

Evaluating Thematic Map Design in Geographical Journals Published in the Twentieth Century

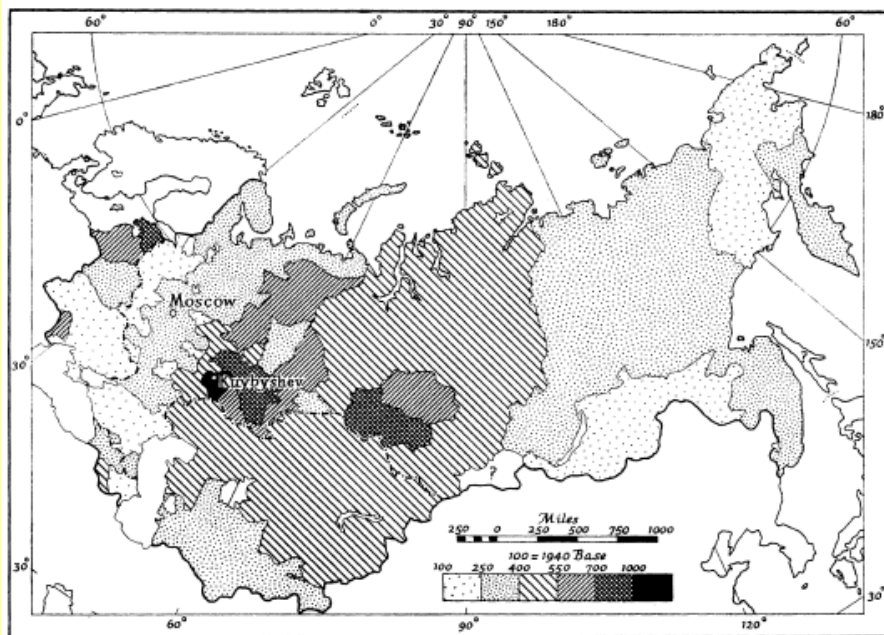


Fig. 3. Growth of industry in the Soviet Union 1940–56. Note: The oblast units are used in the R.S.F.S.R. but elsewhere the S.S.R. figures have been used in the absence of comparable oblast data

From Hooson (*Geographical Journal* 1960, 186).

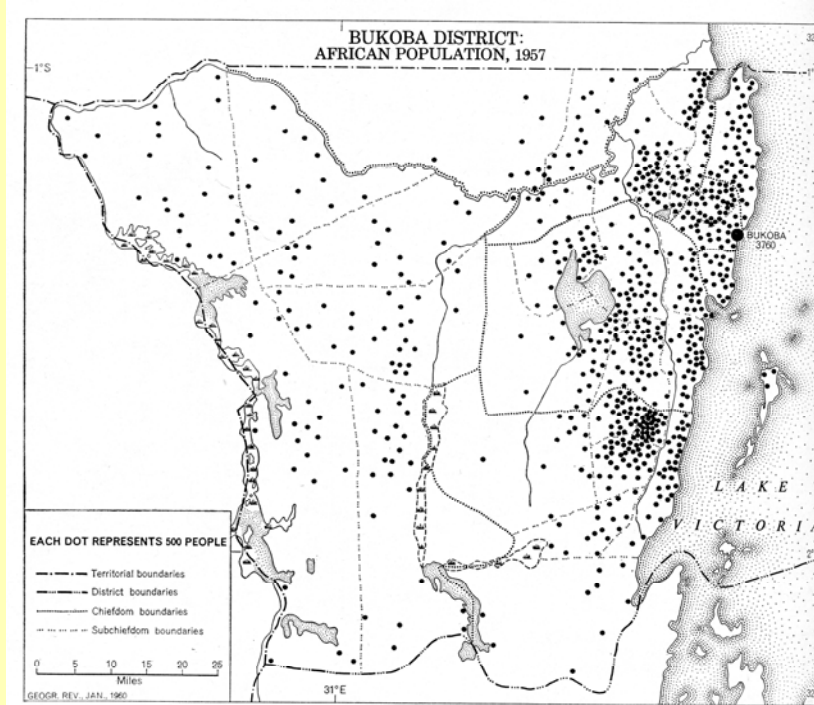


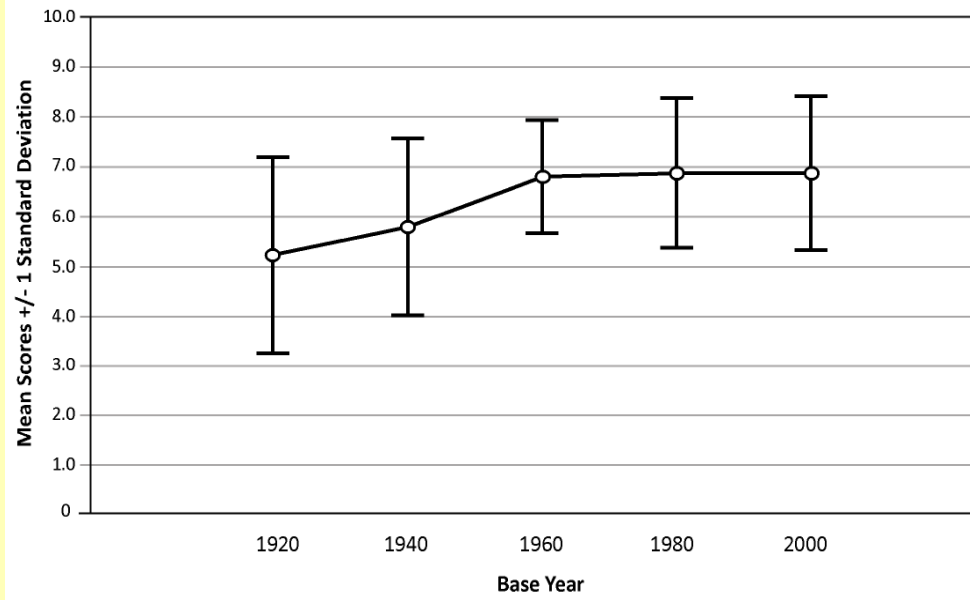
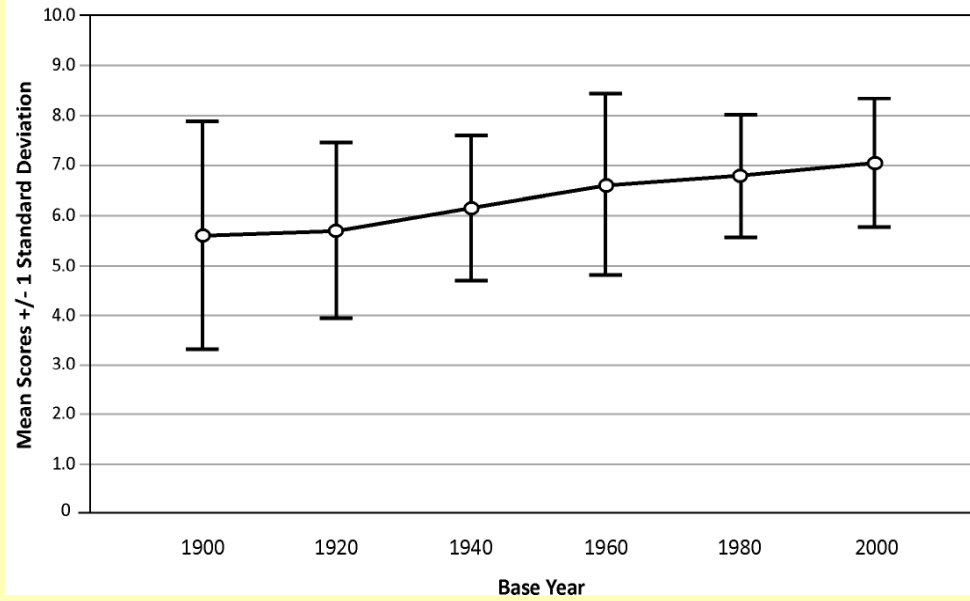
FIG. 6—African population of Bukoba District, 1957.

From McMaster (*Geographical Review* 1960, 80).

Terry A. Slocum, University of Kansas
Fritz C. Kessler, Frostburg State University

Our Previous Research

- *Annals of the AAG, March 2011*
- Compared the *Annals of the AAG* with *The Geographical Journal*
- One limitation is that professional cartographers were involved only for *The Geographical Journal*
- Major conclusion was that maps did not exhibit the high quality of design that we might expect

A**Overall Map Design Scores in the *Annals*****B****Overall Map Design Scores in *The Geographical Journal***

Goals of our Research

- Analyze changes in the design of thematic maps
- Analyze the frequency of maps relative to other non-text material
- Analyze the frequency of thematic maps relative to other kinds of maps
- Analyze the frequency of various kinds of thematic maps

Some Hypotheses

We hypothesized an improvement in map design over the 20th century due to:

- Improved drafting tools
- Availability of computer-based methods
- Availability of cartographic texts and coursework in cartography

Countering this hypothesized improvement was the fact that assistance in map design for both journals ended in the 1970s.

Other Hypotheses

- Growth of positivism and quantitative geography in the 1950s and 1960s would lead to greater use of nontext info
- Growth of nonpositivist views in the latter portion of the 20th century would lead to the opposite

Data Collection: Basic Rules for Selecting Maps

- Sampled 20 maps from each journal at twenty-year intervals (1900, 1920, . . . , 2000)
- No more than two maps from any article
- Maps selected from an article had to differ in both symbology and design

Data Collection: Years, Pages, and Articles

Results for the Geographical Review

Base year	Range of years	Number of pages	Number of articles
1900	1899-1901	720	64
1920	1920	390	28
1940	1940	338	21
1960	1960	266	13
1980	1980	236	17
2000	1999-2000	877	45

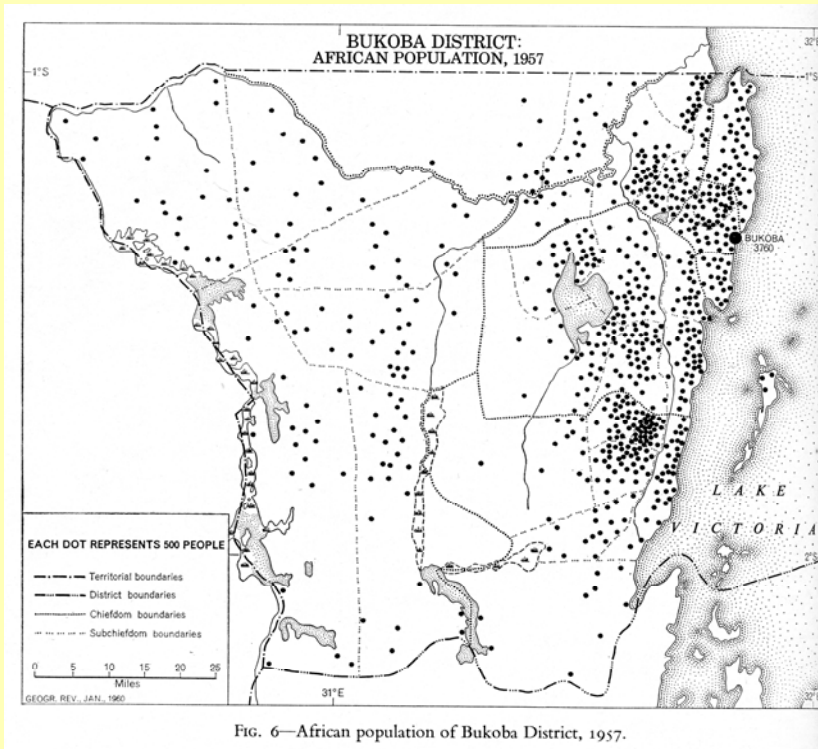
Data Collection: Map Elements

1. Legend
2. Symbology
3. Visual hierarchy
and Figure-ground
4. Lettering
5. Title and Caption
6. Base information
7. Inset maps
8. Scale
9. Projection
10. Orientation
11. Source
12. Map referenced

Data Collection: Symbology Element

- Given the nature of the data, was the proper symbology used?
- For a particular mapping technique, were logical design decisions made?

Data Collection: Qualitative Evaluation

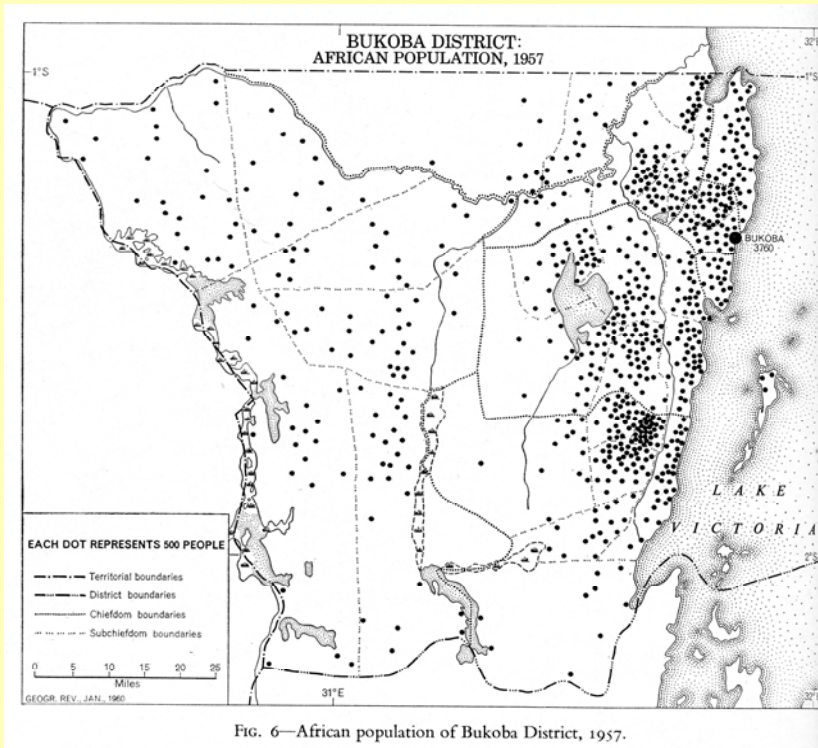


Regarding the Symbology:

+ The dots are very legible and coalesce in the densest areas producing a nice looking dot map!

- There is some confusion because the large dot for Bukoba in the northwest does not appear in the legend.

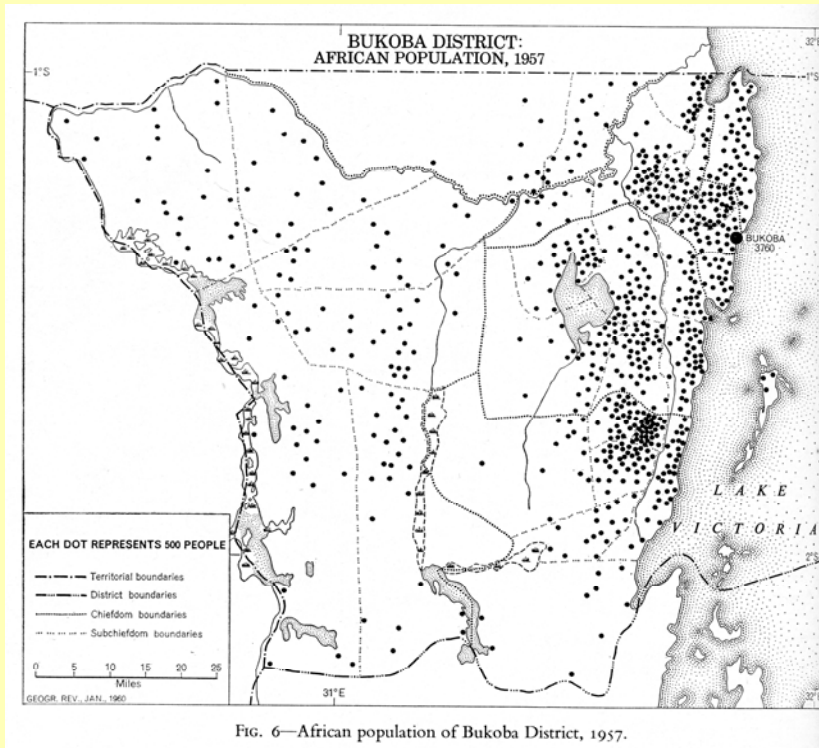
Data Collection: Quantitative Evaluation



Legend Presence

- 0 = No legend information, but not necessary
- 1 = No legend information, but necessary
- 2 = Legend present on map, but not necessary
- 3 = Legend present on map and necessary
- 4 = Legend information in caption and necessary
- 5 = Other

Data Collection: Quantitative Evaluation



Legend Theme

Using the following Likert scale,

- 1 Strongly disagree
- 2 Somewhat disagree
- 3 Neither agree nor disagree
- 4 Somewhat agree
- 5 Strongly agree

Evaluate the statement shown below:

Themes on the map are clearly represented in the map legend or explained in the caption.

Data Collection: Quantitative Evaluation

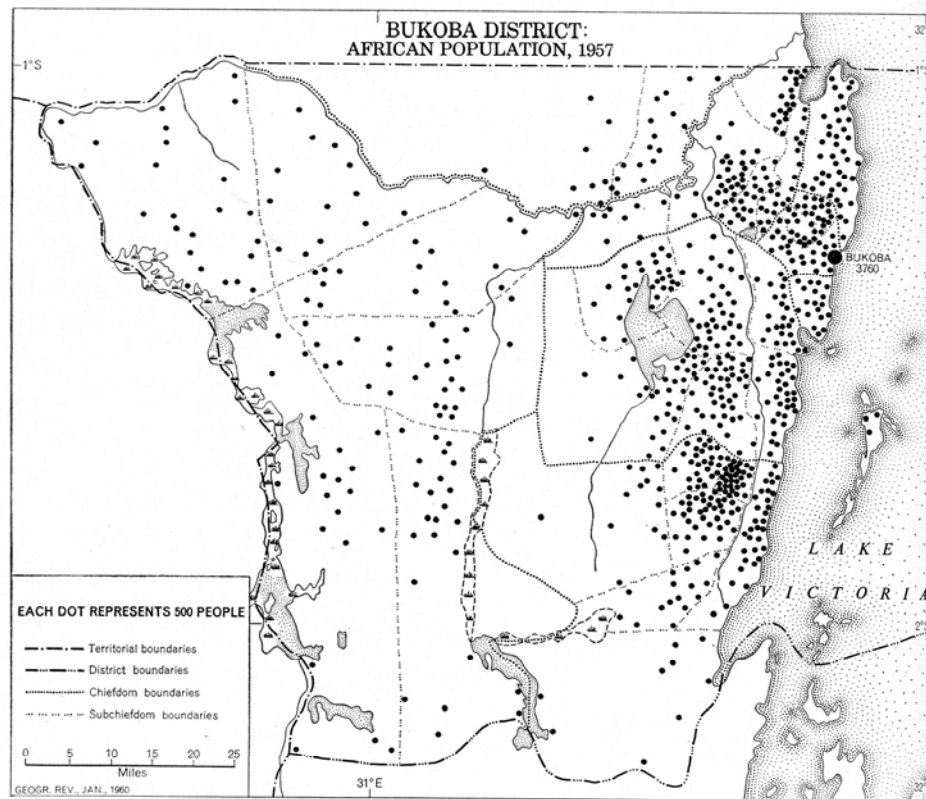
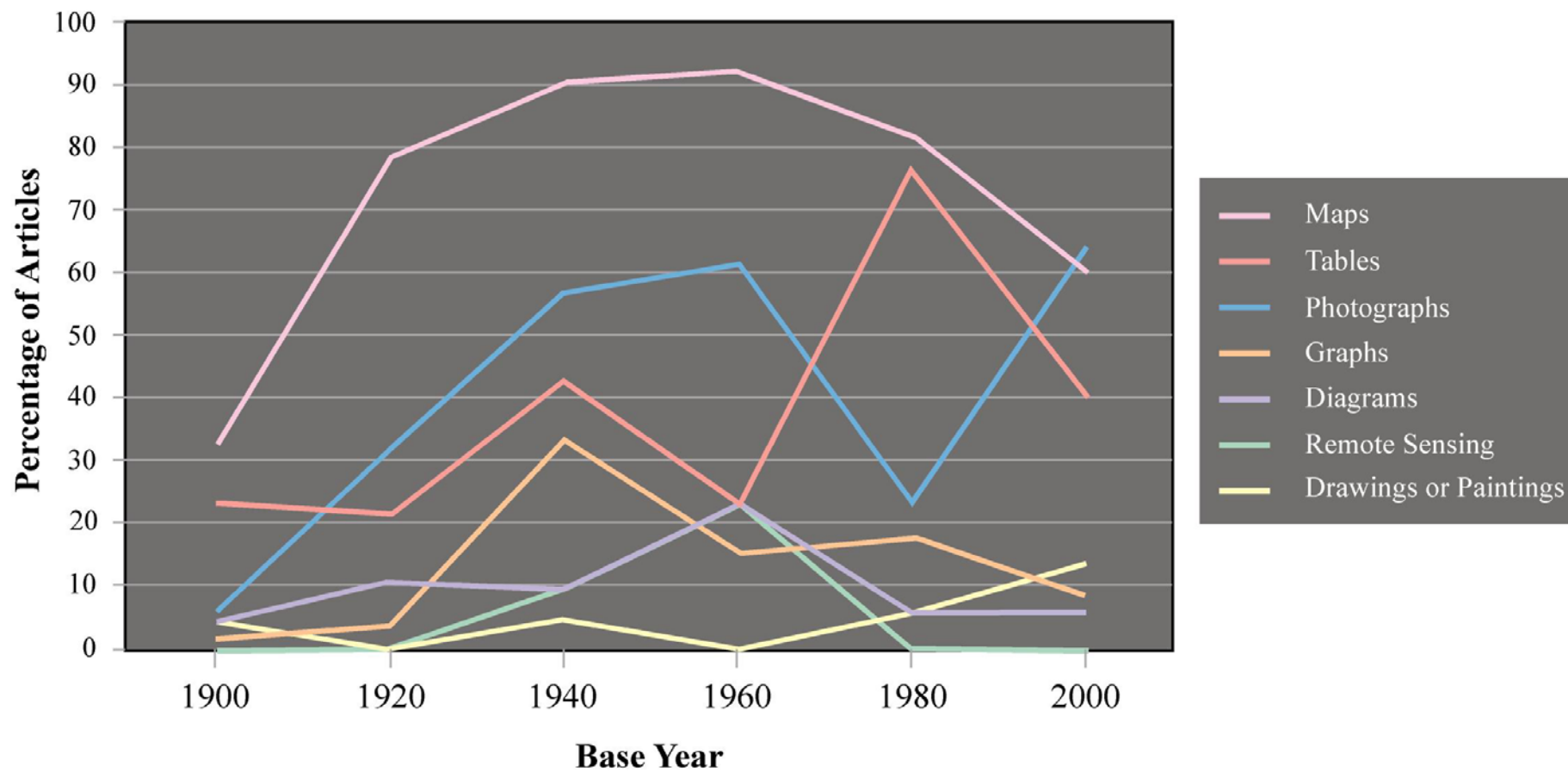


FIG. 6—African population of Bukoba District, 1957.

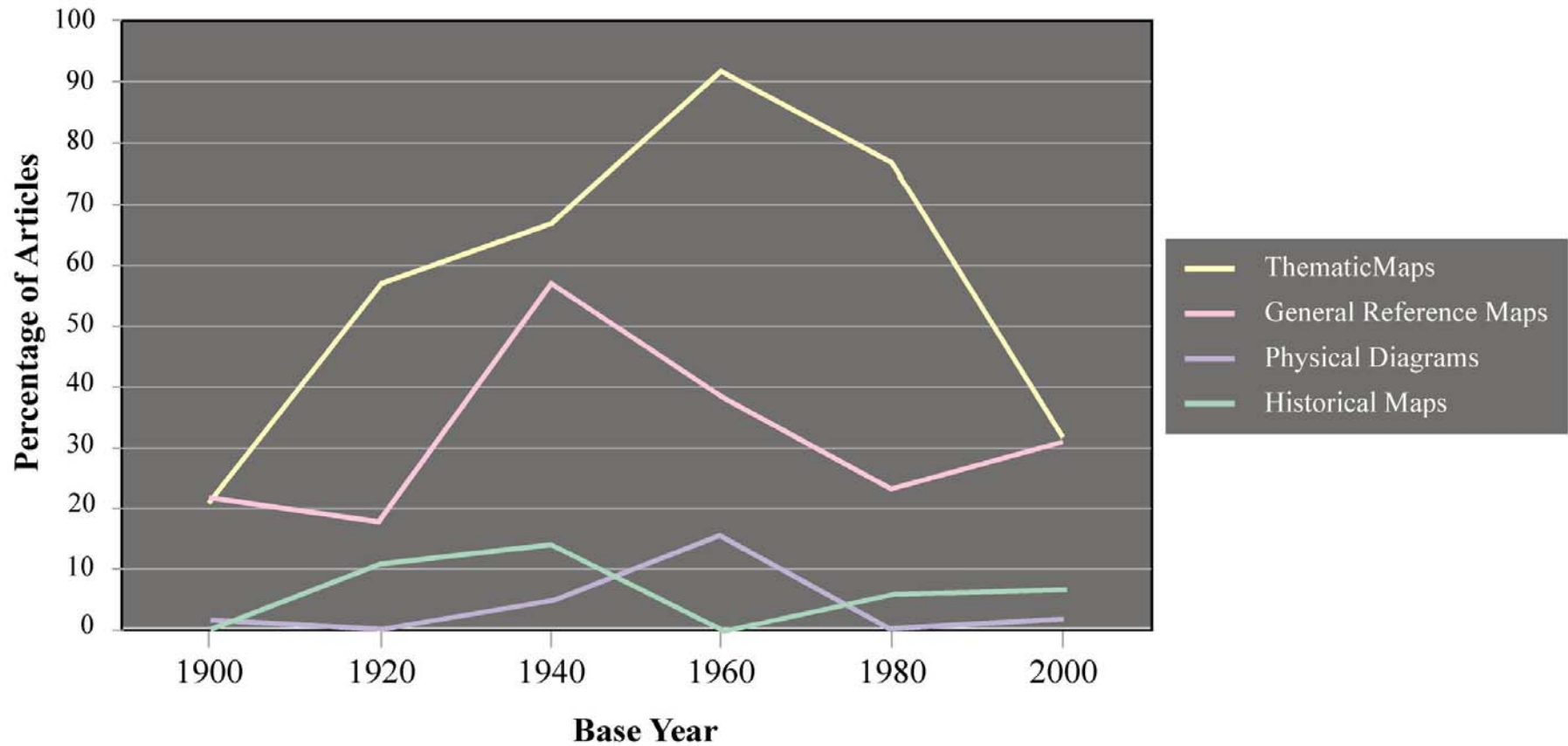
Overall Design of each map

With 1 being the worst possible designed map and 10 being the best possible designed map, how would you rate this map?

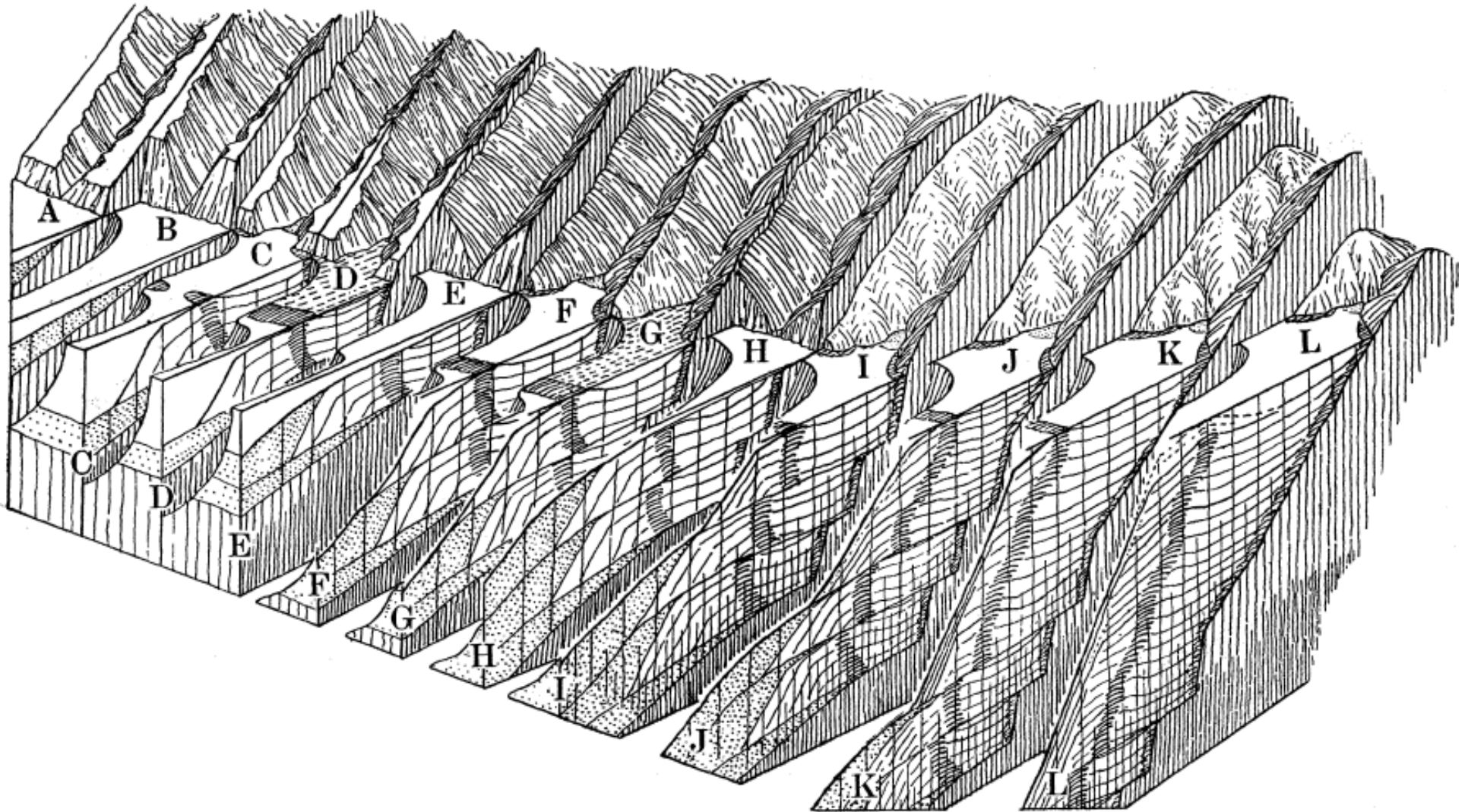
Frequency of Non-Text Material in the *Geographical Review*



Frequency of Basic Map Types in the *Geographical Review*

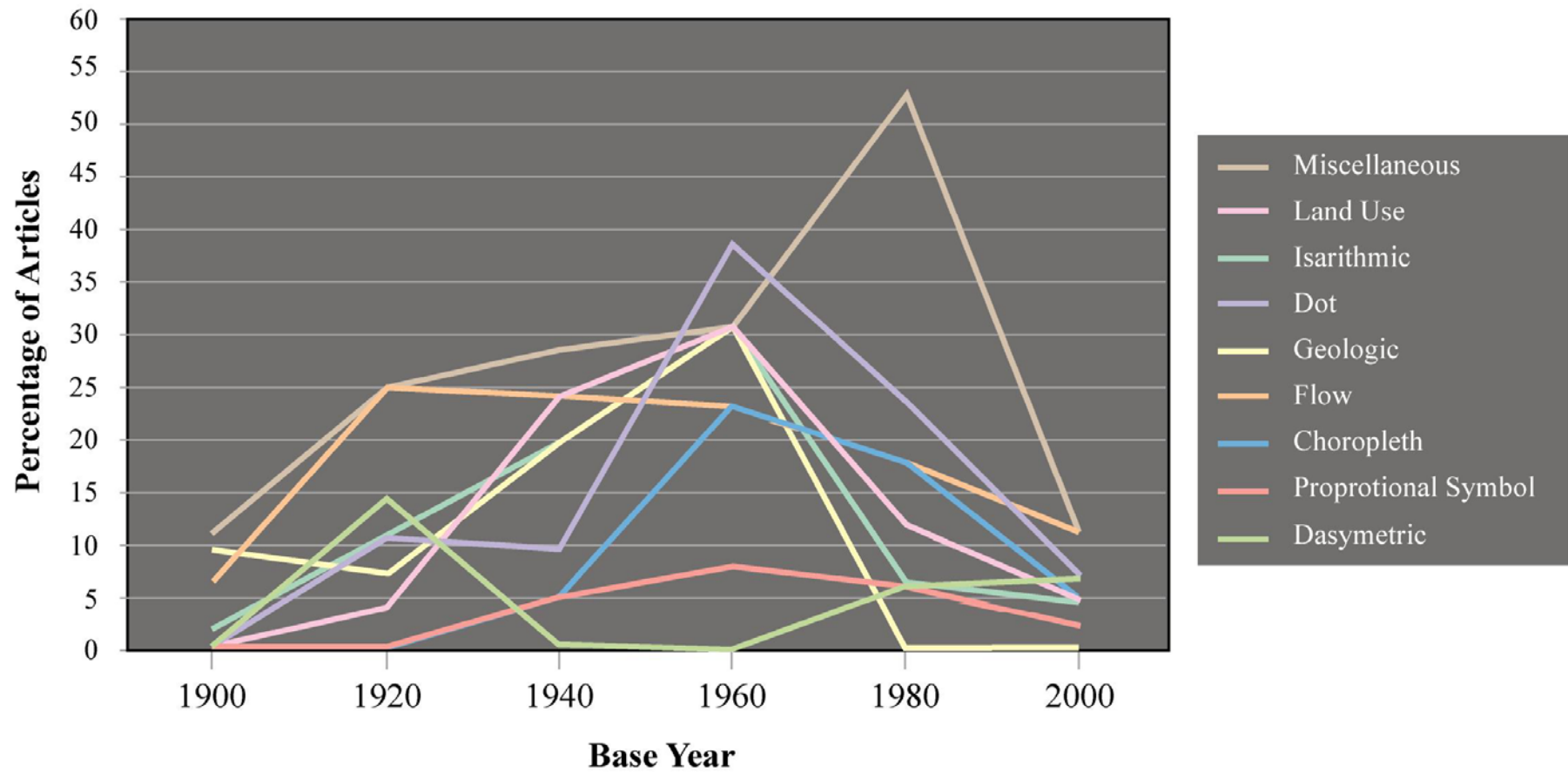


A Classic Physical Diagram

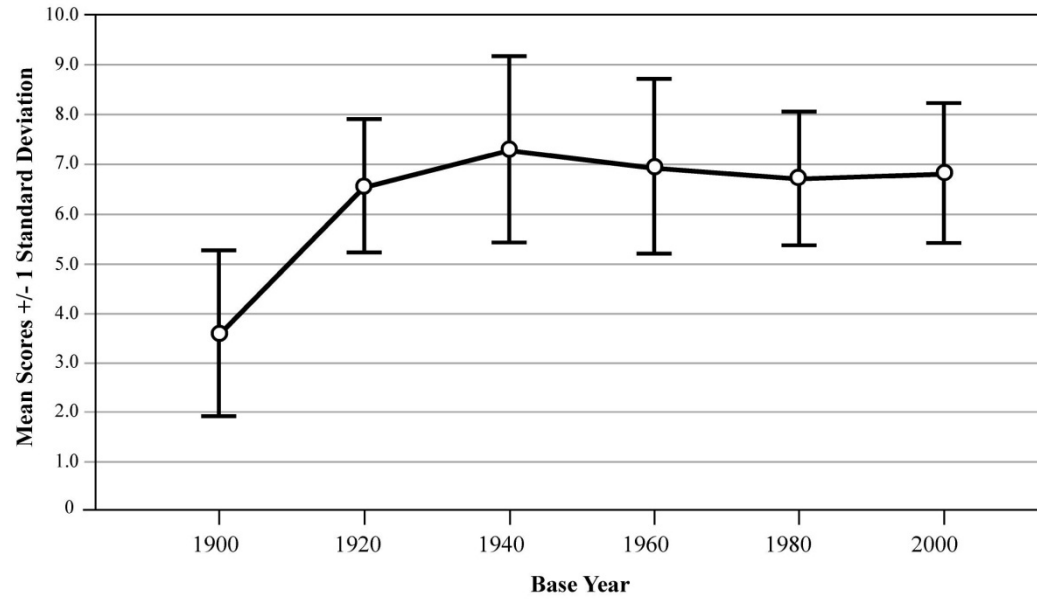


9. Twelve block diagrams showing successive stages in the evolution of shore features and reefs of a subsiding island. For explanation see note, p. 215.

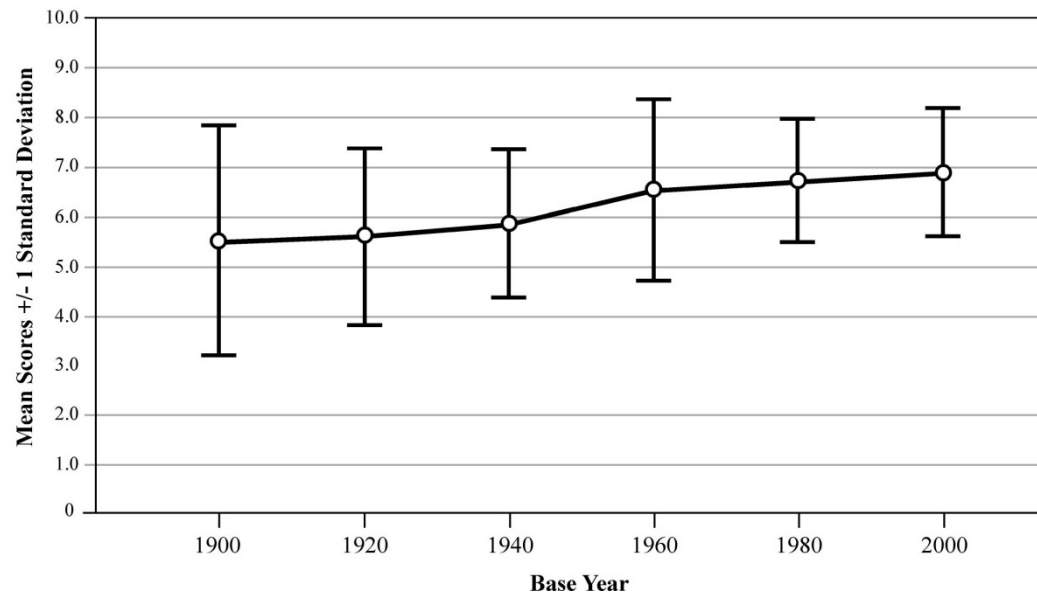
Frequency of Thematic Maps in the *Geographical Review*

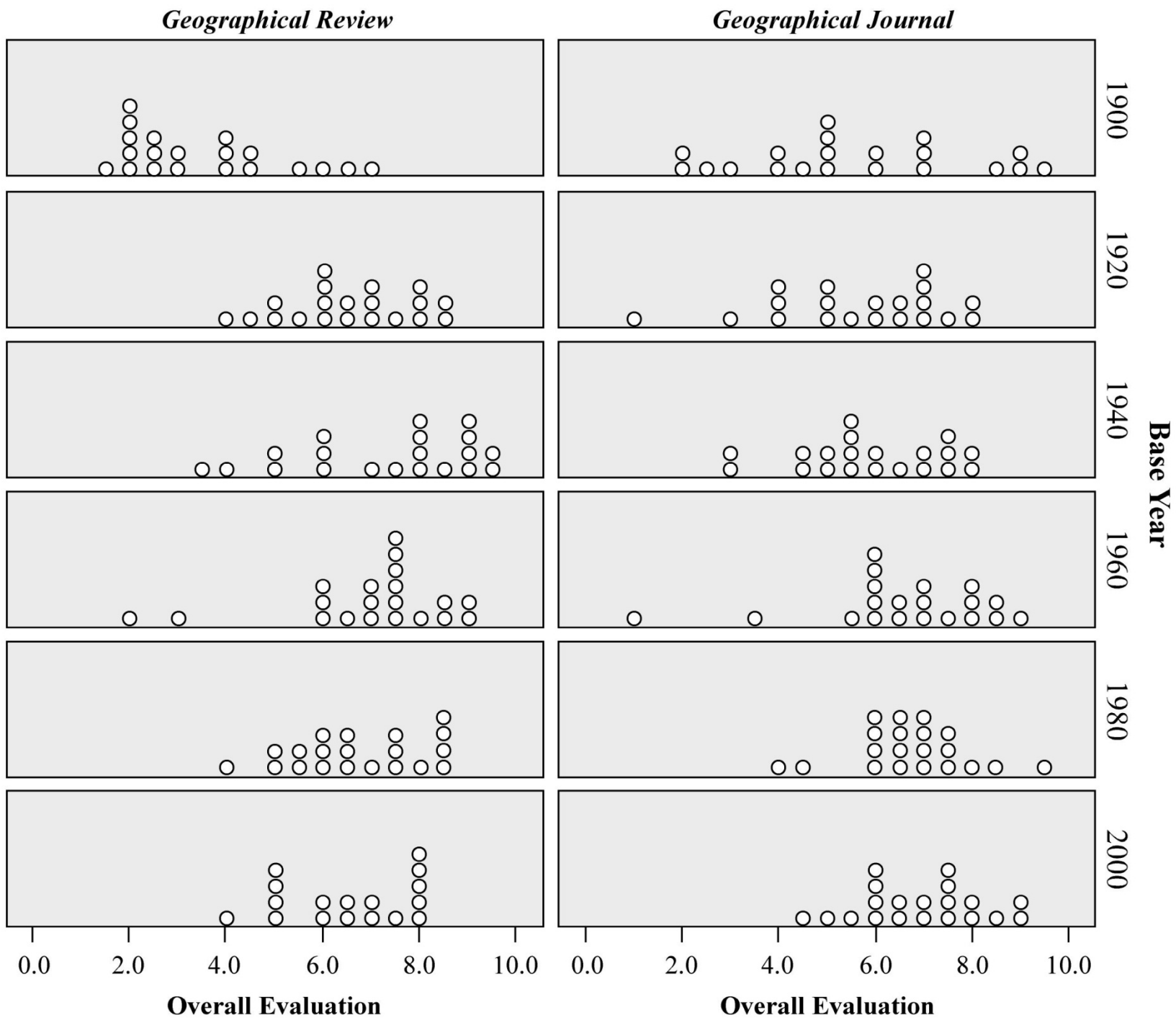


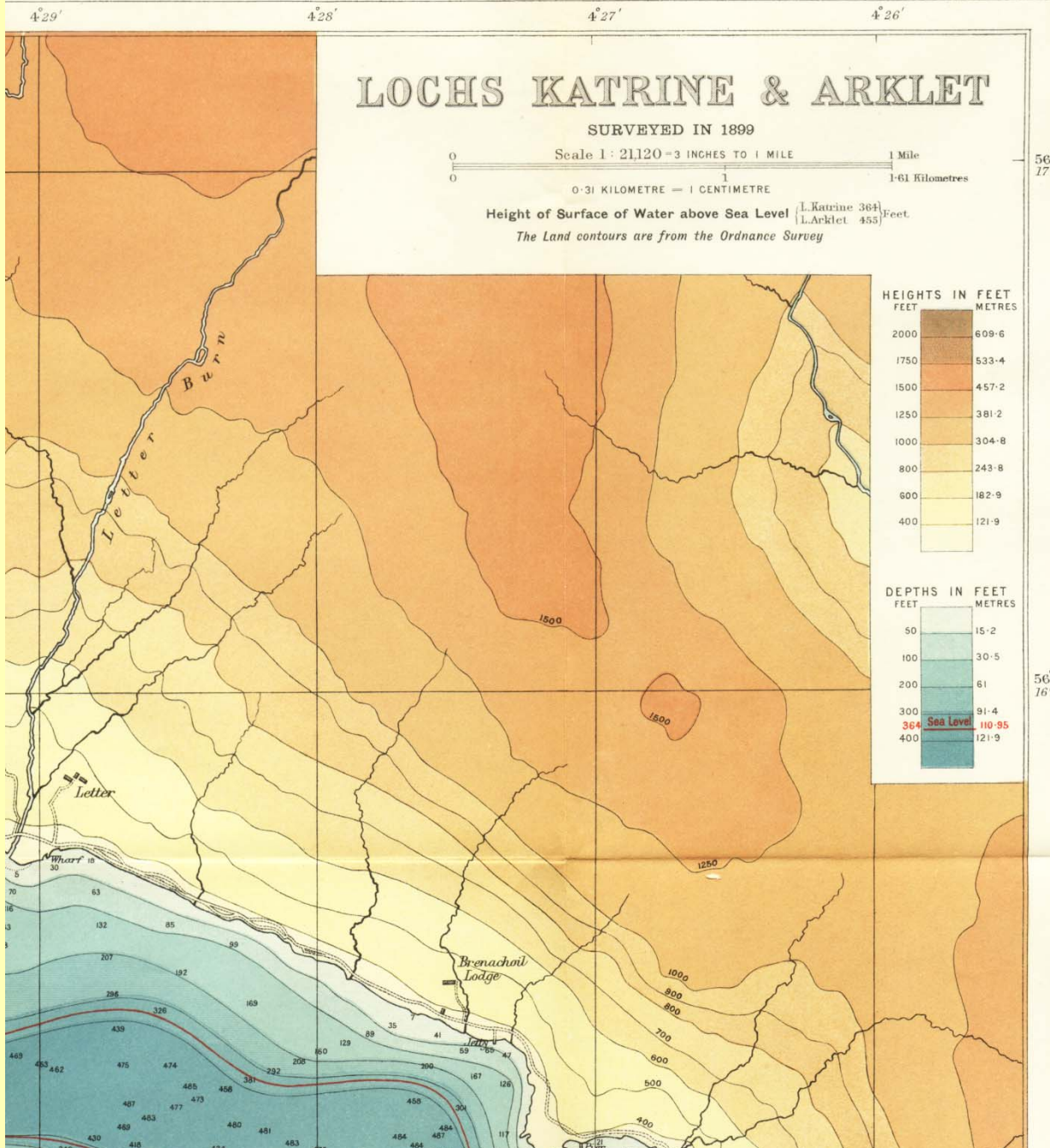
A Overall Map Design Scores in the *Geographical Review*



B Overall Map Design Scores in the *Geographical Journal*







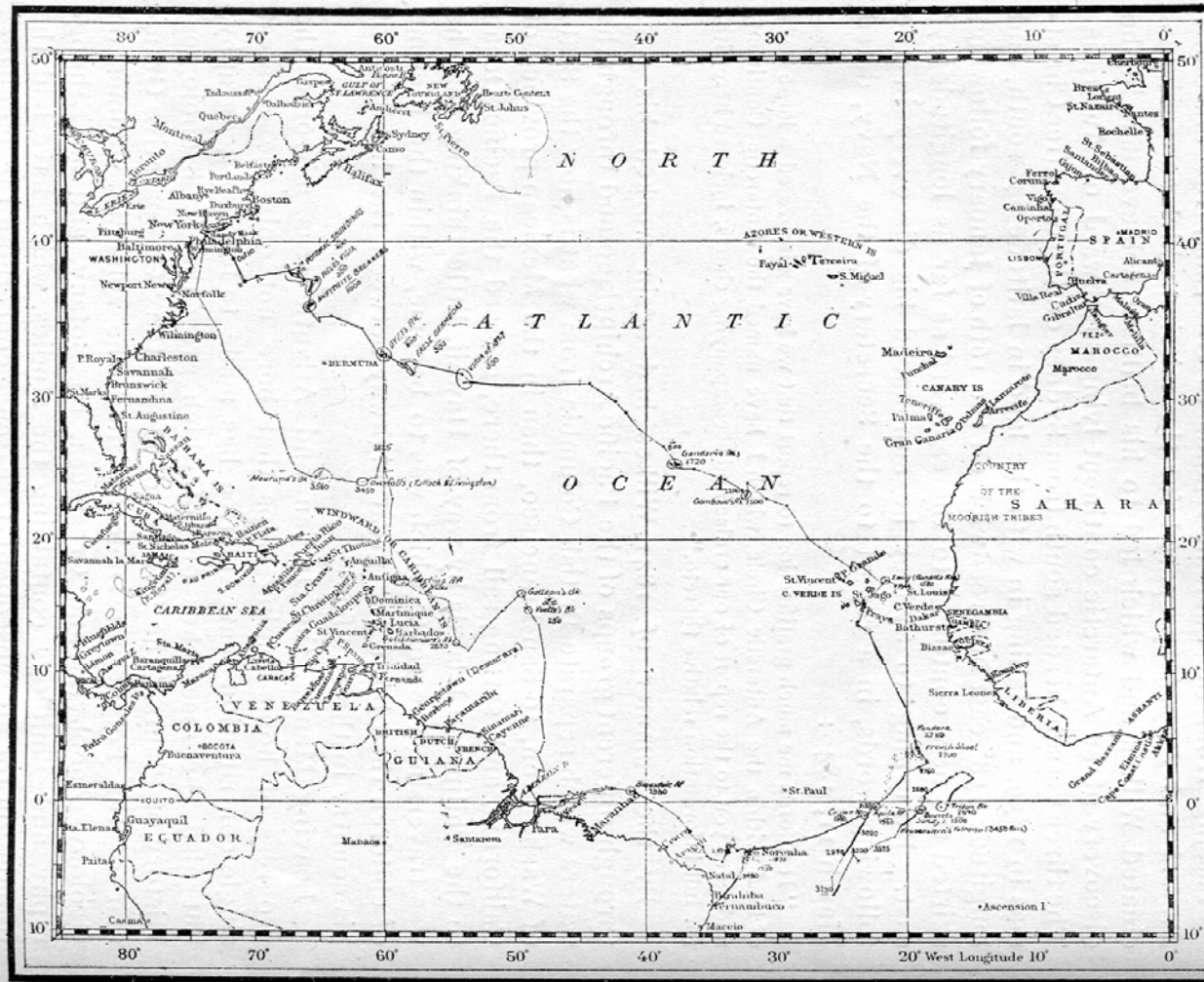
From Murray
(*Geographical Journal*,
1900 Map Insert)

Prob-values for the Gamma Statistic

	<i>Geographical Review</i>	<i>Geographical Journal</i>
Visual Hierarchy	0.010*	0.290
Readability	<0.001*	<0.001*
Logic of Symbology	0.007*	0.582
Legend Theme	0.207	0.016
Legend Title	0.678	0.174
Legend Design	0.103	0.056
Scale Meets Conventions	0.024	0.794
Map Projection	0.463	0.148
Title Directness	0.169	0.049
Map Referenced	0.070	<0.001*

*Significant using a modified Bonferroni correction developed by Hochberg (1988); the overall α was set to 0.15.

THE CRUISE OF THE U.S. BRIG DOLPHIN



From Littlehales (*Geographical Review* 1899, 130)

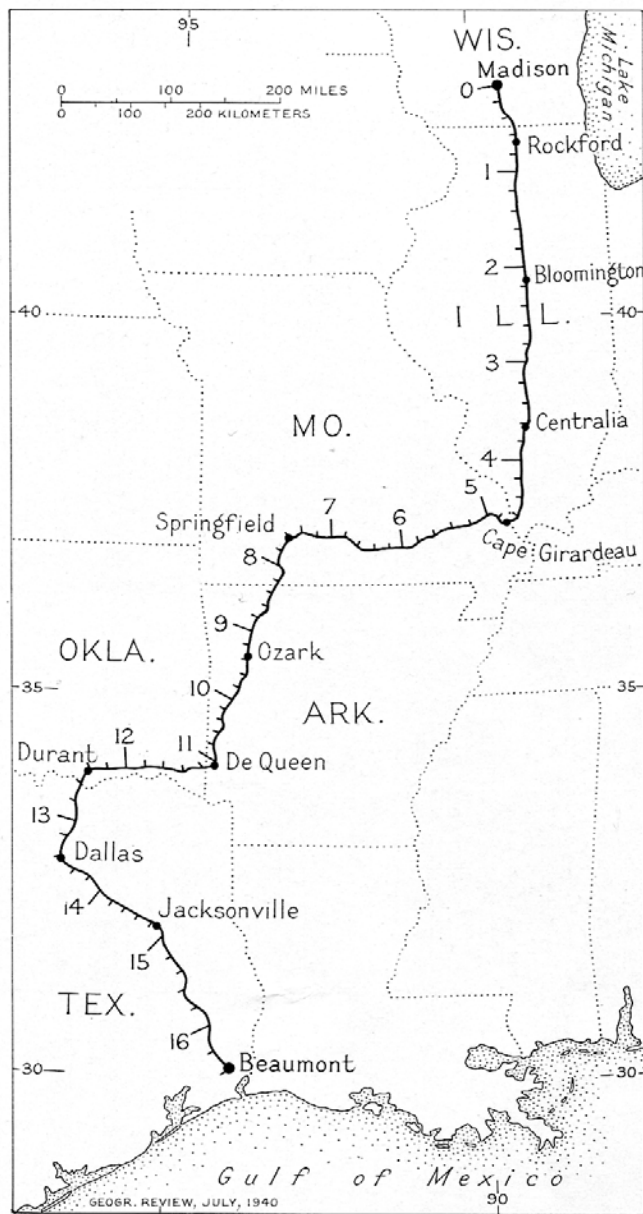


FIG. 1—Route of traverse described in text. The figures indicate distances in hundreds of miles from Madison. The 20-mile sections correspond to those shown on Figures 2-17.

From Finley and Scott
 (*Geographical Review* 1940, 413)

Prob-values for the Gamma Statistic

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Prob-values for the Chi-square Tests

	<i>Geographical Review</i>	<i>Geographical Journal</i>
Location of Title	<0.001*	<0.001*
Orientation	<0.001*	0.008*
Source	0.001*	0.060
Legend Presence	<0.001*	0.230
Legend Units	0.088	0.607
Location of Map Title	0.005*	0.644
Inset Map for Location	0.013*	0.203
Inset Map for Complex Areas	0.154	0.434
Scale Essential	<0.001*	0.073

*Significant using a modified Bonferroni correction developed by Hochberg (1988); the overall α was set to 0.15.

Conclusions

- Our analysis contradicts Michael Friendly's notion of a Modern Dark Ages from 1900-1950.
- We hypothesized that map design would improve over the twentieth century.
 - Not true for the *Review*
 - Only marginally true for the *Journal*
- Our statistical analysis could be strengthened with a larger sample of maps.
- Authors of journal articles need greater guidance in designing maps.

How Do We Assist Authors?

- Promote the importance of coursework in map design and associated software tools
- Develop a set of Web tutorials on key aspects of map design for journal articles

Thank you!