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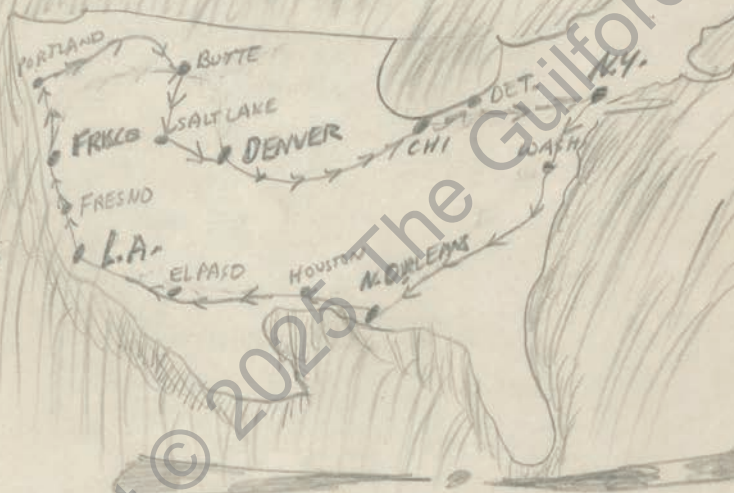
How is it made?

ON THE ROAD

Reverting to a
Simpler style —

Further draft &
beginnings —
Nov. 1949

ITINERARY & PLAN



- ① New York Jail
- ② Times Square I
- ③ Road to New Orleans
- ④ New Orleans
- ⑤ Road to Frisco
- ⑥ Frisco (+ Valley)
- ⑦ Road to Butte
- ⑧ Butte
- ⑨ Road to Denver
- ⑩ Denver

- ⑪ Road to New York
- ⑫ Times Square Again

From May to May

CHARACTERS

Red Moutrie	Mrs. Moutrie
Clem Lemke	Elena
Slim Jackson	Old Moutrie
Old Bull	Laura Moutrie
Dean Penney	Laurette
Marylou	And Various Shades
Evelyn Johnson	

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CHAPTER

4

Map Making Tools

The reason a map is being made suggests appropriate tools. Even if Jack Kerouac had access to GIS software, it would not have served him as well as the pencil he used for the maps he made while working on his Beat Generation bible, *On the Road*. Notoriously typed on a 120-foot scroll during a three-week creative outburst in 1951, this work was preceded by years of travel, note taking, draft making, and maps. The map here, from Kerouac's 1949 notebook "Night Notes," reimagines the second road trip described in the book. The pencil, with its ease of use, erasability, and low cost is a great map making and thinking tool. But GIS software can be, too. Choose appropriate tools based on what you need to do.

Making Maps without Computers

You certainly don't need a computer to make maps. Indeed, map making with pencils and paper is appropriate, inexpensive, and effective in many instances. A sketch map made with pencils and paper may be your final map, or it may be a vital step in the process of producing a map with other tools. Jack Kerouac's hand-drawn map helped him envision *On the Road*. Visual thinking and discovery are not limited to any specific map making tools.

Old-school mapping tools. Back when the Voyager map was made (1987), the map making tools of choice were lighted drafting tables, scribes, technical pens, peel-coat film, and stick-up type (right). Within five years such tools would be replaced by computers, software, digitizing tables, scanners, and mice. Map making tools change quickly, but map design principles should transcend these changes.



Empower without power. Computer mapping doesn't work when you don't have a computer. Sketch mapping (left), in this case in the Philippines, engages community members in compiling cultural and economic resources. In parts of the world, computers, computer skills, and electricity may not exist. Sketch maps are as useful as their computer counterparts and certainly may be digitized for use on the computer.

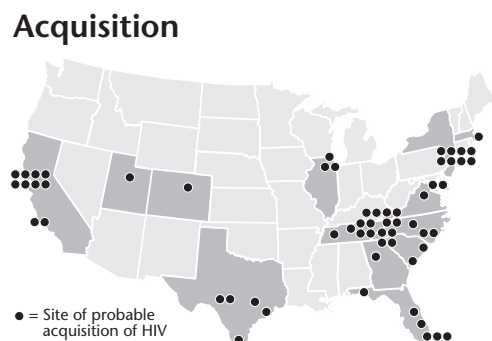
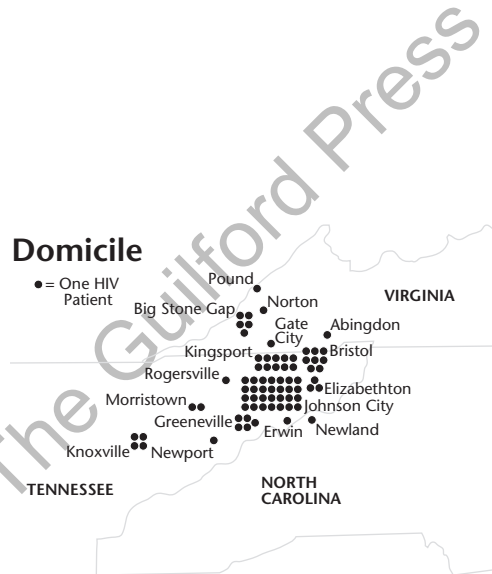
Win the election. Volunteers for the Democratic presidential candidate go door to door in a key city in a swing state. Using a map printed from an internet site and a pen, they mark their opponent's supporters as an X and their supporters as an O. A filled O means a supporter who may not vote (such as an elderly person with no transportation). Addresses and phone numbers of these supporters are entered into a spreadsheet. These people will be called on election day, urging them to vote and offering them transportation to the polls.



Sketch and discover. Abraham Verghese used maps to help think about his HIV-infected patients. Dr. Verghese practiced medicine in rural Tennessee. He and his colleagues were stunned when HIV-infected patients began to dominate their practices. What was this urban problem doing in rural Tennessee? “There was a pattern in my HIV practice. I kept feeling if I could concentrate hard enough, step back and look carefully, I could draw a kind of blueprint that explained what was happening here...” Dr. Verghese borrowed a map of the U.S. from his son. With the map spread on his living room floor, he marked where his HIV patients lived. He labeled the map Domicile, but he could have called it “Birthplace,” for most of his patients were men who had come home to die.

Dr. Verghese next mapped where his HIV patients lived between 1979 and 1985. The places on the Acquisition map “seemed to circle the periphery of the United States” and were mostly large cities. “As I neared the end, I could see a distinct pattern of dots emerging on this larger map of the USA. All evening I had been on the threshold of seeing. Now I understood.” Dr. Verghese learned of a circuitous voyage, a migration from home and a return, ending in death. It was “the story of how a generation of young men, raised to self-hatred, had risen above the definitions that their society and upbringing had used to define them.”

The maps Verghese made on his living room floor with pencils and paper (and redrawn here) might not be much to look at, but the thinking they inspired was invaluable.



Making Maps with Computers

Most maps are made with computers and software. Geospatial software imports or creates data and maps referenced to a coordinate system (such as latitude and longitude). Making maps means making diverse software work together. Mapping software changes constantly. Online discussion forums and conferences are vital for serious mapmakers.

Mappable Data

Geospatial data sources provide data with geographic coordinates, data that can be matched (such as addresses) or joined to geospatial data (such as FIPS codes).

Open Source data: OpenStreetMap, Natural Earth, USGS Earth Explorer, Copernicus Open Access Hub, NASA Earthdata Search, United States Census Bureau

Commercial data: ESRI ArcGIS Living Atlas of the World, DigitalGlobe, Airbus OneAtlas, Google Earth Engine, Policymap

Mapping Software

Geographic Information Systems (GIS) capture, store, analyze, manage, and present spatial or geographic data. Such software typically runs on a desktop or laptop computer or server.

Open Source: QGIS, GRASS

Commercial: ArcGIS, MapInfo

Remote sensing software analyzes raster data collected by satellites, aerial photography, drones, and other remote sensing technology. Such image analysis is computationally demanding.

Open Source: Orfeo Toolbox (OTB), SNAP

Commercial: ENVI, Erdas Imagine

Global Positioning Systems (GPS) generate geographic data from coordinated earth/satellite system. GPS software processes GPS data for use in other software.

Open Source: GPSTools

Commercial: Garmin Base Camp

Programming languages allow customization of geospatial software and the development of mapping applications.

Open Source: Python, JavaScript, SQL (databases)

Commercial: C++, C#,

Online mapping sites provide online geographic data for navigation and general reference with a few basic GIS, GPS and mapmaking functions.

Open Source: OpenStreetMap

Commercial: Google Maps, Google MyMaps, Google Earth, Apple Maps

Web mapping software help create, display, and interact with web maps, typically with scripting languages and libraries of map app elements.

Open Source: Leaflet, Open Layers

Commercial: Map Box, ArcGIS Online

Bridge Software transfers GIS (spatial) data to graphic design software.

Commercial: ESRI Adobe Interface, MAPublisher, Geographic Imager

Graphic design software imports maps created with other geospatial software for further design, layout, and preparation for printing, the web, and other media. Maps typically lose their coordinates when imported into such software.

Open Source: GIMP, Inkscape, Krita

Commercial: Adobe Illustrator, Photoshop, InDesign, CorelDraw

Discussion Forums and Conferences

GeoNet - Esri Community

Geospatial World Forum

GIS Lounge Forum

GIS Stack Exchange

OpenStreetMap Forum

Reddit - r/gis

The Spatial Community

ESRI User Conference

International Cartographic Association

International Conference on Cartography and GIS

NACIS: North American Cartographic Information Society

State of the Map Conference

Workflow

Workflow is a specific map's creation process: initial conception, planning, data gathering, appropriate tools, design, and completion in the intended medium. Workflow is related to the broader map making process, reflected in the order and content of chapters in this book. Any mapping project requires drawing ideas from the general map making process and applying them strategically to a specific workflow. Professional project managers coordinate all these aspects of workflow and the people involved in the process. Nat Case helped to develop these workflow guidelines.

Workflow requires strategically refining the general map making process to fit your specific map.

Workflow requires thinking about the end of the process at the beginning. When does the map have to be finished? What is your deliverable? A digital file to a printer for a book? Publication on the web? Printed on laser printer? Are there intermediate milestones with their own deadlines, and how are they structured?

Workflow is often (but now always) collaborative. Who asked you to make the map? Are you clear on all their expectations? Who can help with data? Who can help with software? Who helps with the final map (say, a professional printer, or webmaster if the map is online). If you are part of a group working on a larger project, yours is one of multiple workflows: how does your workflow contribute to the broader group workflow?

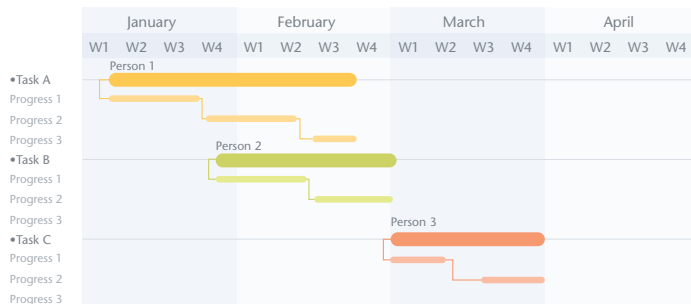
Workflow is an interactive process. For each project, engage in trial and error and be prepared to make adjustments to reach your final goal. Seek feedback and constructive criticism along the way.

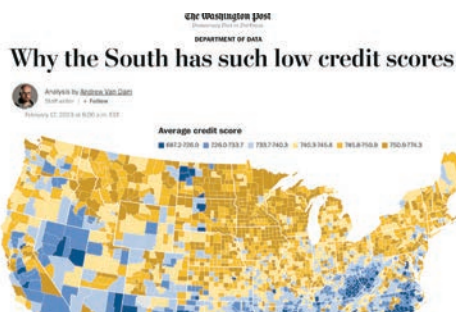
Workflow is a learning process. Throughout a project (and career) you'll learn about new kinds of data, software, and techniques. Check online videos, discussion forums and presentations by pros at conferences. *Workflow requires knowing when to depart your comfort zone. Be flexible.*

Workflow subdivides your efforts. Workflow requires splitting your project into sections (possibly layers in software), usually linked to specific data sources, each of which will require different kinds of acquisition strategies, processing via software, organization, design, and finalizing as part of the final map. Consider which subdivided section can run simultaneously, and which sequentially.

Workflow should be documented, for the future. Workflow documentation can be as simple as sources documentation, software documentation, process outline, and linking of final layers to specific sources. Basic question: who is this documentation for, and what do you need to include for them to understand details of your workflow?

Serious project managers use a Gantt Chart to map out workflow and guide people and projects





That's a cool map. As a client of (and author for) Guilford Publications, Denis and I are responsible for new editions of this book, *Making Maps*. That means keeping an eye out for cool mappable data: like this county level map of US credit scores. I'll need to remake this map for the book: the next step is to find the data.

Where's the data? "Source: Sumit Agarwal, Andrea Presbitero, André Silva and Carlo Wix" led me to a paper with some maps, but no data. Hmm. Might be easier to contact the author of the *Washington Post* article, Andrew van Dam.



Analysis by [Andrew Van Dam](#)
Staff writer | + Follow

February 17, 2023 at 6:00 a.m. EST

Help arrives. Andrew responded. He got the data from the U.S. Federal Reserve Board, who were responsible for the data used in the study. The FRB forwarded the data to me, as a spreadsheet.

	A	B
1	county_fips	fico_bucket
2	1001	2
3	1003	3
4	1005	2
5	1007	1
6	1009	2
7	1011	1
8	1013	2
9	1015	2
10	1017	1
11	1019	3
12	1021	2
13	1023	1
14	1025	2
15	1027	2
16	1029	1
17	1031	2
18	1033	2

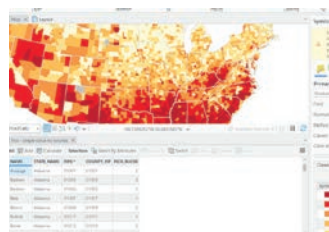
Editing data for ArcGIS Pro. In Excel, I converted the FIPS column to text and added a 0 before the four digit county FIPS codes to help the join in ArcGIS Pro.

	A	B
1	FICO Bucket	Range
2	1	687.2-726.0
3	2	726.0-733.7
4	3	733.7-740.3
5	4	740.3-745.8
6	5	745.8-750.9
7	6	750.9-774.3

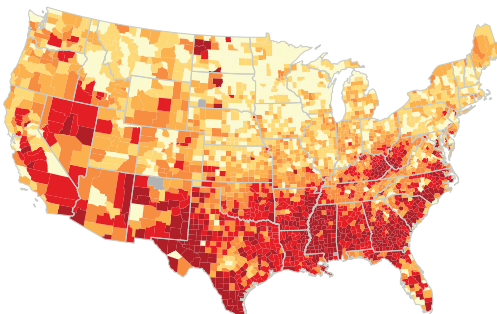
Joining spreadsheet, classifying, and color in ArcGIS Pro. The data were already classified into "buckets" so I used the FRB's classification. Colors came from an orange range provided in the software.

Export to Adobe Illustrator. The ArcGIS Pro Adobe export option did not work, so I saved as a vector PDF and emailed it to my Mac. That worked!

Once in Illustrator, I adjusted the colors and line weights based on my documented specs.



InDesign to the Printer. The map was placed into InDesign where this book has been designed and constructed. I'll send all the files to William at Guilford and he'll prep the files and export them for the printer of the book.



Artificial Intelligence

ChatGPT: Artificial intelligence (AI) refers to the development of computer systems that can perform tasks that typically require human intelligence. These tasks include learning, reasoning, problem-solving, perception, language understanding, and decision-making.

JBK: How will AI impact map design?

ChatGPT: AI will have a profound impact on map design, influencing how maps are created, customized, and presented.

Automated Map Layout: AI algorithms can automatically arrange map elements such as labels, symbols, and legends in a visually pleasing and organized manner. This can save time for cartographers and improve the overall aesthetics of the map.

Dynamic Styling: AI can adapt map styles based on user preferences or the specific context of use. For example, an AI-powered map might adjust its color scheme and visual representation to match a specific theme or cater to individuals with color vision deficiencies.

Personalized Maps: AI can create maps tailored to individual users or specific target audiences. By analyzing user data and preferences, AI can generate maps that highlight relevant points of interest or provide information based on the user's interests and needs.

Style Transfer: AI can transfer map styles from one map to another. This means a map designer could take the aesthetic elements from a well-designed map and apply them to a new map, maintaining a consistent visual identity across different projects.

Data-Driven Design Decisions: AI can analyze large datasets to identify patterns and correlations that can inform map design decisions. For instance, AI might determine the most effective way to display a particular dataset to enhance understanding and insights.

Real-Time Map Updates: AI can dynamically update map information in real-time, ensuring that the map remains current and relevant. This is especially useful for digital maps that are frequently updated with live data, such as traffic conditions or weather information.

Context-Aware Maps: AI can analyze user context, such as location and time of day, to provide maps with contextually relevant information. For instance, a map app could display nearby restaurants during lunchtime.

Automated Data Integration: AI can assist in integrating diverse datasets into maps seamlessly. By understanding the relationships between different data sources, AI can help create more comprehensive and informative maps.

Natural Language Interaction: AI-powered map design tools may allow designers to interact with the software using natural language, making it easier to specify design preferences and customize map elements.

Enhanced 3D Mapping: AI can improve the design of 3D maps by automatically generating realistic terrain models and rendering textures, leading to more immersive and visually appealing representations.

Despite these advantages, it's crucial for map designers to retain creative control and ensure that the AI-generated maps align with the intended purpose and user experience.

Whereas maps, like guns, must be accurate, they have the additional advantages that they are inexpensive, don't require a permit, can be openly carried and used...

Bernard Nietschmann, "Defending the Reefs" (1995)

...The Indians are very expert in delineating countries upon bark, with wood coal mixed with bear's grease, and which even the women do with great precision.

John Long, *Voyages and Travels* (1791)

A little instruction in the elements of cartography – a little practice in the use of the compass and the spirit level, a topographical map of the town common, an excursion with a road map – would have given me a fat round earth in place of my paper ghost.

Mary Antin, *The Promised Land* (1912)

A traveller would bring his judgment in Question who should despise the Directions of his Map for want of real Roads in it, because here stands a Dott instead of a Town, or a cypher instead of a City, and it must be a long Day's journey to travel thro' two or three inches.

From a letter to *The Spectator*, no. 593, Monday 13 September 1714.

Kim: You suck at drawing, don't you?

Scott: Maps are hard! I could draw it really good if it was a sheep.

Bryan Lee O'Malley, *Scott Pilgrim vs. the World* (2005)

More...

Older map making texts are all about making maps with feet, eyeballs, pens, and paper. Erwin Raisz published the first in English in 1938, *General Cartography*. In 1962 he published *Principles of Cartography*. Both amply exhibit his ability at landform mapping, many of which are still in print. Another classic, very much still being used, is David Greenwood's *Down to Earth: Mapping for Everybody* (1944), republished as *Mapping* (1964). Few of the maps in Wood's *Everything Sings* (2013) were made with a computer (the atlas provides production notes for all its maps). Few parish maps are made with computers.

While not necessary, most of you will be making your maps on computers. Billions and billions of manuals and guides and websites explain how to use GIS software, and web mapping sites are usually easy to use without much guidance. Thoughtful GIS books include Nicholas Chrisman, *Exploring Geographical Information Systems* (2001); Francis Harvey, *A Primer of GIS* (2016); and Paul Longley, Michael Goodchild, David Maguire, and David Rhind, *Geographic Information Science and Systems* (2015).

Sophisticated map making and analysis tools can be free. Check out QGIS (www.qgis.org), a full-function GIS and mapping software package, free and open-source, available for multiple operating systems. For learning programming for web maps, get out of this paper book and onto the web. Of particular coolness is the University of Kentucky's *New Maps Plus* (newmapsplus.uky.edu).

For an engaging overview of maps and graphs in action, helping to figure stuff out, see Howard Wainer, *Graphic Discovery* (2005).

Mark Monmonier's thought-provoking books are full of stories about how maps do their work in the world: *Cartographies of Danger: Mapping Hazards in America* (1997), *Air Apparent: How Meteorologists Learned to Map, Predict, and Dramatize Weather* (1999), *Bushmanders and Bullwinkles: How Politicians Manipulate Electronic Maps and Census Data to Win Elections* (2001), *Spying with Maps: Surveillance Technologies and the Future of Privacy* (2002), *From Squaw Tit to Whorehouse Meadow: How Maps Name, Claim, and Inflamm* (2007), *Coast Lines: How Mapmakers Frame the World and Chart Environmental Change* (2008), *No Dig, No Fly, No Go: How Maps Restrict and Control* (2010), and *Lake Effect: Tales of Large Lakes, Arctic Winds, and Recurrent Snows* (2012).

Sources: Jack Kerouac map reproduced by permission of SLL/Sterling Lord Literistic, Inc. Copyright by John Sampas, Literary Representative. Sketch mapping photo courtesy of the *Participatory Avenues* website (iapad.org). Dr. Verghese's AIDS data from Abraham Verghese, *My Own Country: A Doctor's Story* (Vintage, 1994) and "Urbs in Rure: Human Immunodeficiency Virus Infection in Rural Tennessee" (*Journal of Infectious Diseases*, 160:6). Workflow content developed with Nat Case (www.incasell.com). Gantt Chart recreated from www.freepik.com. Credit score map and data from Andrew van Dam. "Why the South has such low credit scores." *Washington Post*, Feb. 17, 2023.

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