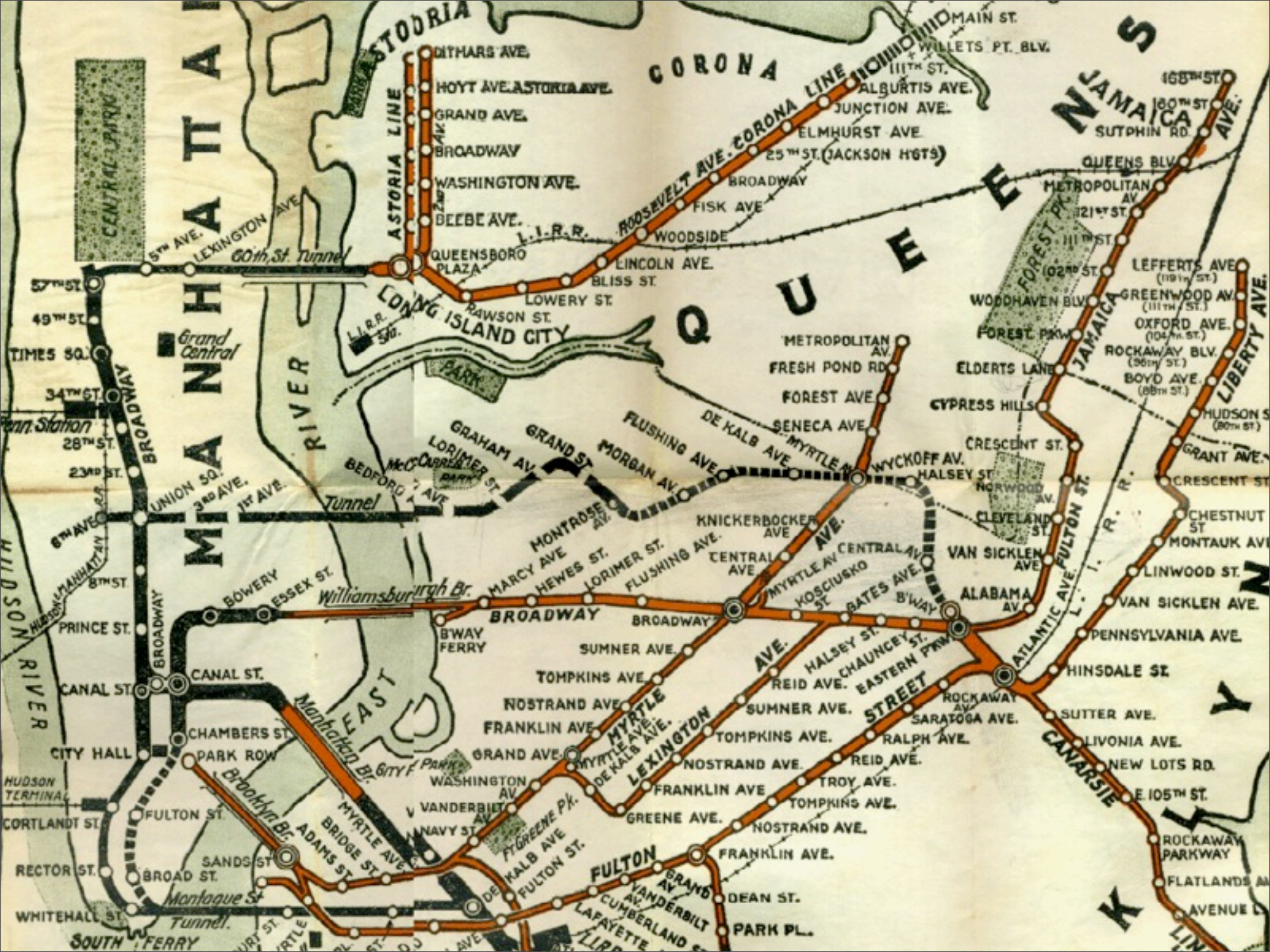


**SURFACE DIVISION**  
**BROOKLYN and QUEENS TRANSIT SYSTEM**

- PRODUCE LINES
- BUS LINES
- BMT RAILROAD TRANSIT LINES
- L.I.T. RAILROAD TRANSIT LINES

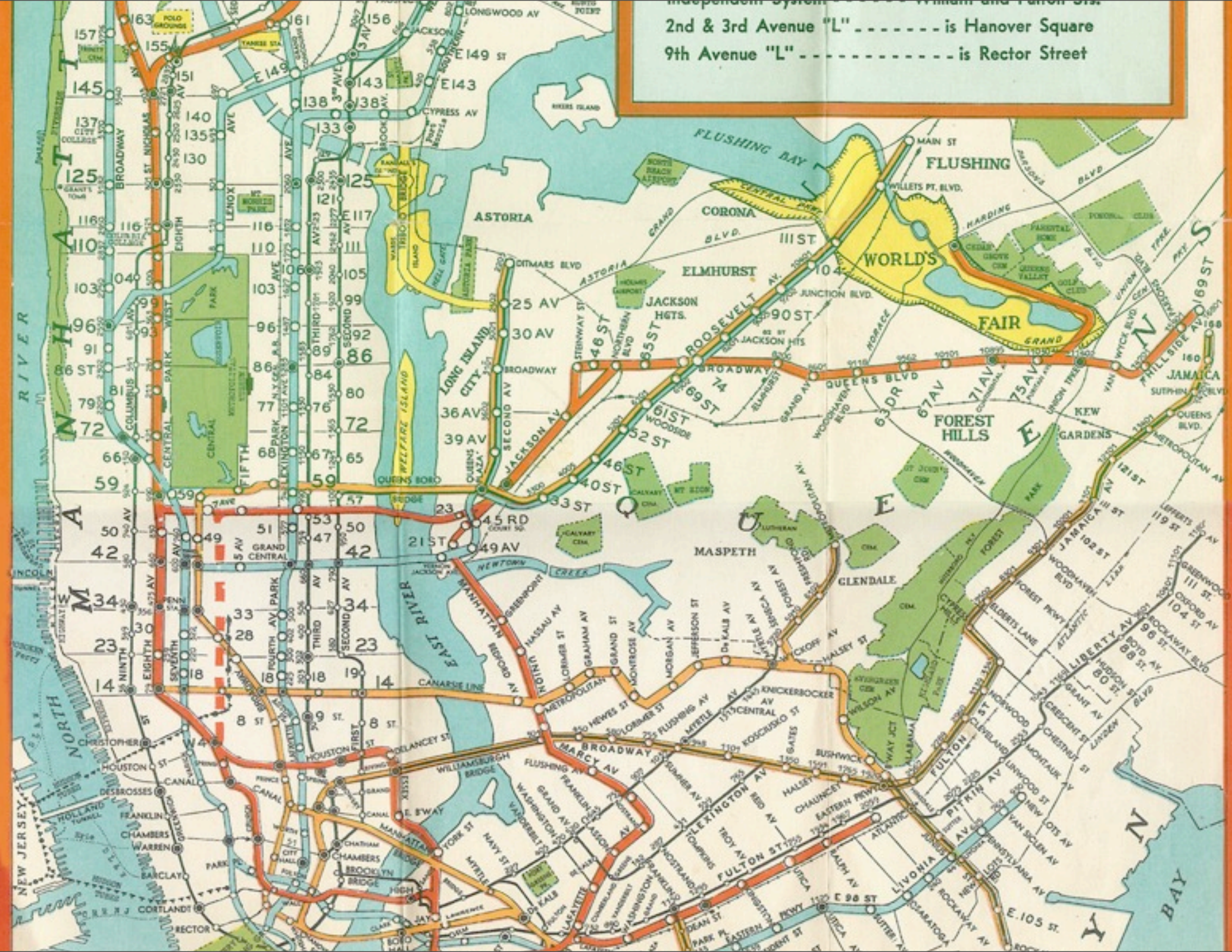








2nd & 3rd Avenue "L" ----- is Hanover Square  
9th Avenue "L" ----- is Rector Street









OFFICIAL  
NEW YORK CITY SUBWAY  
MAP AND STATION GUIDE

Service divisions:

BMT IND IRT

Stations:

Name of station  
(Located at or near)

Stops made by:

Local trains only Expressed and local trains

Lines and branches:

SEA RAIL I RT LINE IRT

Free transfer between divisions:

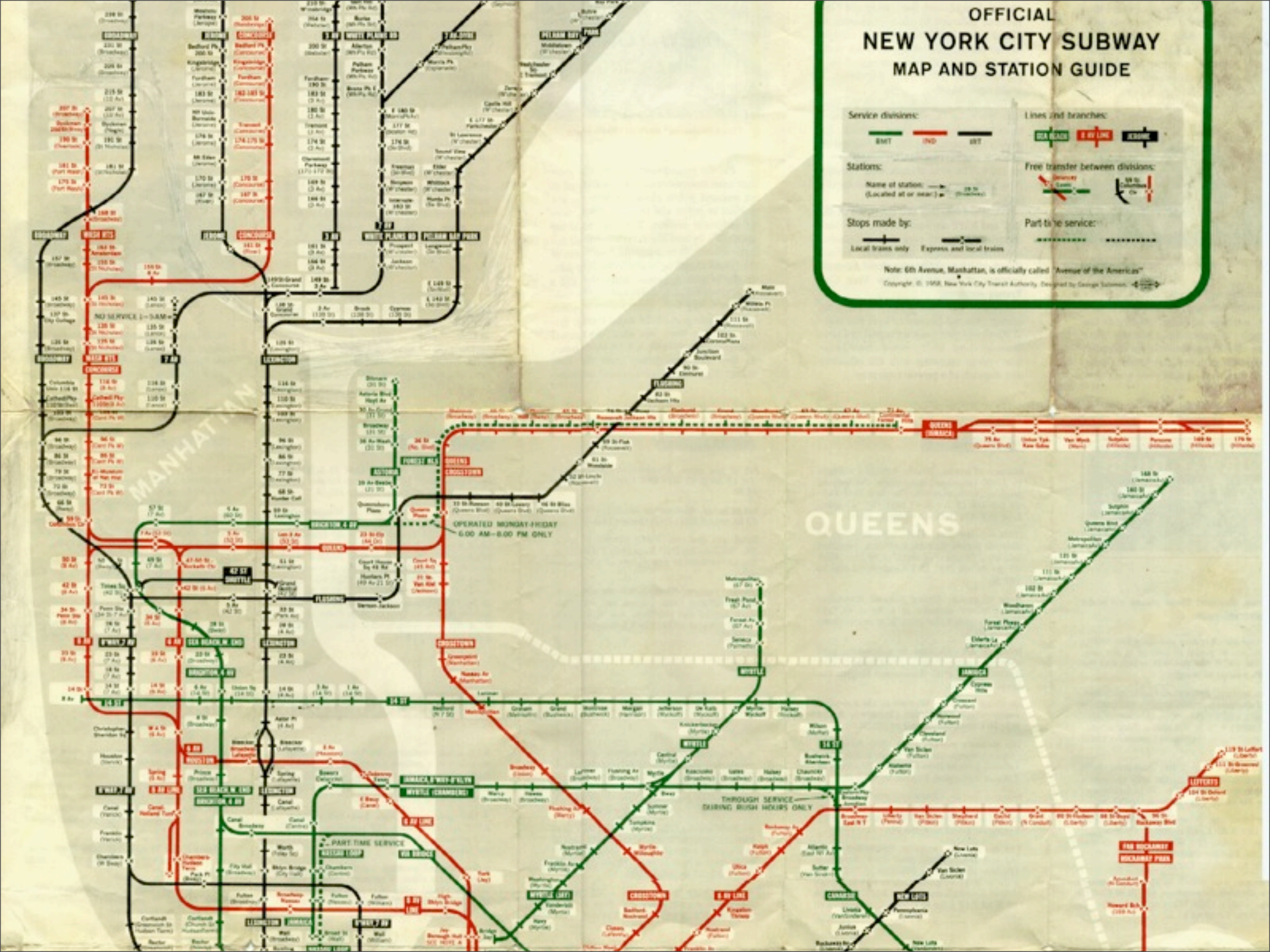
Transfer from IRT to IND

Part time service:

Part time service

Note: 6th Avenue, Manhattan, is officially called "Avenue of the Americas"

Copyright © 1968, New York City Transit Authority. Designed by George Schinner.





## February 17, 2000

© 1996-2002, Michael Calmeyer



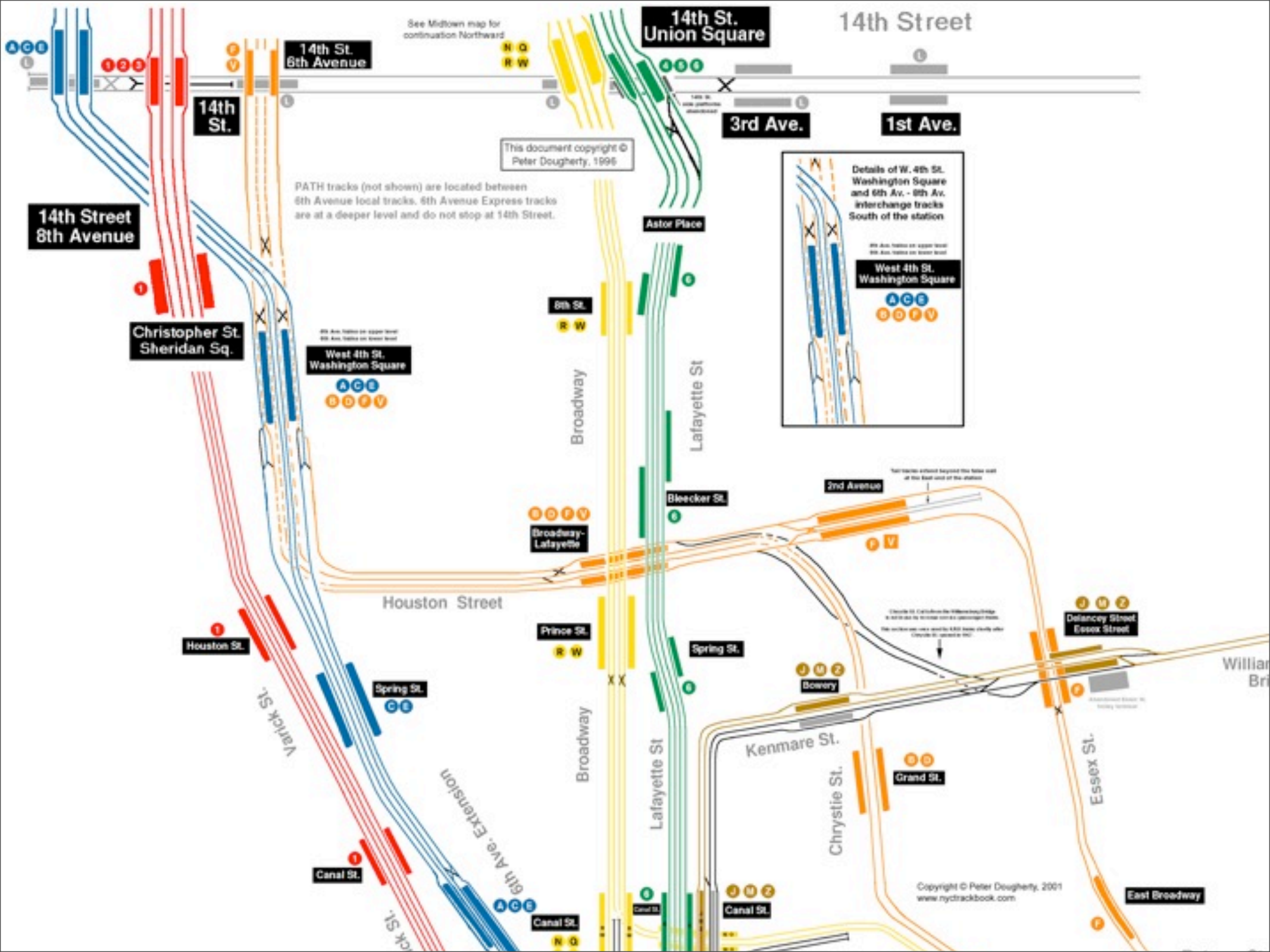




[http://subway.com.ru/  
maps.htm](http://subway.com.ru/maps.htm)



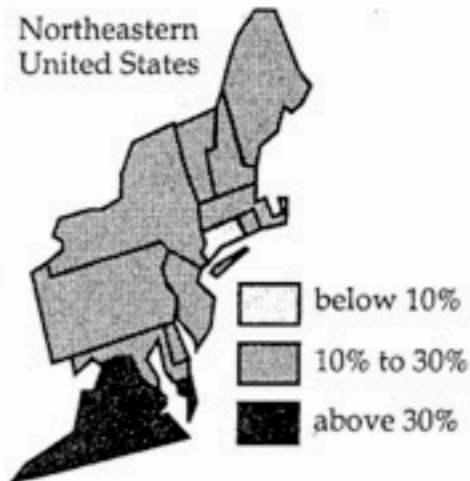








**Occupied Housing Units  
Lacking a Telephone, 1960**



**Occupied Housing Units  
Lacking a Telephone, 1960**

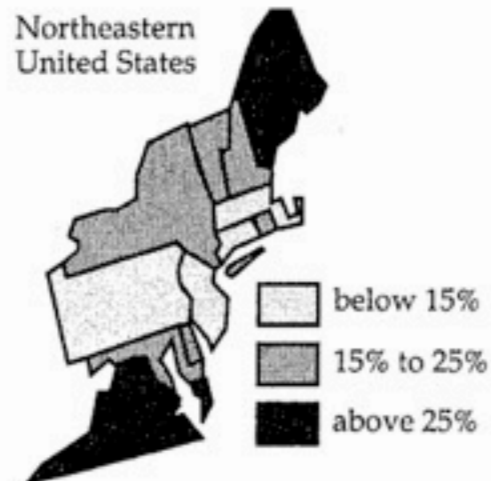
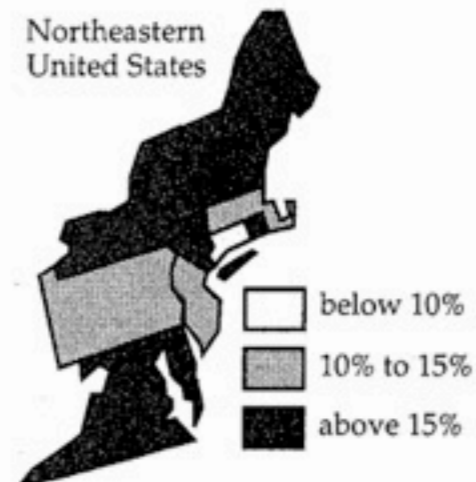


FIGURE 3.10. Different sets of class breaks applied to the same data yield different-looking choropleth maps.

**Occupied Housing Units  
Lacking a Telephone, 1960**



**Occupied Housing Units  
Lacking a Telephone, 1960**

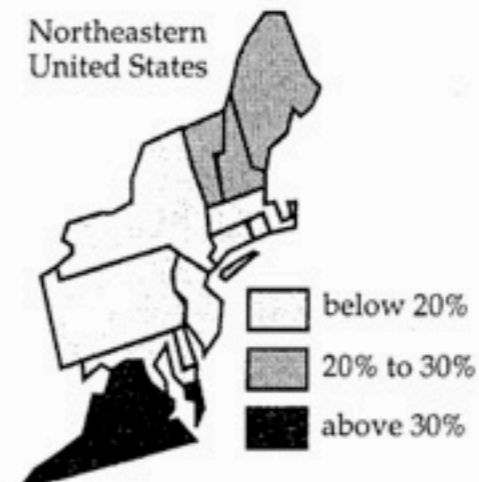


FIGURE 3.11. Class breaks can be manipulated to yield choropleth maps supporting politically divergent interpretations.



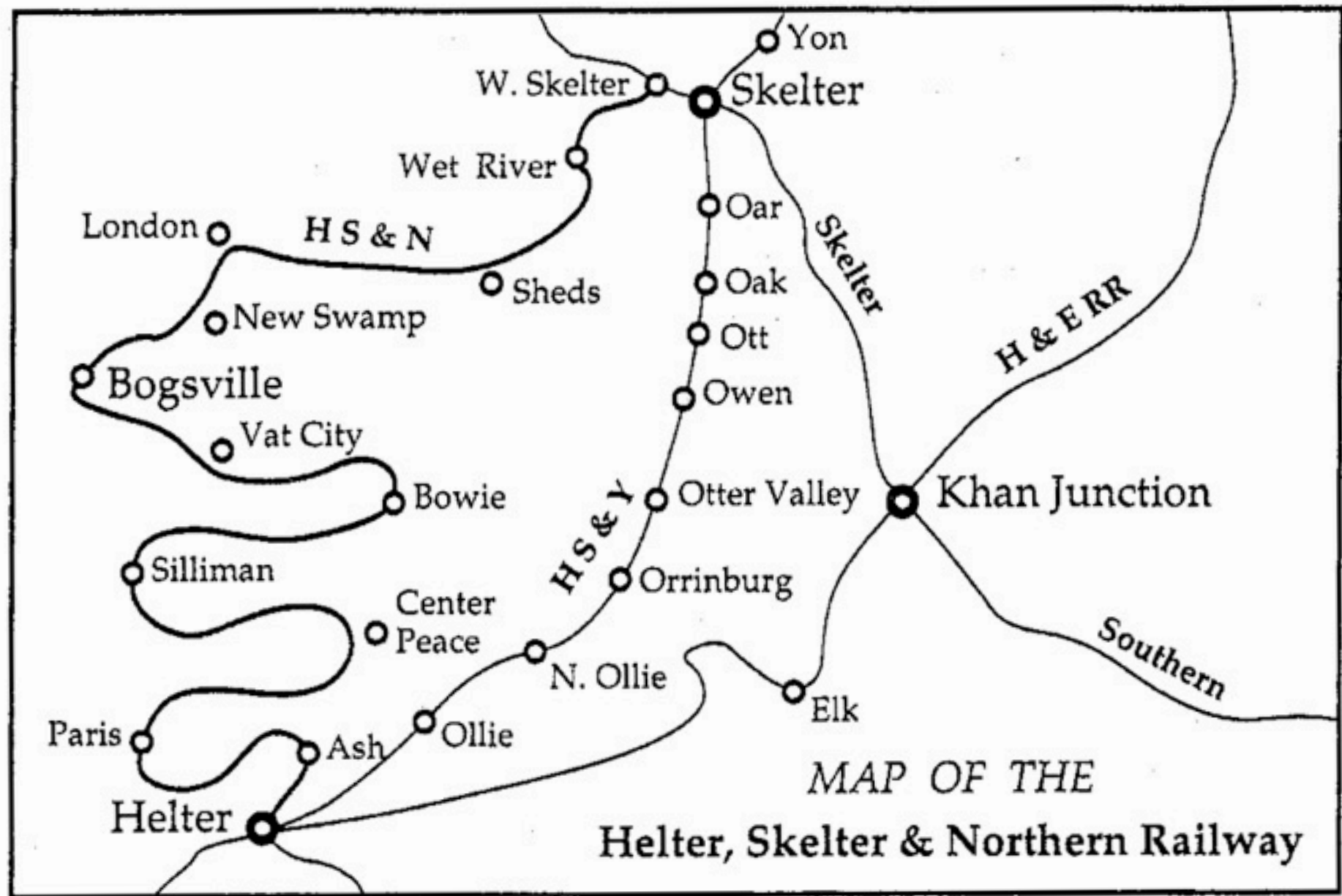


FIGURE 5.1. Engineering department's map of the Helter, Skelter and Northern Railway.

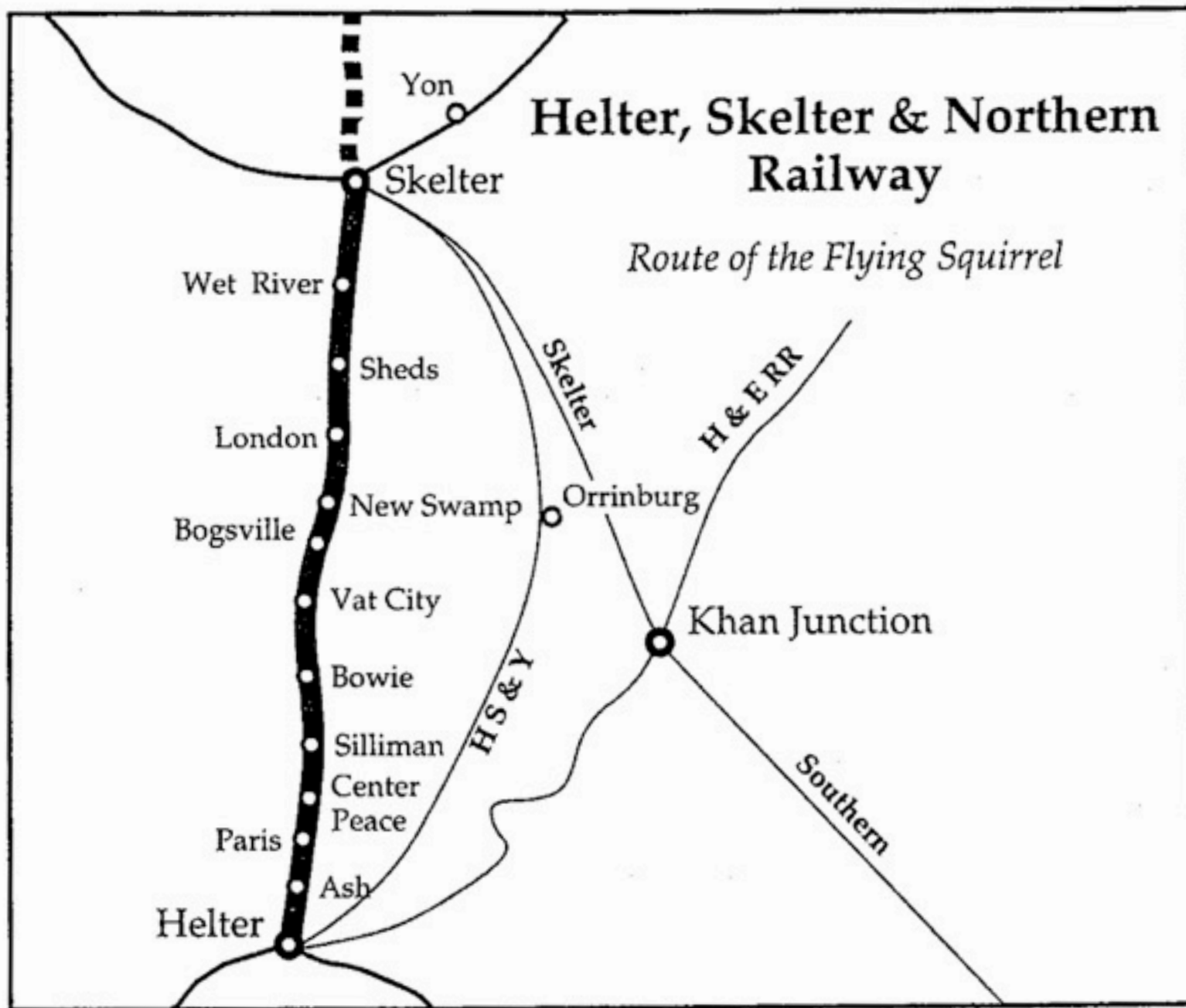


FIGURE 5.2. Advertising and timetable map of the Helter, Skelter and Northern Railway.

## *Upward Airlines—Reach for the Clouds*

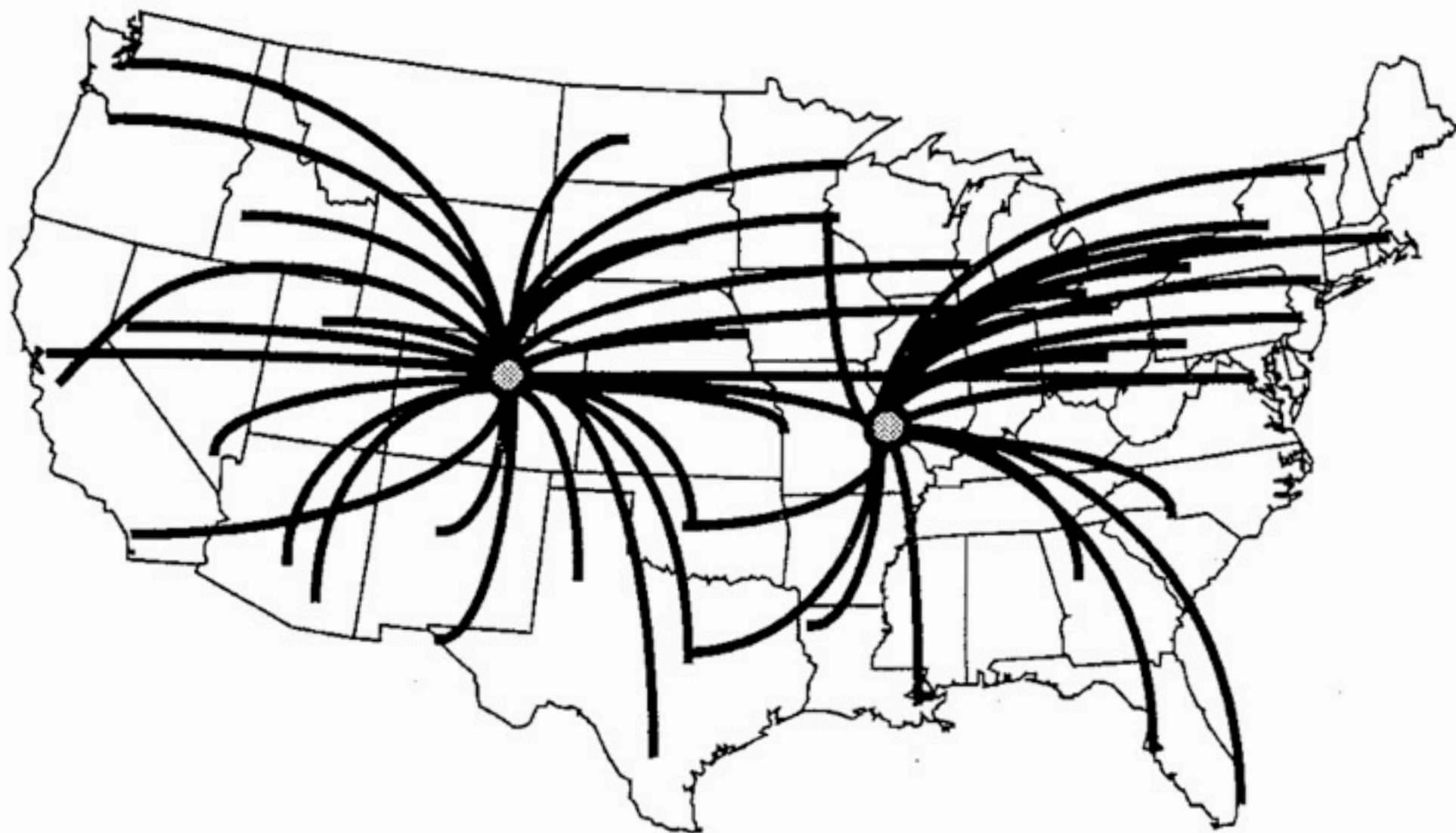


FIGURE 5.3. Advertising map emphasizing Upward Airlines' service area and connections.







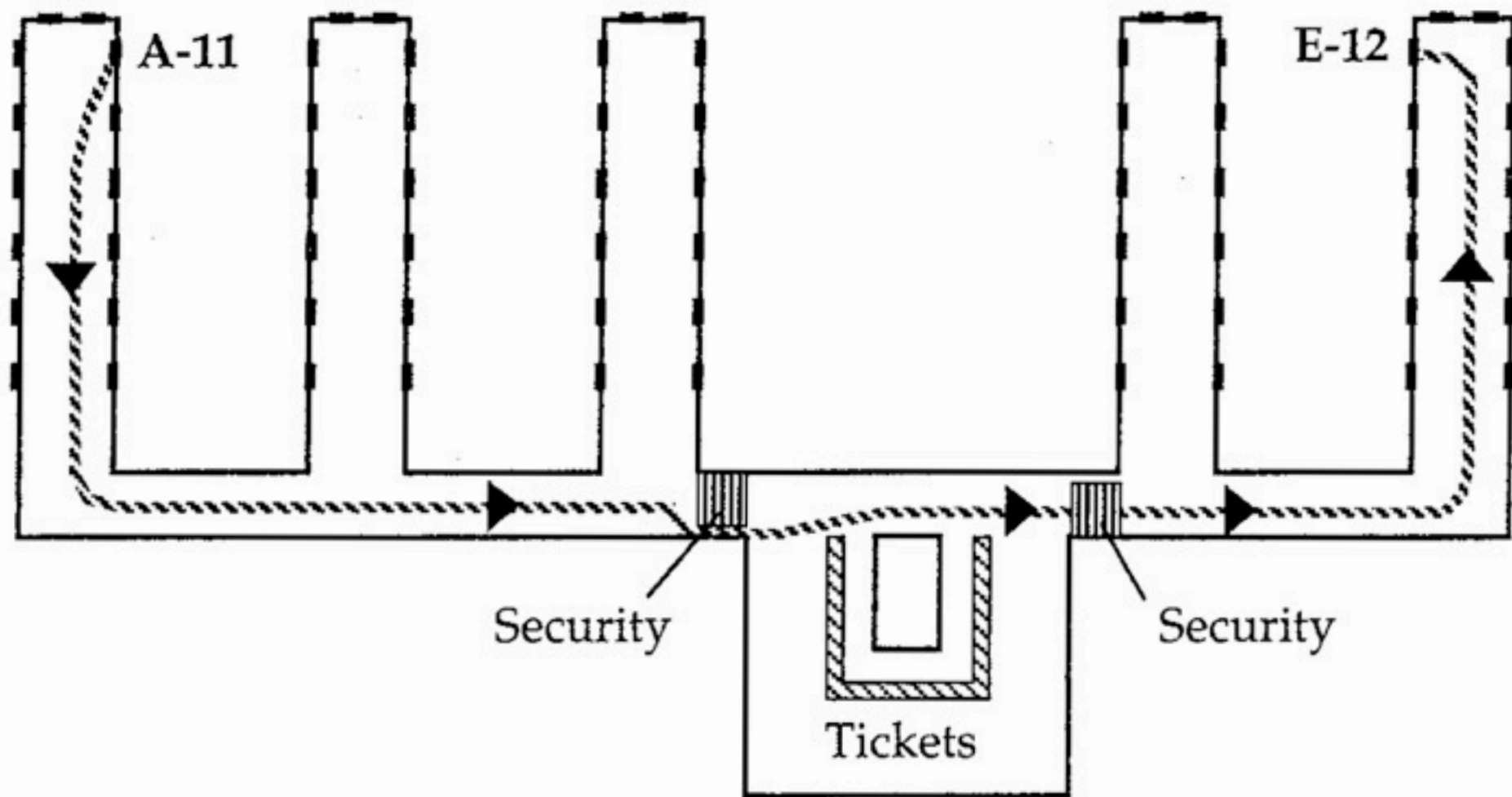
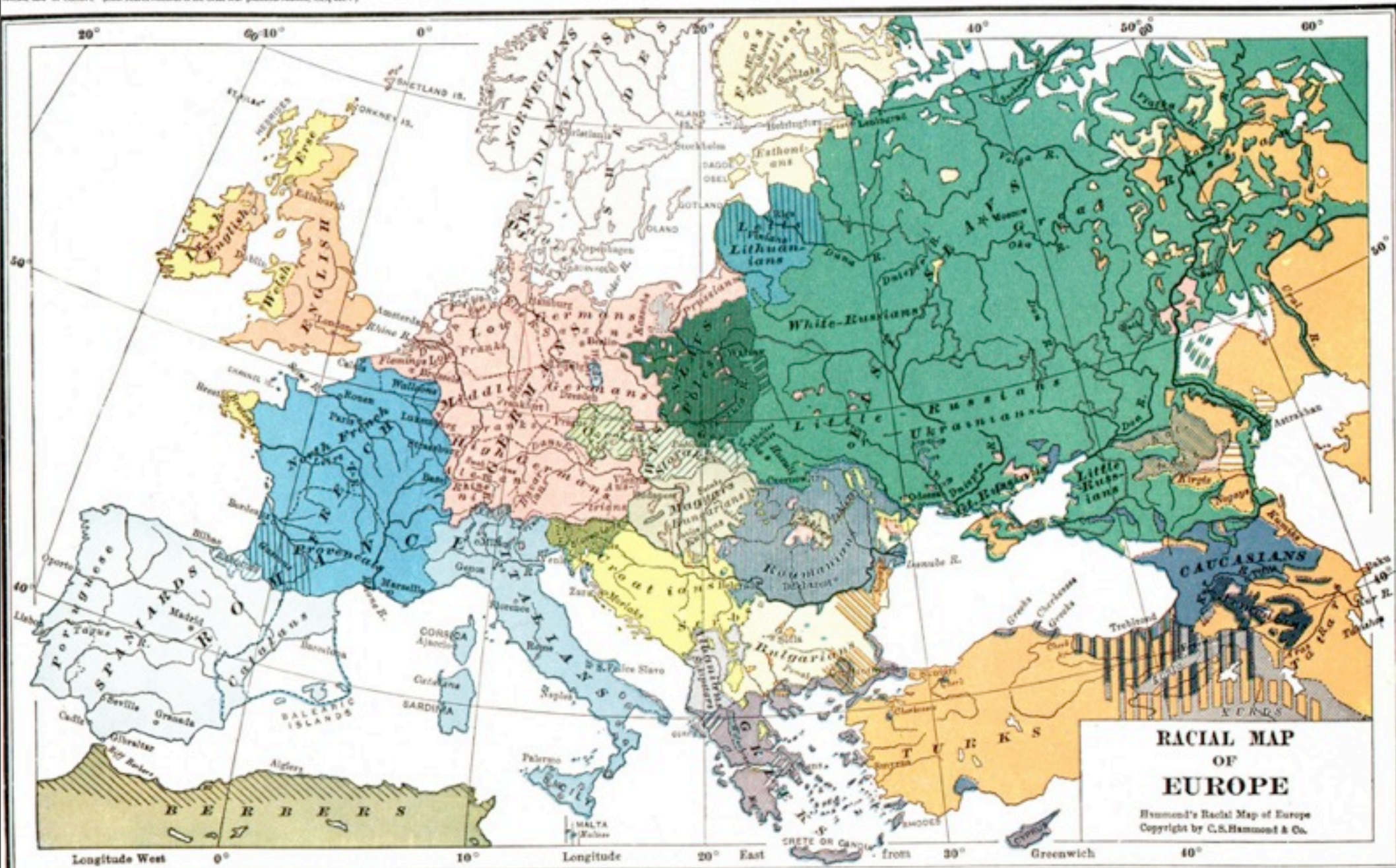
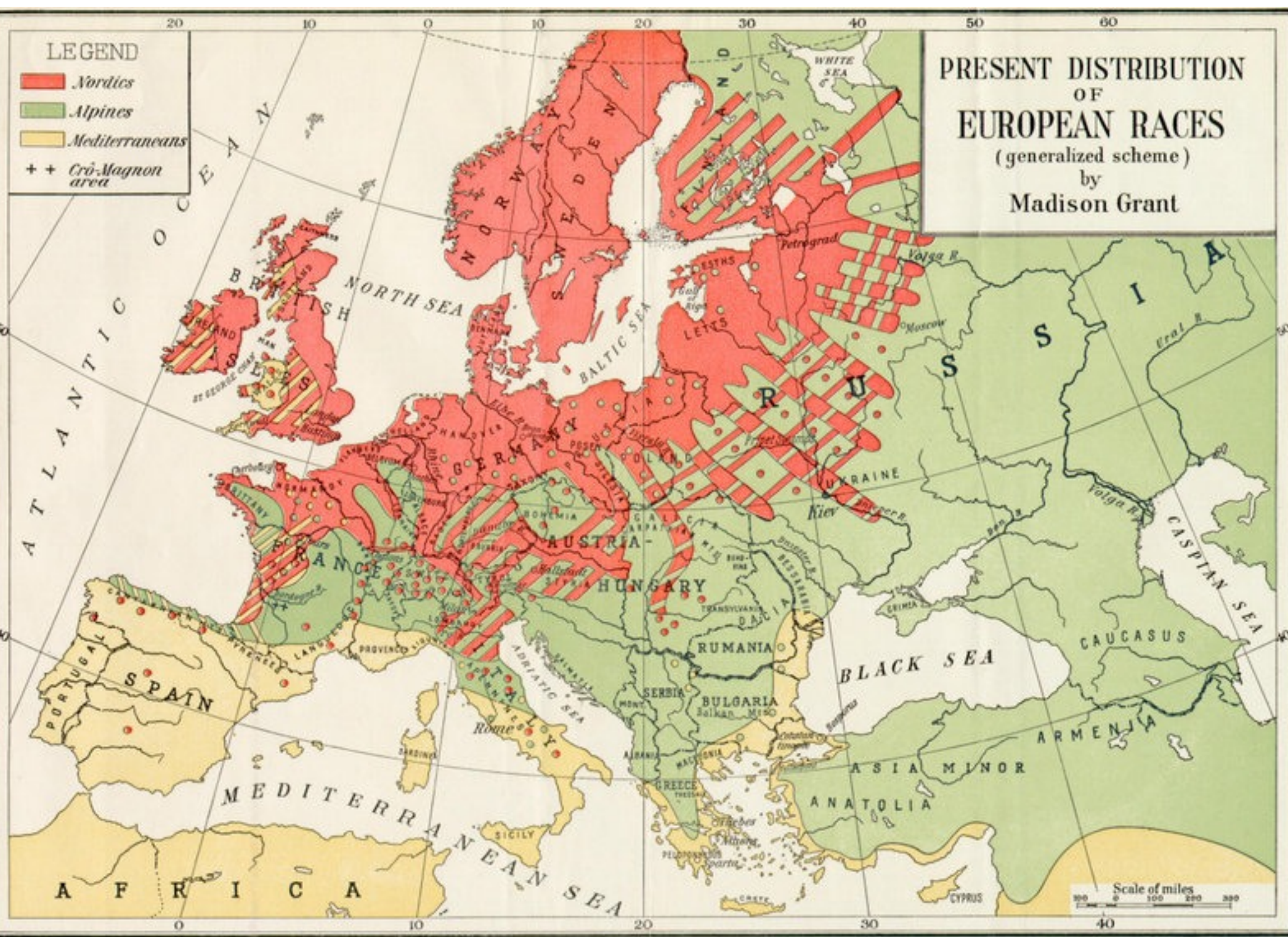


FIGURE 5.4. The hub map Upward Airlines won't publicize: the fifteen-minute luggage-laden trek from gate A-11 to gate E-12, with a stop at the security checkpoint.

# Ethnic Distribution Maps of Europe







# LEGEND

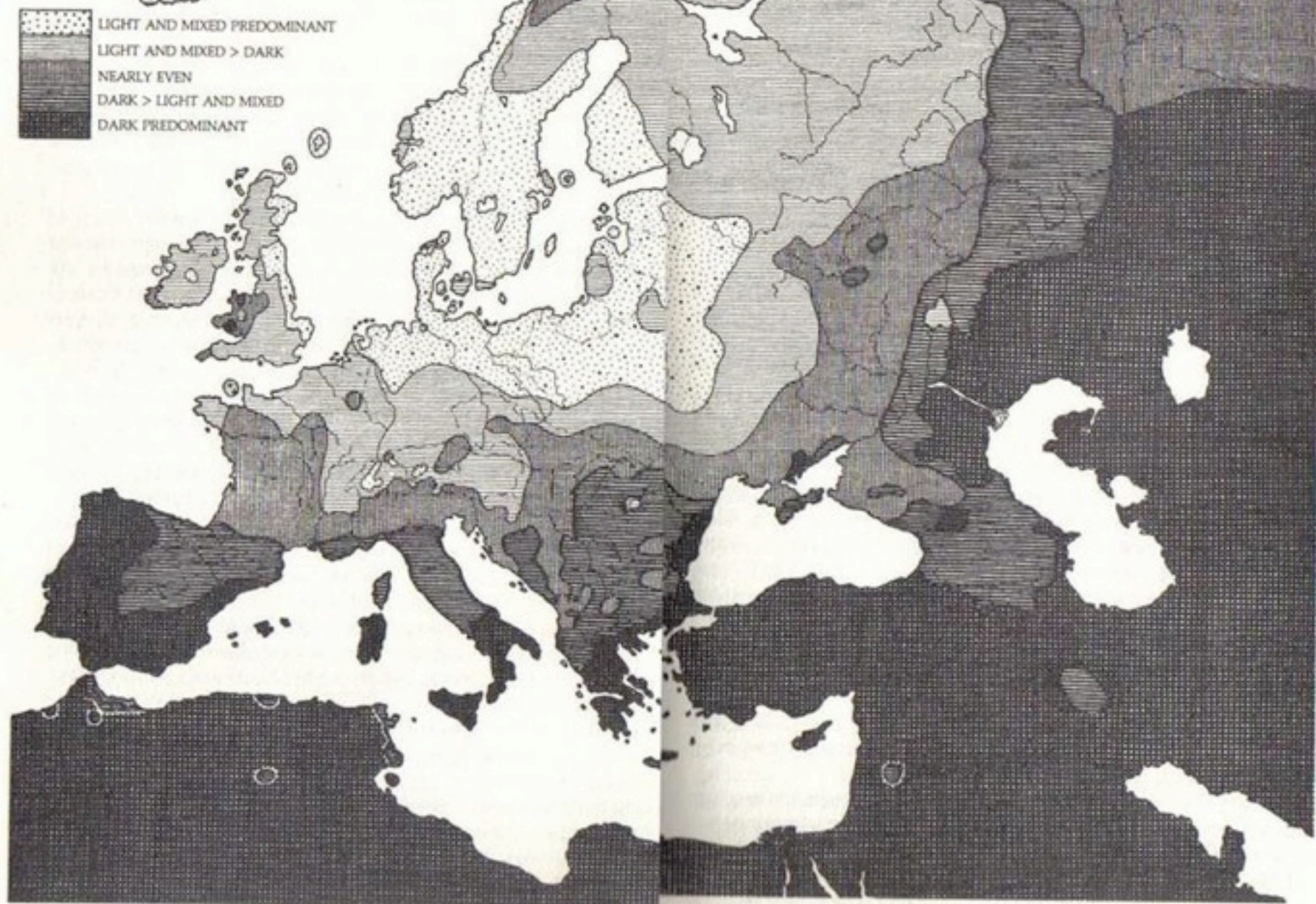
- *Nordics*
- *Alpines*
- *Mediterraneans*
- ++ *Cro-Magnon area*

## PRESENT DISTRIBUTION OF EUROPEAN RACES (generalized scheme) by Madison Grant

Scale of miles  
0 100 200 300



MAP 4.2. PIGMENTATION OF HAIR AND EYES

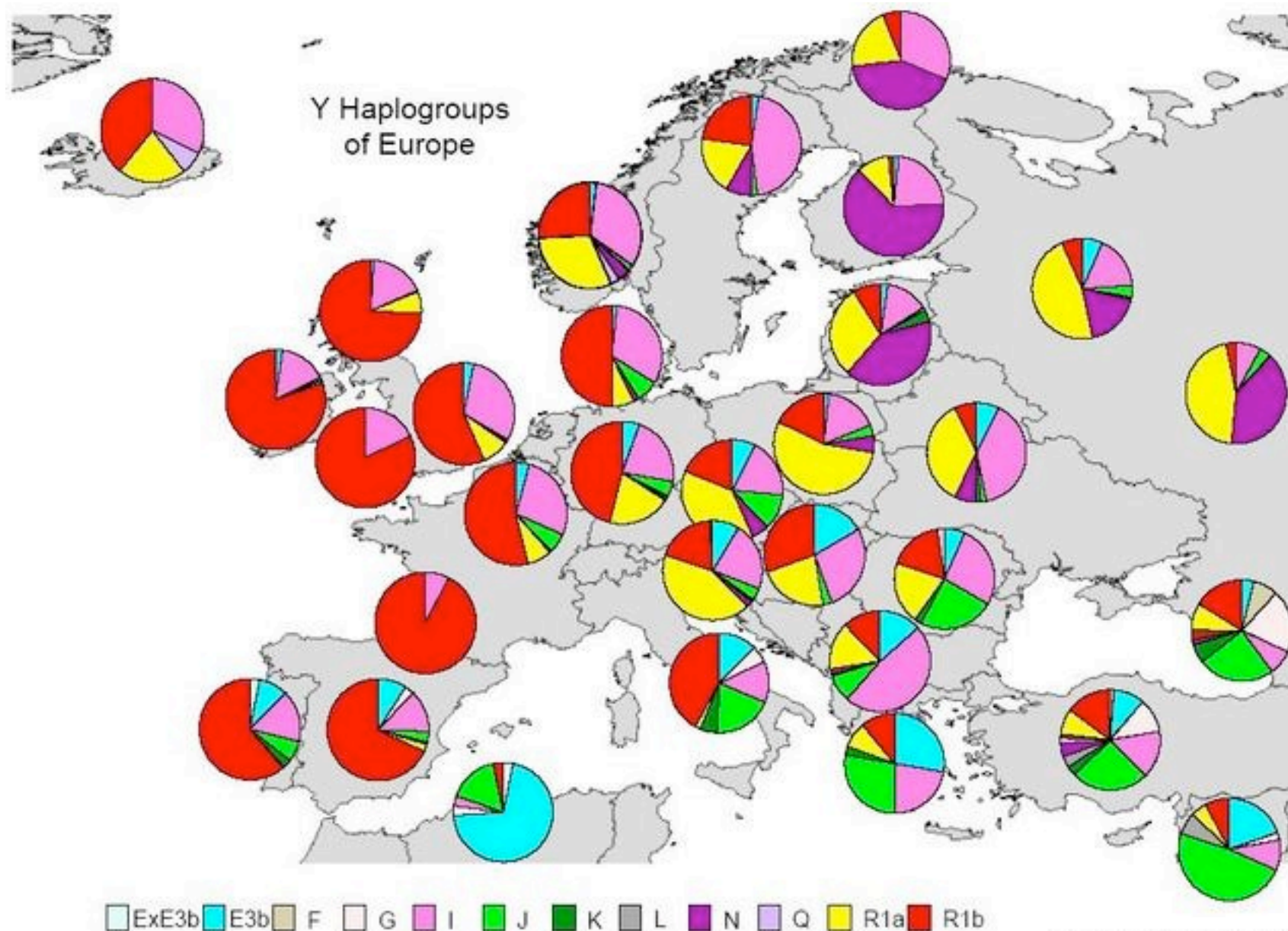


SOURCE: Drawn by Elmer Rising, ca. 1939.

THIS map combines data on the pigmentation of hair and eyes in modern Europe. Light hues cluster around the North Sea and the Baltic in the lands most recently deglaciated. Hair is darkest to the west in Wales, Ireland, the Faroes, Iceland, and

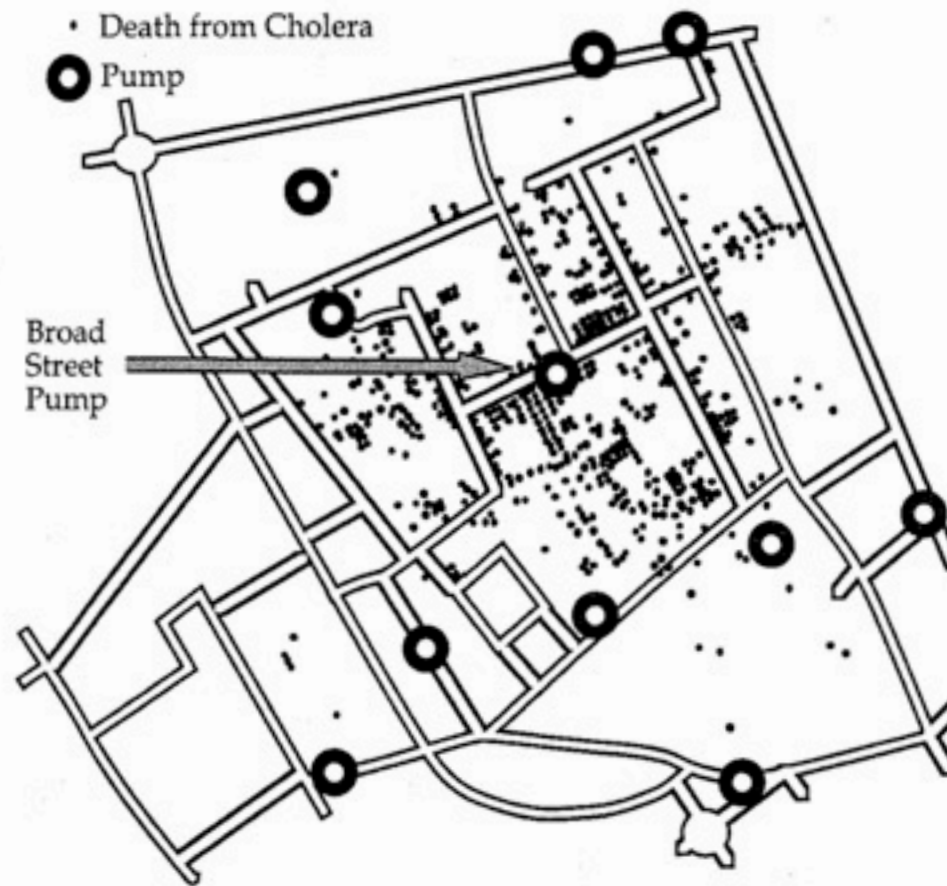
parts of western Norway. There, browns and reds are frequent, and the local blonds are mostly golden, while farther east in Baltic and Slavic lands the combination of brown eyes and ashen hair is common. Although not shown here, in the west exposed skin may be red and raw; in the east it is smoother and shinier and tans more easily.







### Snow's Dot Map



### Areal Aggregations and Density Symbols

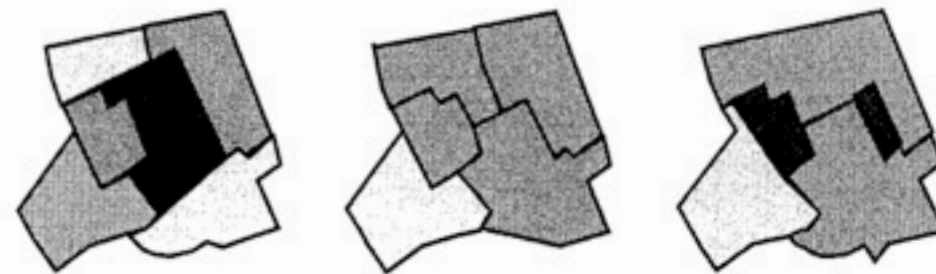
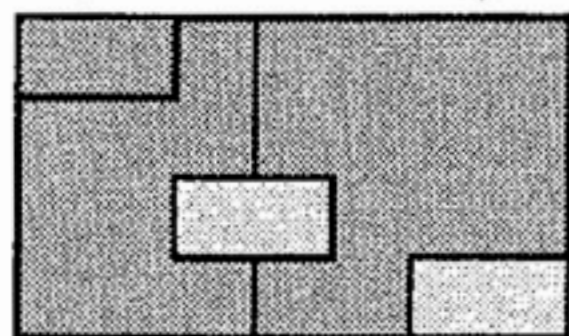


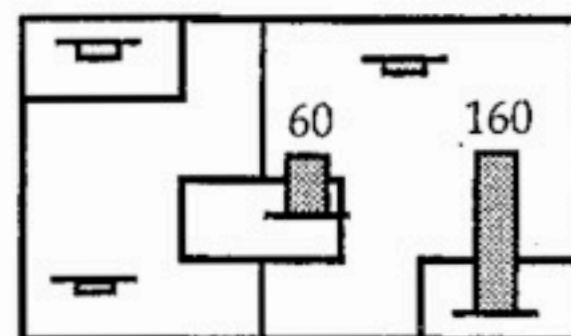
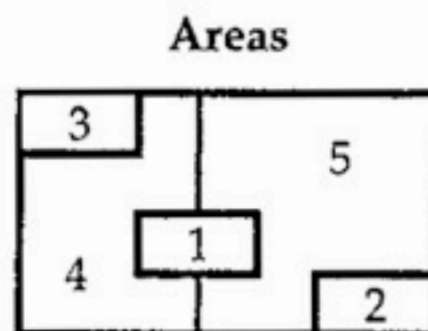
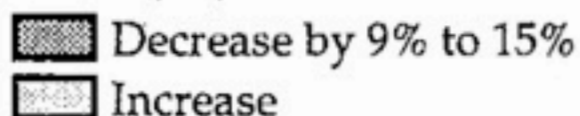
FIGURE 10.18. A reconstruction of John Snow's famous dot map of cholera (above) and three choropleth maps (below) produced by different areal aggregations of this part of London.



| Area | Labor Force<br>(000s) | Unemployment (000s) |       |        | Unemployment Rate |       |        | Percentage<br>Change |
|------|-----------------------|---------------------|-------|--------|-------------------|-------|--------|----------------------|
|      |                       | $t_1$               | $t_2$ | Change | $t_1$             | $t_2$ | Change |                      |
| 1    | 3,000                 | 120                 | 180   | +60    | 4.0%              | 6.0%  | +2.0%  | +50.0%               |
| 2    | 16,000                | 640                 | 800   | +160   | 4.0%              | 5.0%  | +1.0%  | +25.0%               |
| 3    | 2,500                 | 125                 | 113   | -12    | 5.0%              | 4.5%  | -0.5%  | -9.6%                |
| 4    | 800                   | 56                  | 48    | -8     | 7.0%              | 6.0%  | -1.0%  | -14.3%               |
| 5    | 500                   | 40                  | 35    | -5     | 8.0%              | 7.0%  | -1.0%  | -12.5%               |



Percentage Change in the  
Unemployment Rate

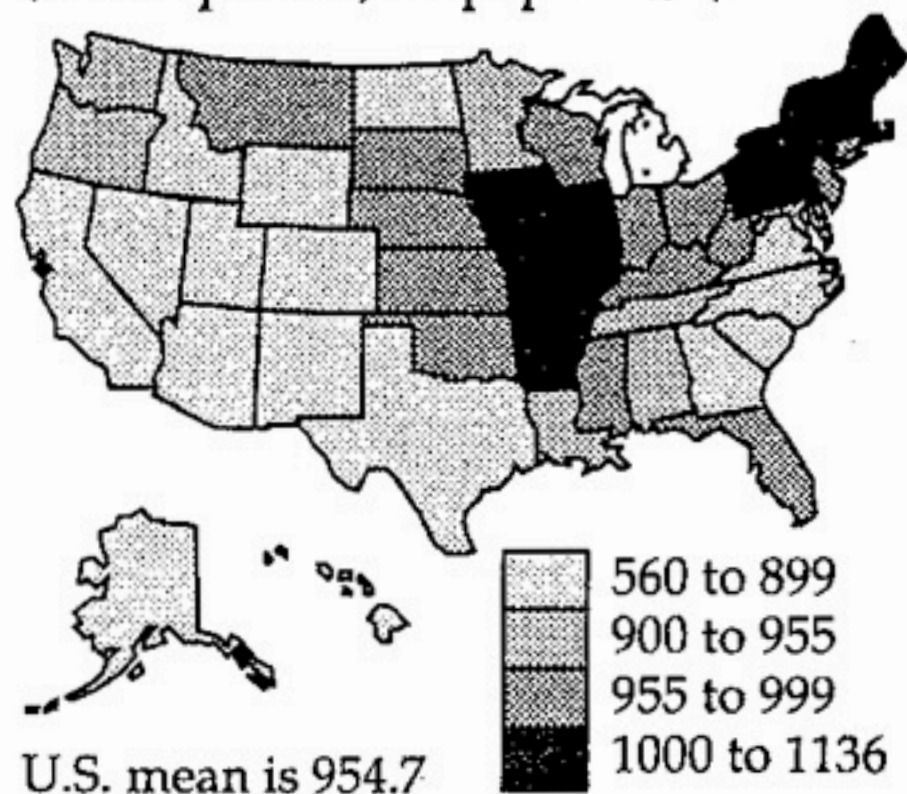


Increases in  
Persons  
Seeking  
Work  
(thousands)

FIGURE 10.19. Unemployment data (top) for a hypothetical region (bottom center) yield different maps, supporting an optimistic (bottom left) and a pessimistic (bottom right) view of recent temporal trends.

## Crude Death Rate, 1960

(deaths per 100,000 population)



## Age-Adjusted Death Rate, 1960

(deaths per 100,000 population)

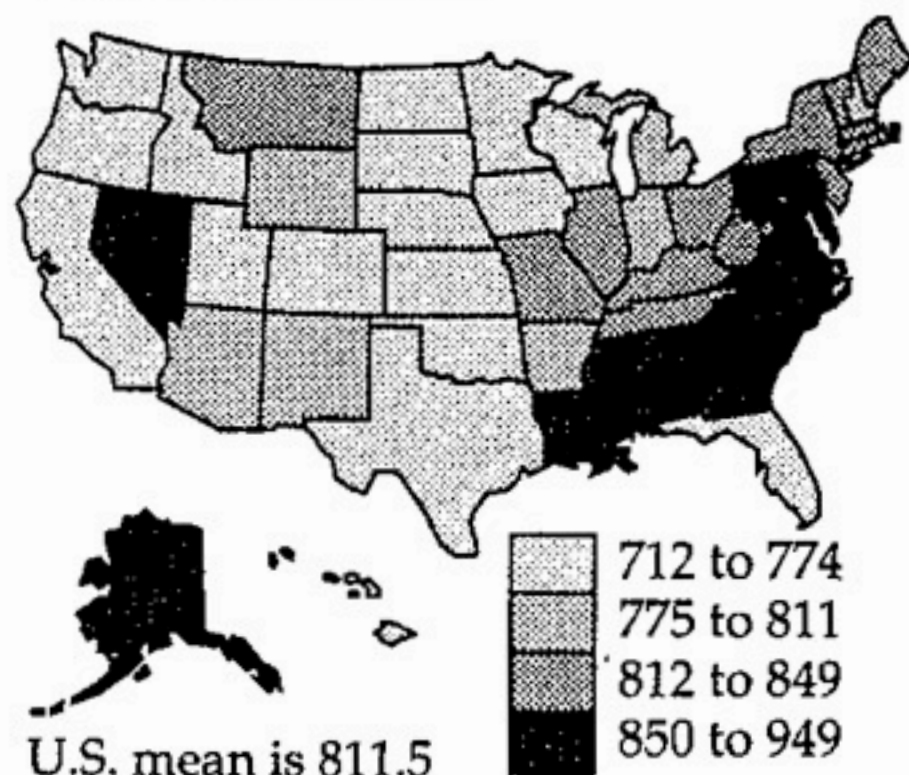


FIGURE 10.20. Maps of the crude death rate (left) and the age-adjusted death rate (right) can present markedly different geographic patterns of mortality.

# Readings and Assignments

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- Readings
  - Lady Tasting Tea, last chapter
  - Influence, first chapter



