

The American School Atlas: 1784 – 1900

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At the end of the eighteenth century, American school atlases and geographies were created by individual authors who would search for a printer willing to publish their work. By the middle of the nineteenth century, millions of school atlases were being produced by large mapping corporations with sophisticated marketing strategies. This paper discusses the forces which influenced the evolution of the American school atlas and geography text between the years 1784 and 1900, including changes in printing technology and paper, the competitive commercial market, prevailing pedagogies of the American educational system, and the rise of thematic mapping. Elements of cartographic design which were typical of American school atlases are also examined. These include data symbolization, level of generalization, and choice of projection.

Keywords: school atlases, cartographic history, map design

INTRODUCTION

This paper presents a brief overview of the publication history and design of maps found in American school atlases and geographies from 1784 to 1900. Apart from the Bible, the most widely read books of the nineteenth century were schoolbooks, and among the most common of these were school atlases and geographies (Elson, 1964).

Virtually any atlas could be used as a school atlas; however, for this study the only atlases reviewed were those which stated explicitly in their title or preface that the intended audience was school children. Many school atlases were reprinted year after year with only minor changes, yet listed as a new edition. For example, Jesse Olney's *School Atlas to Accompany the Practical System of Geography for Schools and Families* went through 91 editions between 1829 and 1860. As a marketing tool, publishers often produced "state editions" of their standard school atlas by simply appending a few pages of text and a map or two concerning an individual state. For the purpose of this study, state or new editions of an atlas were reviewed only when there appeared to be significant changes from earlier versions. Biblical and historical atlases, though frequently used by the schools, were not considered. In all, 148 school atlases or geography texts with maps were examined. Almost all of the atlases evaluated are part of the collections of the Newberry Library in Chicago, the New York Public Library, or the Library of Congress.

For each atlas, the number and size of maps, areas of the world portrayed, types of non-map illustrations, method of printing, and the intended audience were all recorded. Map themes and cartographic design elements, including methods of data symbolization, choice of projections, and level of generalization, were examined. Also noted was the inclusion of map skill exercises, question sets, glossaries, and advice to teachers or students on using the atlas.

In general, school atlases were inexpensive, of moderate dimensions, had a limited number of pages and were cheaply reproduced and bound. They were in no way reflective of the highest form of the atlas makers craft. However, it could be fairly argued that the school atlas influenced how the average citizens of our nation came to know the world to a much greater degree than did the large masterpieces of the nineteenth century American atlas makers.

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Prior to the American Revolution, all geography texts which circulated in the American colonies were published in Europe. One of the most popular for young children was an English translation of Jean Marie Bruyset's *Atlas des Enfants* (1774), while Englishman William Guthrie's geographies (1770 and 1780) were widely used for the instruction of older students. After the Revolution, a fledgling publishing industry began in the former colonies, with centers in Boston, New York, Hartford, and Philadelphia. The first geography text published in the United States was Jedidiah Morse's *Geography Made Easy*. Morse published the small volume while he was a student at Yale University in 1784. According to the prefatory advertisement of his first edition, he originally intended it "... as a manuscript only, for the use of schools under his immediate instruction". However, after showing the work to several "worthy gentlemen" he was induced to refine the work and make it generally available (Carpenter, 1963). The book gained rapid acceptance and for over a quarter of a century remained the most popular geography text on the market. *Geography Made Easy* contained only two maps, one of the world and one of the United States. In later editions the map of the United States was replaced by a map of North America. The maps, 7 3/8 inches by 5 3/4 inches, were folded and tipped into the small volume (Figure 1). Their design and content was essentially the same as maps produced for adult geographies of the day. In spite of its popularity, the Morse text was widely criticized for the number and quality of its maps, a criticism that Morse himself shared.

In the same year that Morse's geography first appeared, Mathew Carey immigrated from Ireland and established a publishing house in Philadelphia. Unlike the European cartographic houses of the same period, Carey subcontracted virtually all phases of map production, including compilation, design, and engraving—a model that would be emulated by many others in these early days of American cartographic publishing (Harley, 1977).

In 1794, Carey published an American edition of Guthrie's *Modern Geography* as a "present" to his new homeland. In his preface to the new edition Carey wrote:

An American edition of this work had long been wanted: and the publisher was of the opinion, that he could not give a more useful or acceptable present to the citizens of the United States. But, upon close examination, he very soon discovered, that the grammar, which had been so long, and so loudly celebrated, united in many passages, almost every fault that can disgrace a literary composition. The book was exactly calculated to flatter the grossest prejudices of the English nation at the expense of every other part of the human species.

Carey attempted to remedy the failings of Guthrie's version of geography. He reduced the section on England from 205 to 130 pages, and still apologized for its length. As for Guthrie's review of the United States, Carey stated that it was so filled with errors that "It would have been more for the honour of the work, had the account of the United States been omitted altogether" (1794, preface). To rectify this slight to his new homeland, Carey wrote an entirely new and much longer section on the United States. In the end, Carey's edition of *Modern Geography* so differed from Guthrie's original and held such a decidedly democratic view of the world that it should be considered among the first truly American geographies, even though it retained Guthrie's name as author.

PUBLICATION HISTORY OF THE
AMERICAN SCHOOL ATLAS,
1784-1900

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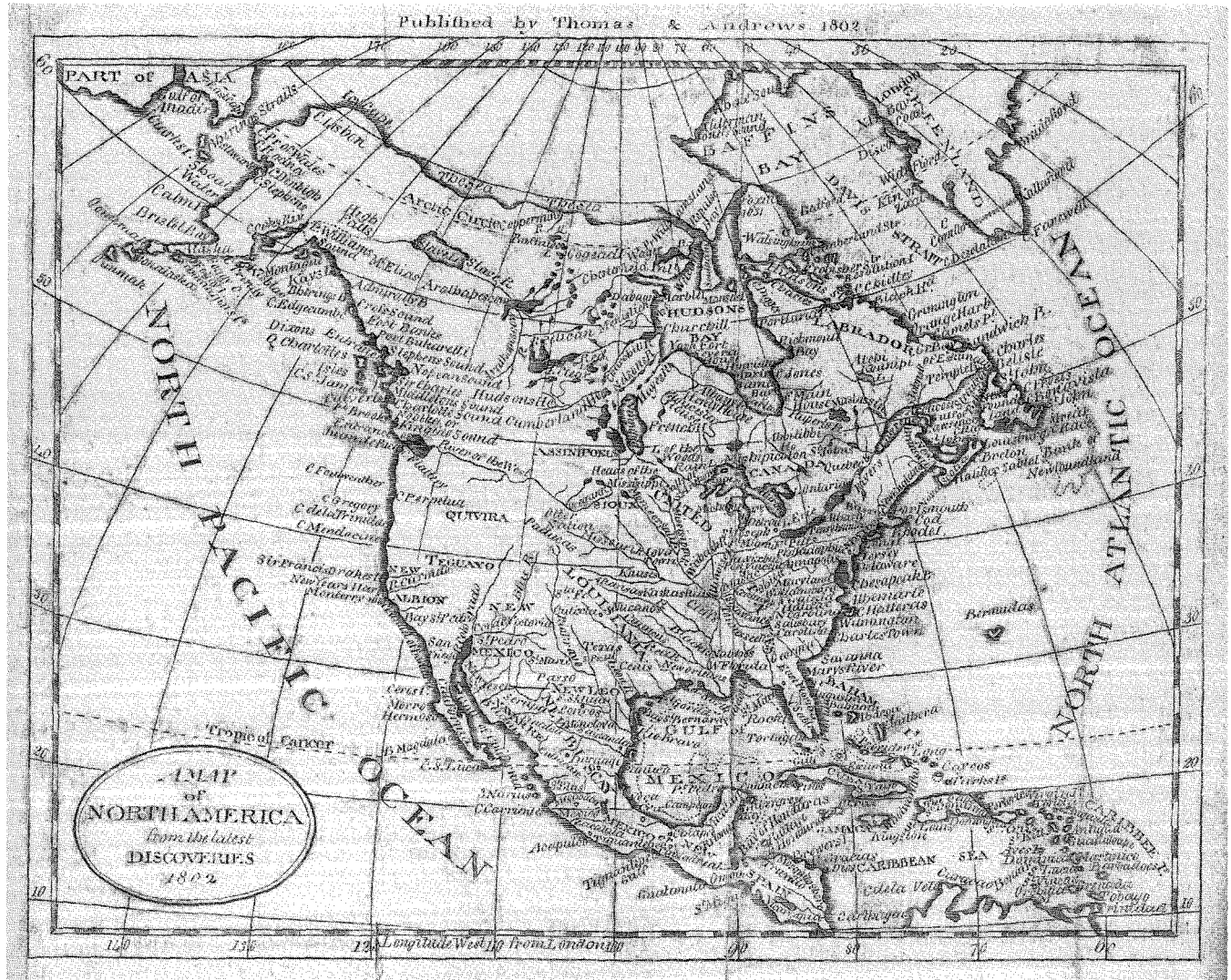


Figure 1. One of two maps found in Jedidiah Morse's *Geography Made Easy* (1802). The map, 7 3/8 by 5 3/4 inches, was folded and tipped into the text. In design the map appears similar to adult maps of the same period.

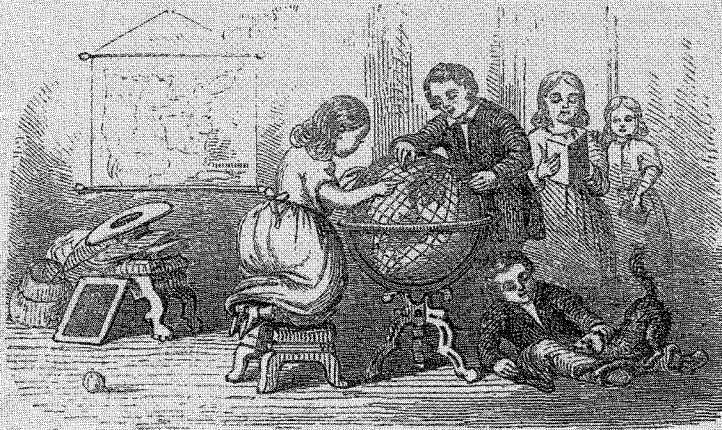
"The practice of reissuing the same map in a variety of formats has a long history in cartographic publishing, but nowhere was it so widely used as in the production of nineteenth century school atlases."

Like Morse, Carey recognized that the maps in his geography were unsatisfactory in both quantity and quality. His solution was to publish a separate atlas to accompany the textbook. In 1795 the first American school atlas, *The General Atlas for Carey's Edition of Guthrie's Geography Improved*, was published. Many of the maps in this atlas had been published earlier in atlases Carey had marketed to adults. As Harley (1977) noted, "Carey became a master in the art of packaging the same maps for reissue in several of his publications" (p.769). The practice of reissuing the same map in a variety of formats has a long history in cartographic publishing, but nowhere was it so widely used as in the production of nineteenth century school atlases.

Two much shorter texts, one by Nathaniel Dwight (1795) and the other by Henry Patillo (1796), were also available by the end of the eighteenth century. They presented an outpouring of factual geographical information in the catechetical style of short questions and answers. A sort of "Cliff Notes" version of the longer geographies, they were designed, as Henry Patillo (1796) wrote in the preface to his text, "... not for the learned or wealthy, but to assist those who have neither Maps nor Gazetteers and for

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LESSON VI.



- Q. What is Geography?
- A. A description of the Earth's surface.
- Q. What is the Earth?
- A. The planet or body on which we live.
- Q. What is the shape of the Earth?
- A. Round, like a ball.
- Q. Of what is the Earth composed?
- A. Land and water.
- Q. What is a Continent?
- A. The largest division of the land.
- Q. How many Continents are there?
- A. Two; the Eastern and the Western.
- Q. On which Continent do we live?
- A. On the Western Continent.

Figure 2. A lesson using the catechetical or question and answer method, from James Monteith's *First Lessons in Geography*, published in 1871.

the farmer who wishes to understand something of the works of God around him."

The catechetical style was quite popular in early textbooks. According to Neitz (1961) this was a result of many authors modeling their books on the catechetical section of the *New England Primer*. Throughout the first half of the nineteenth century, the question and answer format was widely used in the geographies designed for students of all ages (Culler, 1945). However, after the Civil War, the catechetical style was found only in geographies designed for the very youngest children (Figure 2).

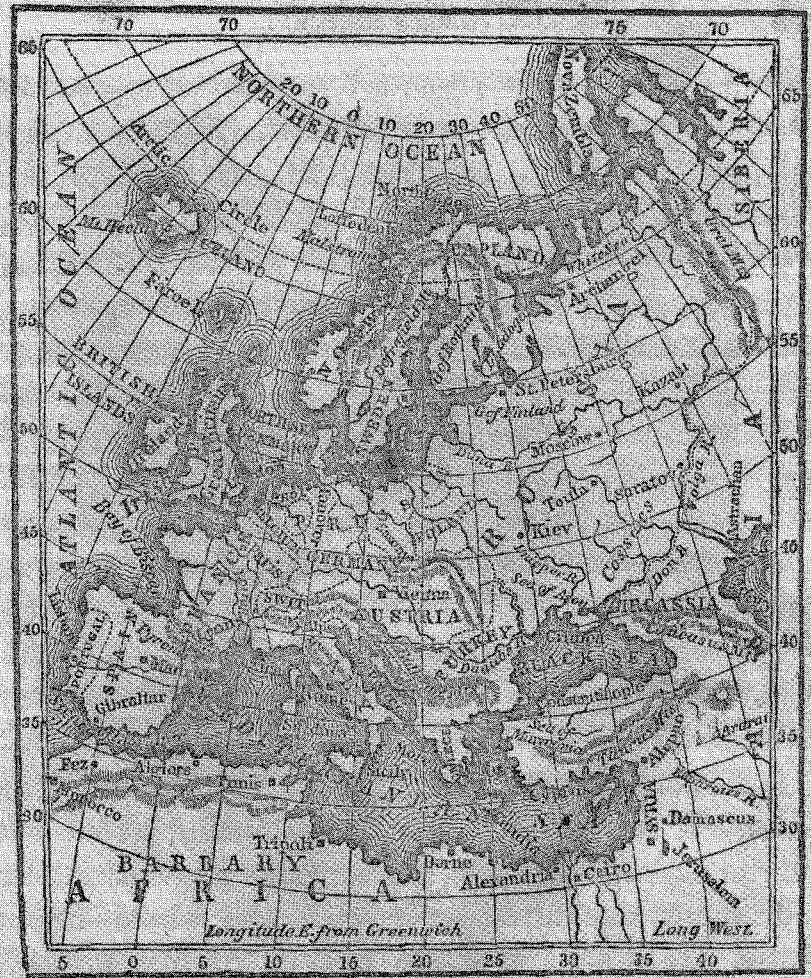
Due primarily to the high cost of paper, early textbooks were almost always quite small. Sahli (1941) measured 49 geographies published between 1784 and 1840, and found that the average size was 4.3 x 6.5

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"The diminutive size of the books presented few good options for map design. Many geographies had no maps or other illustrations; some authors included a few small maps, printed using wood-cut blocks. These maps were either quite simplistic or nearly unreadable (Figure 3). A handful of geographies, such as the Morse geographies, included larger maps which were folded and "tipped" into the text by hand. This was an expensive step not well suited to schoolbooks, as the delicately tipped maps could not long withstand the harsh handling of young children. To overcome the "map problem," as Jedidiah Morse referred to the difficulty of including appropriate maps for student

inches (28.9 square inches). Jacob Cummings' popular *First Lessons in Geography and Astronomy*, first published in 1818 and running through numerous editions, was a Lilliputian 5 square inches! The diminutive size of the books presented few good options for map design. Many geographies had no maps or other illustrations; some authors included a few small maps, printed using wood-cut blocks. These maps were either quite simplistic or nearly unreadable (Figure 3). A handful of geographies, such as the Morse geographies, included larger maps which were folded and "tipped" into the text by hand. This was an expensive step not well suited to schoolbooks, as the delicately tipped maps could not long withstand the harsh handling of young children. To overcome the "map problem," as Jedidiah Morse referred to the difficulty of including appropriate maps for student



QUESTIONS ON THE MAP OF EUROPE.—What sea lies to the west of Europe? To the south? What continent lies to the south? Where is Madrid? Vienna? St. Petersburg? Paris? Rome? Nova Zembla? Direction of Great Britain from Spain? Of Austria from Sweden? Where is the Black Sea? The Straits of Gibraltar? Iceland? Sardinia? Sicily?

Figure 3. This map is typical of early American wood-cut block maps appearing in geographies (Goodrich, 1866). Lettering was visually quite mechanical or "blocky," and the information was poorly separated into visual hierarchical layers.

use (Brown, 1941), several geography authors, including Morse, commissioned separate atlases to accompany their texts. These atlases were of a much larger format than the geographies, often 8 x 10 inches or more. To keep down the cost, they seldom had more than twenty-five pages.

Initially, school atlases, such as the one produced by Mathew Carey, were simply abbreviated versions of a publisher's adult atlas. However, by the early 1820s, school atlases that were clearly designed for children were beginning to appear (Figure 4).

The second half of the nineteenth century saw several technical innovations that radically changed the look of school atlases and geographies. The introduction of cheap wood pulp paper allowed for books with more and larger pages (Figure 5). The invention of cerography (wax engraving) provided publishers a way to print text and detailed maps using the same printing press, thus eliminating the need to print maps on one press and "tip" them into a book printed on a second press. Woodward (1977) points out another important design change that was a by-product of the technological innovations:

The use of wax-engraved plates on power presses fed with cheaper paper released a large amount of money to be channeled to other destinations. While several of these destinations were undoubtedly the pockets of printers and publishers, it can also be stated that the map buyer began to receive more for his retail dollar. One such benefit appears to have been the frequent addition of color to wax-engraved maps (p. 120).

The result is that the school child of the second half of the nineteenth century saw a very different geography text than had the child of the first half of the century. No longer were separate "accompanying" atlases necessary. The new generation of integrated texts was much larger and contained numerous illustrations, including a variety of full color maps. While much of the change in the look of geography textbooks can be attributed to technological advances, the intense competition among textbook publishers was responsible for the rapid incorporation and innovative use of that technology.

At the beginning of the nineteenth century, geography texts were the products of individual authors who sought out a publisher willing to print their book or simply printed it themselves. After the Civil War, most geographies were being compiled and published by major corporations including Mitchell, Colton, Rand McNally, The American Book Company, and George F. Cram. These companies produced a wide range of educational materials including wall maps, globes, teacher's manuals, and outline maps. However, the most profitable items for the educational divisions of these companies were their age-graded series of geography texts. Typically, these series included a primary, elementary, and high school geography (Kaimovitz, 1998). In addition, the major geography publishers also marketed state or regional editions of their texts. Typical was the *Kansas Edition of the Rand McNally Grammar School Geography* (Bowen 1894) in which Rand McNally simply appended an eight page account of the state to the end of their standard grammar school text. The account summarized the physical, social and economic condition of Kansas, and included a full color, double page map of the state, as well as a dozen illustrations of important buildings and scenic views.

Attempts to open previously untapped markets led publishers to commission translations of their more popular geographies (Kaimovitz, 1998).

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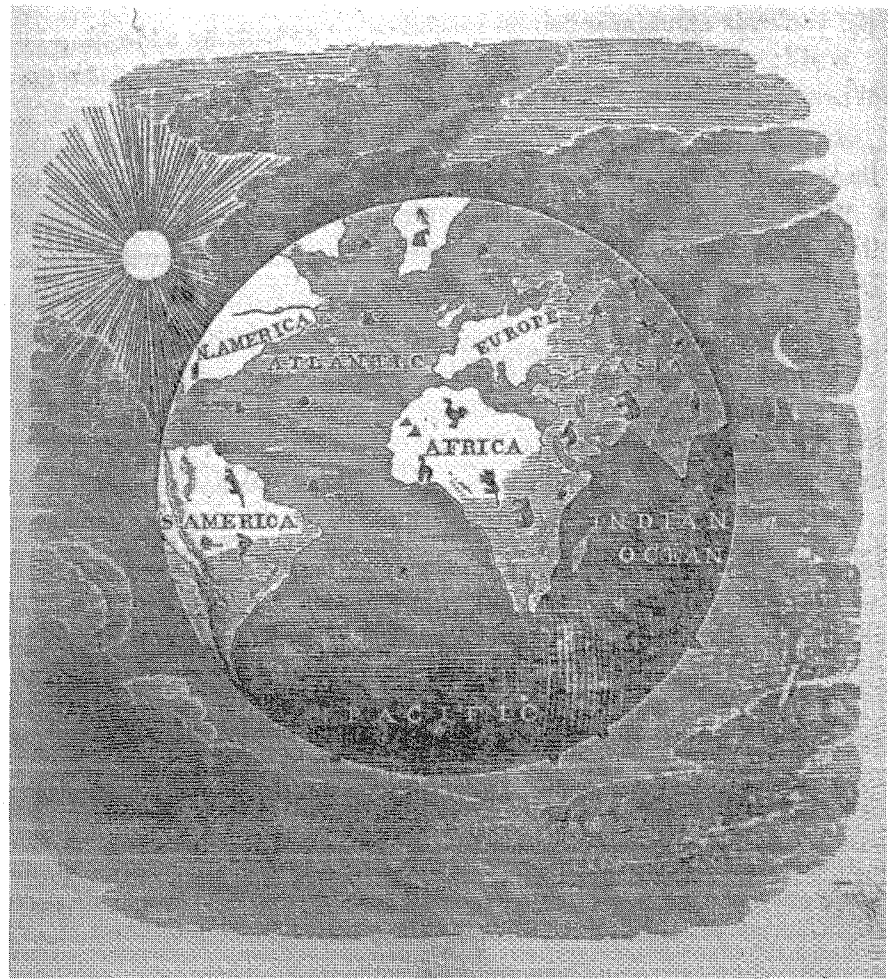


Figure 4. This view of the world was clearly intended for a very young audience (Goodrich, 1836). A "picture" of the world hanging in space became a mainstay of primary and elementary level geographies throughout the nineteenth century. Courtesy Jackson Library, University of North Carolina-Greensboro.

"During the second half of the nineteenth century the large commercial publishers began to employ noted geography and educational scholars to write and review their books."

THE CARTOGRAPHY OF THE
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American geographies were produced in French, Spanish, the Hawaiian language, and the language of the Dakota Sioux. *Maka-oyakapi*, Arnold Guyot's elementary geography in the Dakota Sioux language, was published, ironically in 1876, the same year as the Battle of Little Big Horn (Riggs and Riggs, 1876).

In many of the of the early school geographies, the written text was often lackluster or even mind-numbingly repetitive. During the second half of the nineteenth century the large commercial publishers began to employ noted geography and educational scholars to write and review their books. The accuracy of the information, level of explanation, and the style in which the material was presented improved greatly. Most notable were the series of geography books carrying the names of Matthew Maury, Arnold Guyot, and Alexander Frye—all of whom had developed international reputations as scholars before writing school geographies.

At the end of the eighteenth century, maps, including school maps, were primarily concerned with the "accurate" delineation of territory and the establishment of possession—"Where is this territory?" and "to whom does it belong?" Great emphasis was placed on the "new" knowledge that a map portrayed. Maps often included a prominent description noting that they

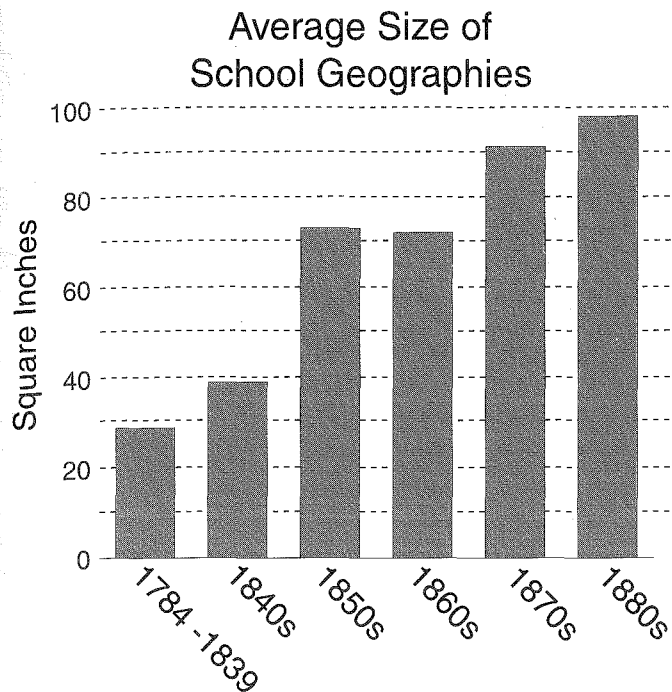


Figure 5. The average size of school geographies increased dramatically with the introduction of inexpensive wood-pulp paper in the 1840s. By the end of the century the average text was more than three times the size of the earliest texts. Data from Sahli (1941) and Culler (1945).

were drawn based on information from "the most recent discoveries" or that they were derived from "the best authorities."

By the early part of the nineteenth century, with the exception of the Arctic and Antarctic regions, the level of geodetic knowledge was such that only minor differences can be found between the outlines of the world's large land masses in school atlases of 1830 and those of today.

This new level of geodetic accuracy may have led map readers, and even some map makers, to conclude that while the population of Boston would change, the coastline of Massachusetts had been determined and was essentially fixed. This attitude is often expressed today by the general public in statements like "hasn't every place been mapped?"

A notable exception to the attempts at portraying geodetic accuracy were the maps produced for very young children. Students just learning to read were taught the basic shapes of continents, and intricate detail was often abandoned in favor of an appealing design (Figure 6). Simplification was seen as the key to making maps appropriate for the youngest children. In the preface to his *First Lessons in Geography*, James Monteith (1871) extolls the virtue of his book because, "The Maps are free from all meridians, parallels of latitude, and any superabundance of names . . ."

During the 1800s a new function was added to the role of maps; not only could maps be used to show the location of places, but also what those places were like. This new function was best met with a new cartographic form, the thematic map. Robinson (1982) states that the "... development of thematic mapping in the Western world ranks as a major revolution in the history of mapmaking. Its intellectual and conceptual consequences are comparable to those that followed upon the spread of the concepts in Ptolemy's *Geography* some three centuries earlier" (p. 17). In advertisements for school atlases, maps were championed for the selection of data that they portrayed and their ease of use in instruction. Claims that the maps were

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THEMATIC MAPS

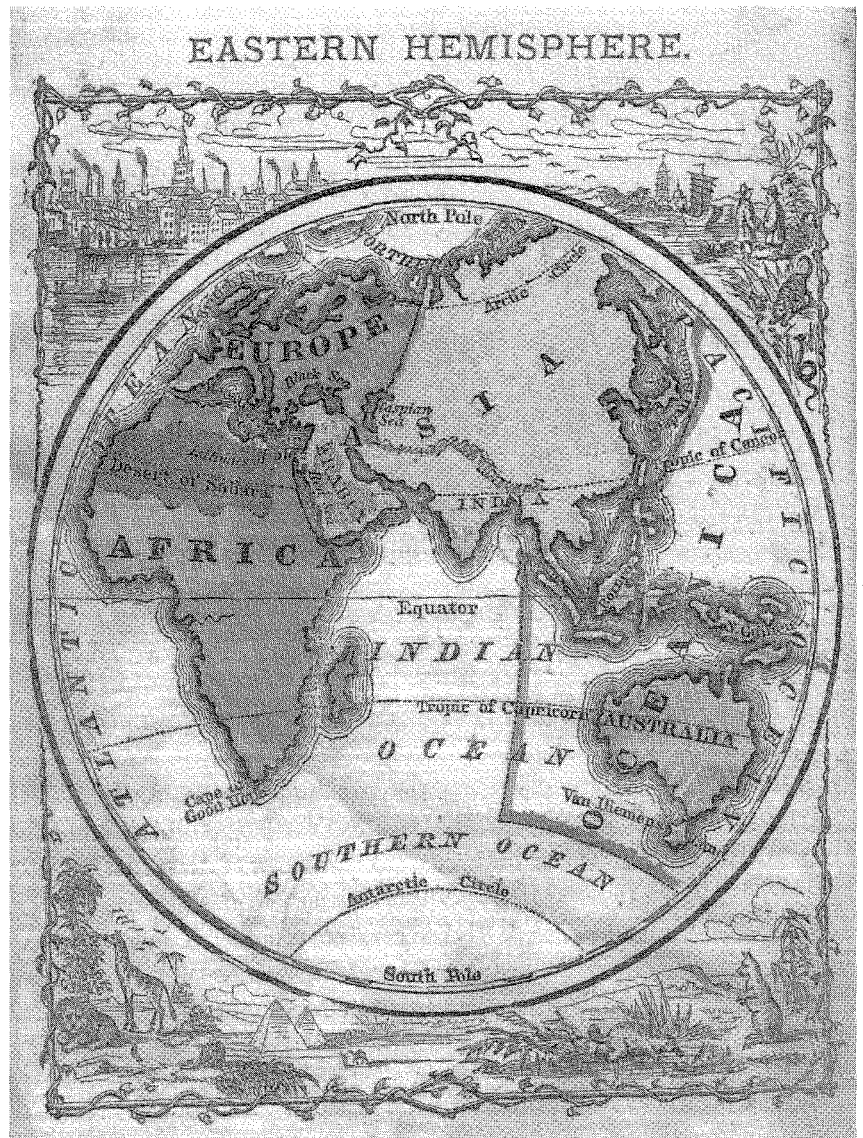


Figure 6. This map portrays a highly generalized, almost "cartoon-like" view of the outlines of the major land masses. The small, corner views of the four continents of the Eastern Hemisphere were clearly designed for young children (Monteith, 1871).

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based upon the "best authorities" no longer referred to surveyors and explorers; rather, the new authorities were educators and geographers.

One of the more remarkable series of school atlases to appear in the early nineteenth century were those of William Channing Woodbridge. Woodbridge was active in educational societies on both sides of the Atlantic and quick to incorporate the latest scientific and educational ideas into his school atlases. His 1826 *School Atlas designed to accompany Woodbridge's Rudiments of Geography* included not only reference maps, but also three thematic maps: "A Moral and Political Chart of the World," "A Chart of the Principal Animals of the World," and "An Isothermal Chart or View of Climates and Productions."

Woodbridge's atlas may represent the earliest use of isotherms in American map making (Robinson, 1982). Woodbridge included a prominent acknowledgment on his Isothermal Chart to the noted German geographer, Alexander Von Humboldt, with whom he corresponded. It is Humboldt who is generally credited with being the first to use isotherms to map

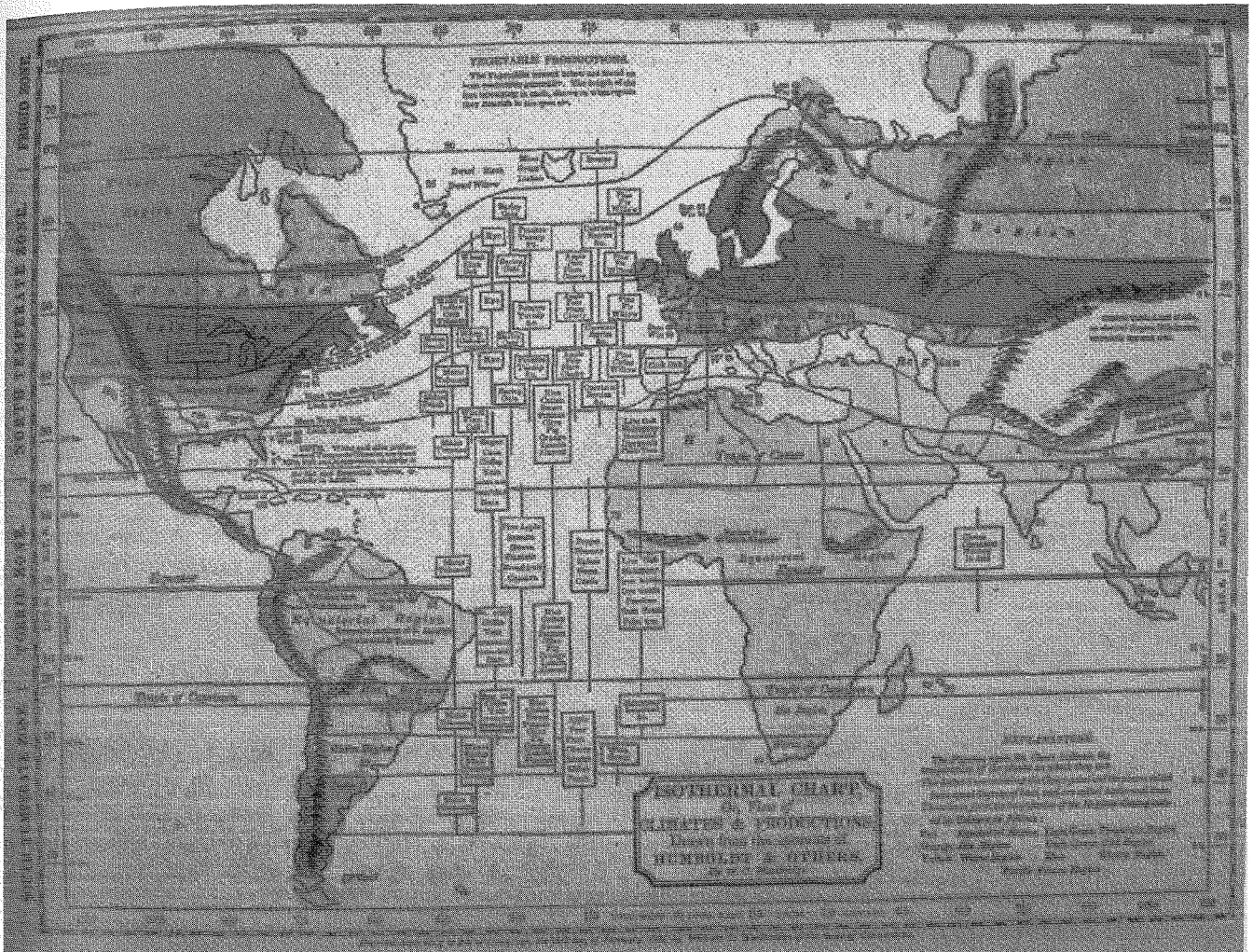


Figure 7. A portion of Woodbridge's "Isothermal Chart or View of Climates and Productions" from the 1831 edition of his school atlas. Courtesy of the New York Public Library.

temperature. The map correlates the range of a variety of productive plants to temperature as noted by the isotherms. As can be seen in Figure 7, Woodbridge chose to include very little general reference information. The result is a map with a focus clearly on the thematic information, unhindered by a great deal of visual clutter. The color scheme he uses for showing temperature is spectral, grading from blue to red, still the most common color scheme used to portray temperature on maps.

Woodbridge's second thematic map was a display of various animals of the world (Figure 8). Sixty-two animal portraits as well as several views of human hunters are found on the map. Each of the animals is identified by a number which corresponds to both the legend on the map and to an accompanying table of longer descriptions. As on the isothermal chart, Woodbridge removed much of the general reference information that had been the mainstay of world maps. With the exception of the equator, even latitude and longitude markings are missing from his map. Woodbridge showed little concern for geodetic accuracy when he clipped off parts of the Arctic, Antarctic, Western North America, and the Far East, and moved Australia westward, all in order to maximize the size of the area of interest on the page. The resulting view is clear and uncrowded, and "It is easy to imagine that this map, with its delightful illustrations of both familiar and

"The color scheme he uses for showing temperature is spectral, grading from blue to red, still the most common color scheme used to portray temperature on maps."



Figure 8. A portion of Woodbridge's "A Chart of the Principal Animals of the World" from the 1833 edition of his school atlas. Courtesy of the Newberry Library.

"Woodbridge's "Moral and Political Chart" categorized the countries of the world based upon their degree of civilization (Figure 9). As his measure of civilization, he used what he considered to be the condition and status of women."

exotic animals, would be quite popular among school children of the day" (Patton, 1997).

Woodbridge's "Moral and Political Chart" categorized the countries of the world based upon their degree of civilization (Figure 9). As his measure of civilization, he used what he considered to be the condition and status of women (Elson, 1964). His lowest levels of civilization, "primitive" and "barbarous," he refers to as "pagan societies," where women are no more than domestic animals; in the next stage, "half civilized," women are slaves to be bought and sold, but they may be given a rudimentary domestic education. The highest two levels, "civilized" and "enlightened," were reserved for Christian nations. In "civilized nations," women were recognized to possess immortal souls and were afforded respect equal to that of men, and in countries attaining the "enlightened" state:

... the status of women is perfectly satisfactory and nothing more remains to be done: *England, Scotland, and the United States* appear to be the only countries in which attention is generally paid to the intellectual improvement of females; and the general standard of purity in morals and manners, is more elevated than in any other nations.

(Woodbridge and Willard, 1824, p. 212)

From the standpoint of design, Woodbridge's use of a graded series of gray shades to portray ordinal level data, such as the degree of civilization, was fairly effective. The bright radiant pattern used to denote the enlightened nations, reminiscent of light emanating from a lamp, must have seemed particularly appropriate. In historical hind-sight it is easy to see the underlying sexist, racial, and cultural biases of this classification system. At the time, however, it was readily accepted and copied by other geographers.

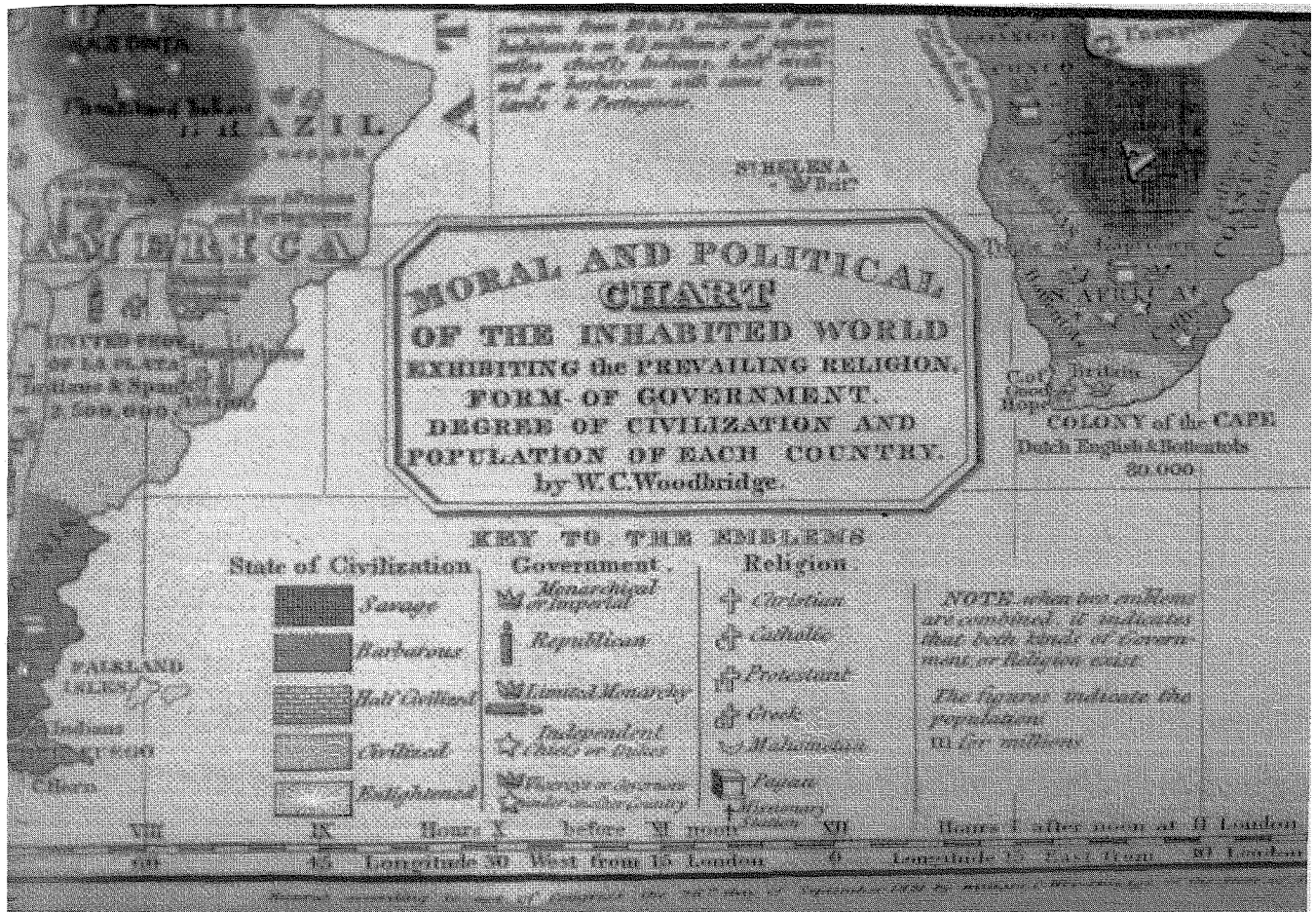


Figure 9. A portion of Woodbridge's "A Moral and Political Chart of the World" from the 1831 edition of his school atlas. Courtesy of the New York Public Library.

Throughout the nineteenth and well into the twentieth century, some variation of this classification scheme of the world's inhabitants was frequently found in children's school books. Starting with Woodbridge, then, thematic maps quickly became a staple of school atlases. It is not that they replaced the general reference map in school atlases; instead, both were now included.

While Woodbridge's thematic maps appear to have been effective visual devices, this was not always the case among early thematic maps found in school atlases. Problems often arose when authors tried to combine detailed reference information with their thematic data. As Robinson (1982) noted:

The natural tendency among map makers is to try and make their maps as useful as possible, but unfortunately the objectives of portraying clearly the geographical structure of a distribution while providing a goodly amount of reference data seem to be essentially antagonistic (Robinson, p. 17).

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R. C. Smith's 1839 "Map of the World" is an excellent example of the antagonistic relationship recognized by Robinson (Figure 10). Smith attempted to portray a variety of information including the size of each nation, the population of each nation and region, form of government, dominant form of religion, location of Protestant missionaries, and the state of civilization, all upon the backdrop of a general reference map. The

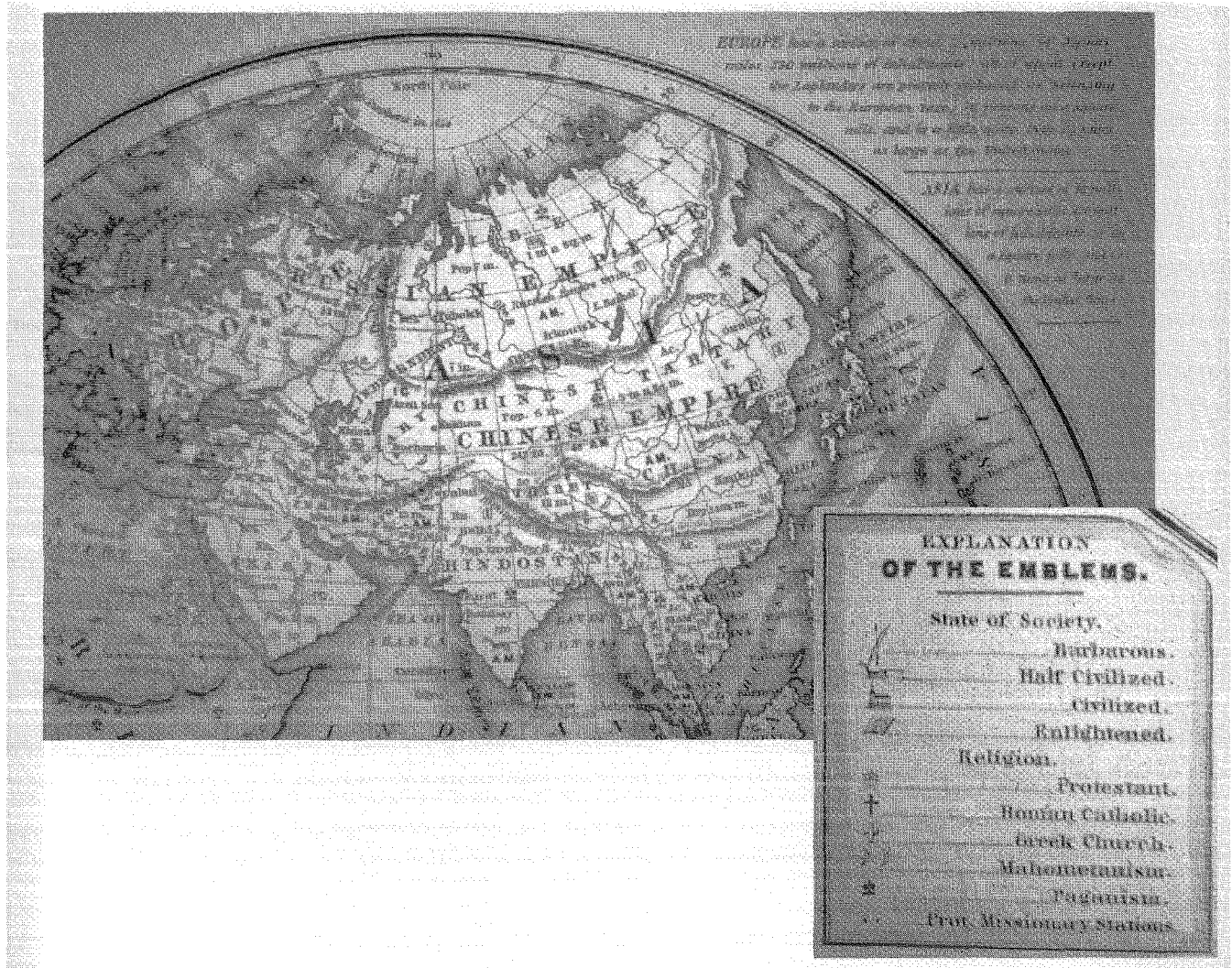


Figure 10. A portion of Roswell C. Smith's 1839 "Map of the World." In addition to the symbols used to show the "State of Society" and dominant form of religion, within each country are small numbers representing the total number of inhabitants, density of population, and size of each nation. Small letters represent the form of government and the various ethnic groups. Courtesy of the New York Public Library.

"... Smith's maps were data depositories, analogous to a dictionary; when a student wanted to know a specific piece of information, they could go to the map and "look it up.""

effectiveness is questionable at best, as the small letters, numbers and symbols used get lost among the general text of the map.

The popularity of maps like this one by Smith may indicate a very different philosophy concerning the purpose for including maps in school books. Woodbridge's maps were graphic devices which revealed the general pattern of data distributions. They were visual explanations of information, while Smith's maps were data depositories, analogous to a dictionary; when a student wanted to know a specific piece of information, they could go to the map and "look it up."

Fewer thematic maps were included in texts for the youngest children. Those that are found invariably utilized pictorial symbols to convey the thematic information. It is clear that iconic symbols were thought to be appropriate for young children, as it is difficult to find any maps that used abstract symbols, such as squares, triangles, circles, etc.

While point phenomena could be portrayed in a pictorial fashion rather easily, areal phenomena provided greater challenges. Continuous data, such as land cover or topography, was particularly difficult to display pictorially on small scale maps. One approach was to paint a series of vignettes on the map, in a sense using large point symbols to represent

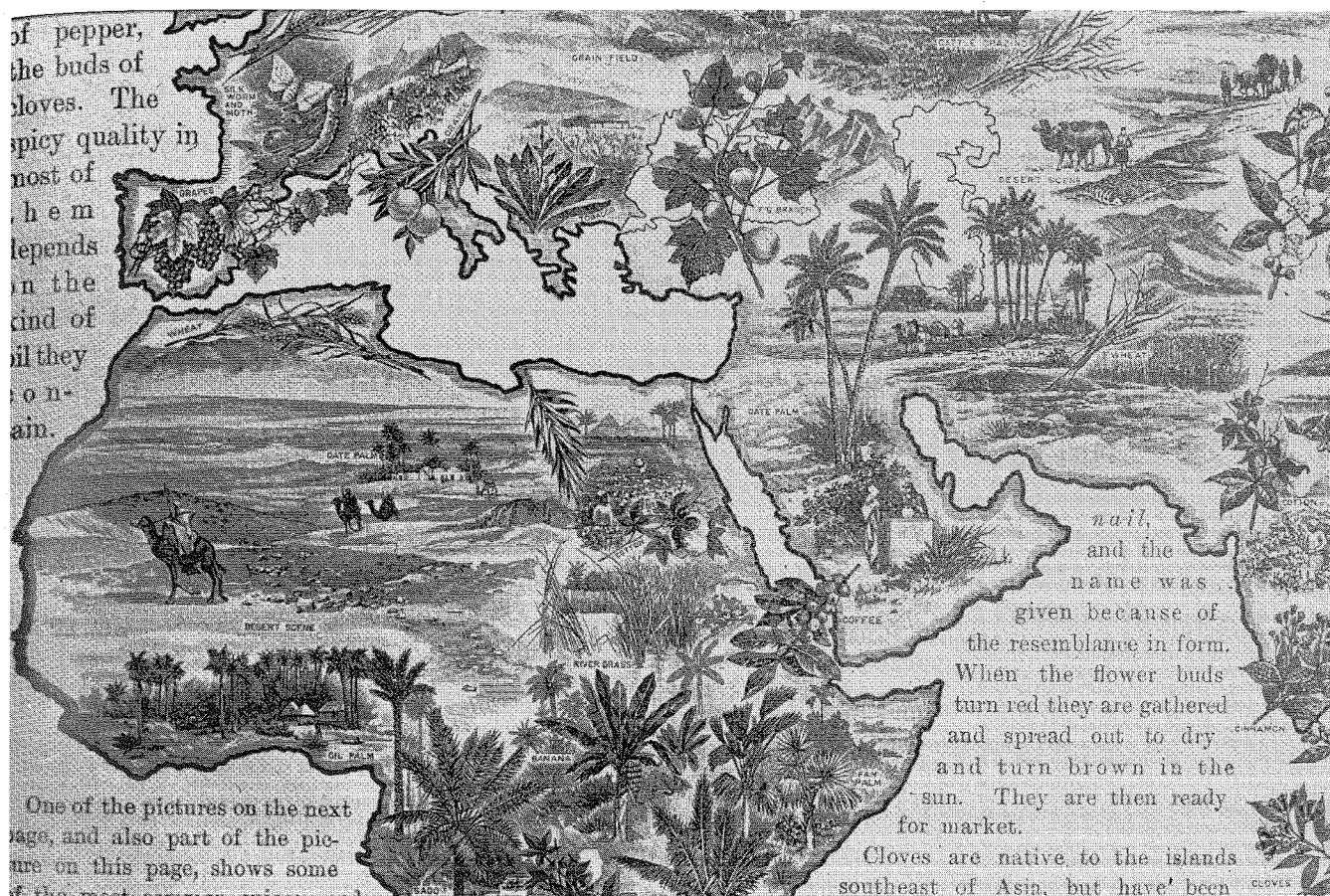


Figure 11. Alexis E. Frye (1895) created unusual and graphically appealing images for his geography texts, which spanned the last two decades of the nineteenth and the first two decades of the twentieth centuries. Here he represents broad geographic regions of the world by using vignettes of landscapes drawn at a local scale. Weaving the text through the map was also a novel design strategy.

areas (Figure 11). Toward the end of the century there were many attempts at representation of the earth's surface in "natural color" and by sophisticated plastic shading (Figures 12 and 13). Some of these illustrations were quite lovely and must have been very appealing to students of all ages. It is interesting that these illustrations were typically referred to as "pictures" of the world and not as maps.

Due primarily to the wide acceptance of wax engraving and embedded type by commercial map publishers in the United States, the American school atlas was not nearly as beautiful as its delicately engraved, copper-plate European cousins. The lettering was stiffly mechanical, the coloring when done by hand, was often quickly and carelessly applied; if the coloring was mechanically applied, there were often registration problems. The overall effect of the maps was somewhat "flat," as if they had no depth (Woodward, 1977). Referring to commercial atlases produced between 1870 and 1930, Woodward states:

THE LOOK OF THE AMERICAN SCHOOL ATLAS

... that the character of the American map publishing industry was far more industrialized or organized on mass production lines than its European counterpart; that the quality of the product suffered in this mass production atmosphere; and that the European map publishing houses placed more emphasis on the artistic aspects of cartography,

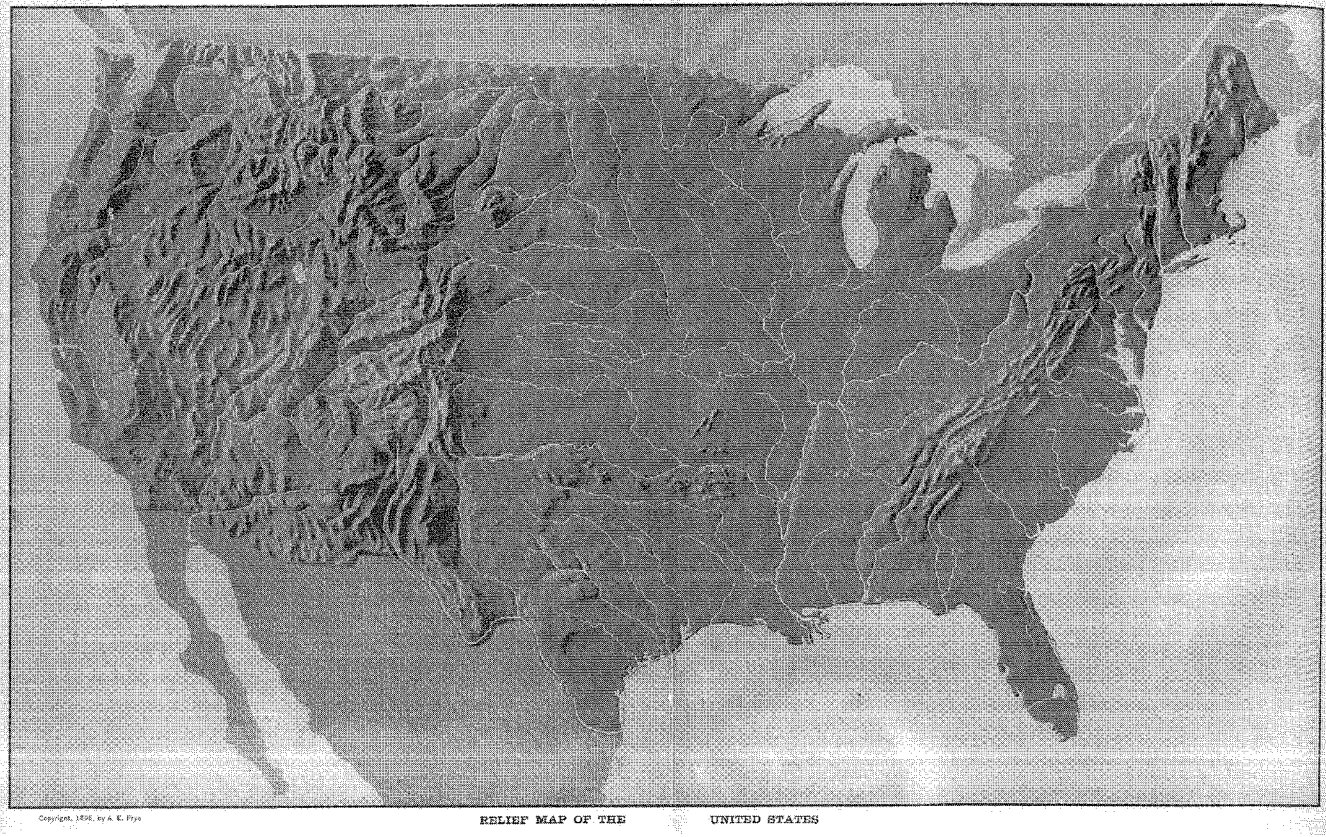


Figure 12. Frye (1895) was an avid supporter of having students create their own 3-D models of the landscape. His texts include numerous plastic relief maps like this view of the United States.

which they considered could be attained more easily by traditional processes (p. 48).

While the aesthetic appeal of American school atlases seldom matched that of European atlases, there were normally a great number of maps and they were large, clear, and almost always in color. The non-map illustrations were typically black and white, but undoubtedly were the most exciting aspect of the book for the children. Fiery volcanic eruptions, natives hunting ferocious beasts, exotic veiled women, and black whirling tornadoes, are found on virtually every page (Figure 14).

MAPS AND PEDAGOGY

One of the strongest and most enduring forces shaping the design of maps during the nineteenth century was the prevailing educational pedagogy based on memorization. At the end of the eighteenth century, Charles Smith (1795) wrote in the preface that the purpose of his school geography was:

... to give young minds a general idea of geography is the purport of this publication. It contains a comprehensive view of the several parts of the globe and a general description of the countries belonging to each part, alphabetically arranged. To make it of easy access to the memory of young persons, the author has reduced the information to as great a degree of simplicity as possible without omitting anything necessary, to a general knowledge of the world.



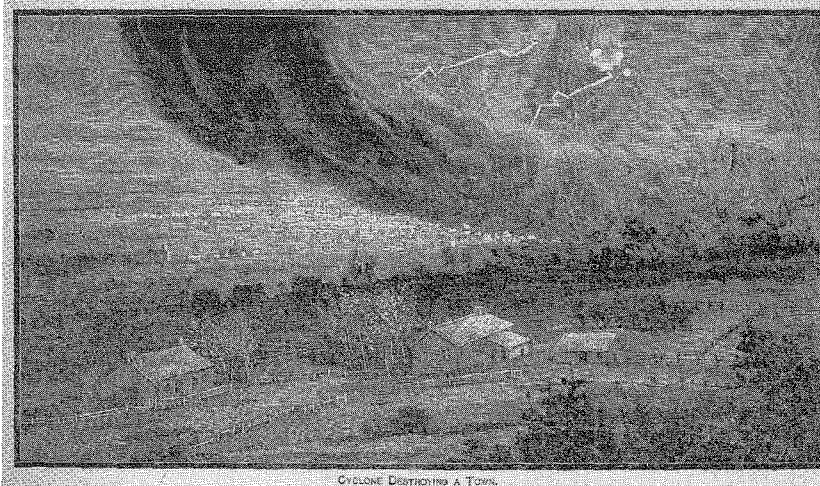
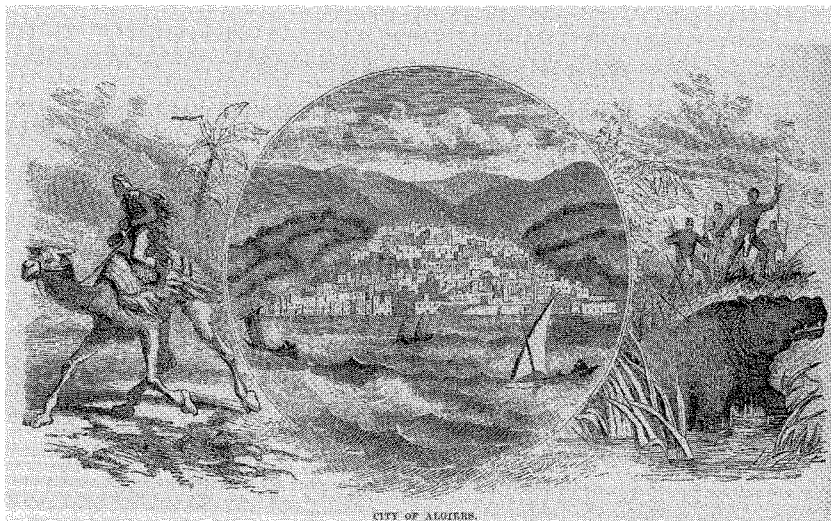
Figure 13. This beautiful view of the globe was colored in rich greens, browns, and blues (Monteith, 1885). It was intended to portray how the earth would look from space. In the corners are portraits of representatives of the various "races of mankind" and scenes of their homelands.

Nearly 100 years later at the very end of the century, in the preface to Rand McNally's *Primary School Geography* (1894), this advice to teachers was given, "All practical educators agree upon one point. That the young pupils in geography, using a textbook, should be assigned the task to memorize."

While it may be an oversimplification, an argument could be made that the pedagogy for the teaching of geography in the nineteenth century could be summarized in a single word, memorization. It is clear that this was a common and widely praised practice, and that maps were seen as ideal vehicles for the task. On the other hand, it is important to note that many educators, particularly in the last half of the nineteenth century, decried the reliance on memorization. C.T. Richardson, president of the Oswego, New York, Board of Education wrote in his 1861 annual report:

Usually a child is taught as a vessel is laden at the wharf, in bulk, facts are thrown in loose without any regard to the fitness of the child's faculties to receive them, and when a certain amount has been committed to memory the child is considered educated.

"... "All practical educators agree upon one point. That the young pupils in geography, using a textbook, should be assigned the task to memorize.""



The Anaconda, (Guiana.)



"An interesting inclusion by many authors were "horror" stories that modern educators would find unsuitable for young children."

Figure 14. Illustrations often appealed to the adventurous spirit of children. Exotic places, such as the view of the city of Algiers (American Book Co. 1894), animals (Cornell, 1855) and violent weather (Rand McNally, 1894) were frequent themes. An interesting inclusion by many authors were "horror" stories that modern educators would find unsuitable for young children. For example, the small wood-cut block print of a rider being pulled from his horse by an Anaconda snake in Guiana (Woodbridge, 1823).

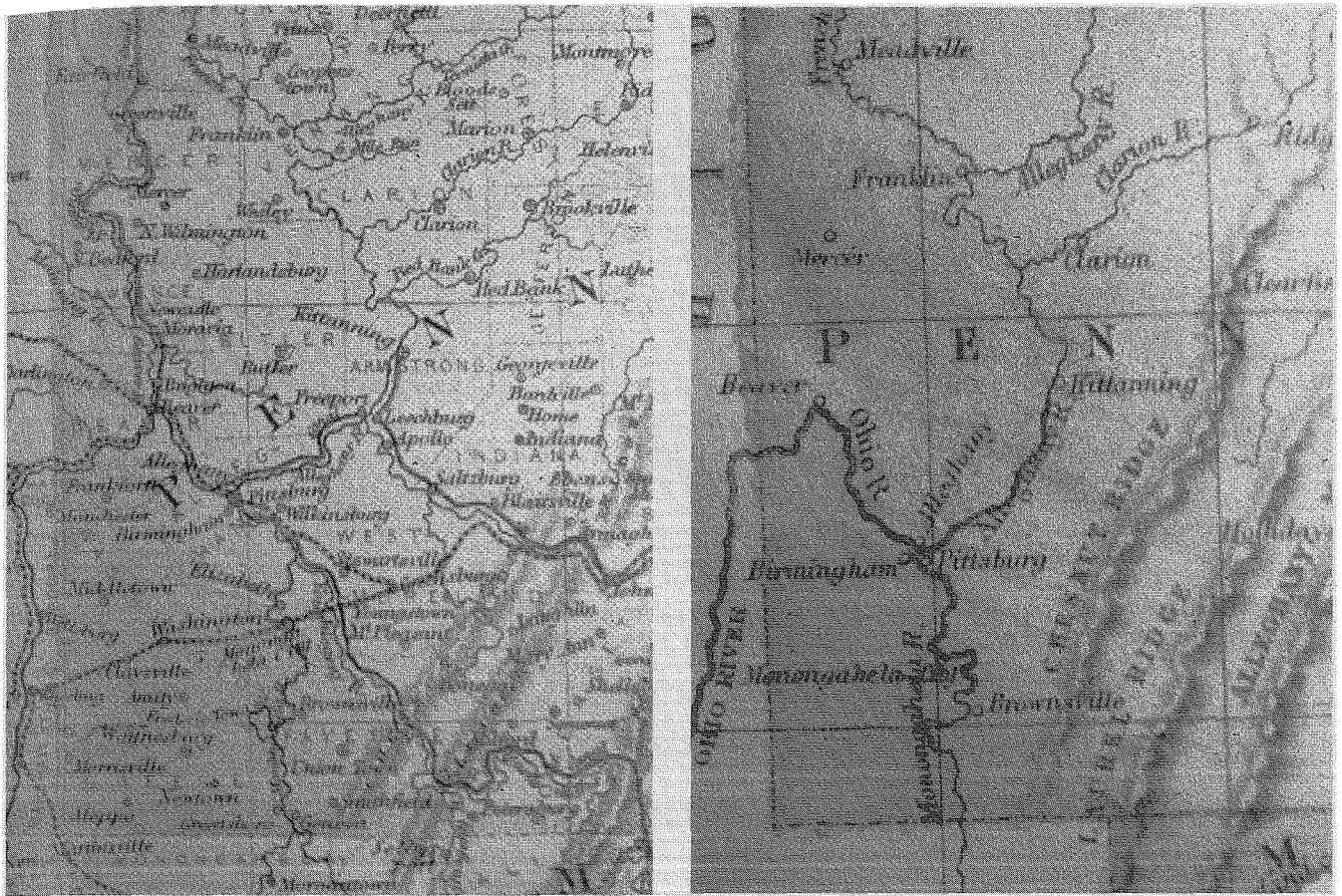


Figure 15. For each major region of the world or grouping of U.S. states Sarah Cornell (1857) included two maps. One map had a great number of place names which could be referred to as needed while the other labeled only those places which the student should commit to memory. Shown here are portions of her "Middle States" maps.

Referring to the common practice of memorizing rules and facts, Francis Parker wrote in 1876:

How would a child learn to talk, if the same abominable system of mnemonics were practiced in the nursery as in the primary school? Fortunately the child has five or six years of wholesome instruction to prepare for the ordeal.

While more enlightened educators may have railed against a pedagogy rooted in rote memorization, atlas makers tailored their products to the majority of teachers who utilized the methodology. School atlases often were marketed on the idea that their maps had been carefully edited to include only those features and places appropriate for memorization. Sarah Cornell (1857) recognized that not all places should be committed to memory, so she created school atlases containing two maps of every region, one detailed map for reference and a less detailed map containing only those places that should be committed to memory (Figure 15).

Samuel Mitchell (1839) produced a series of outline maps for the purpose of having students write in place names so as to make memorization easier. And Rand McNally developed a graded series of maps drawn on the same base, but as one progressed from primary to grammar school, the number of place-names increased (Figure 16).

"School atlases often were marketed on the idea that their maps had been carefully edited to include only those features and places appropriate for memorization."

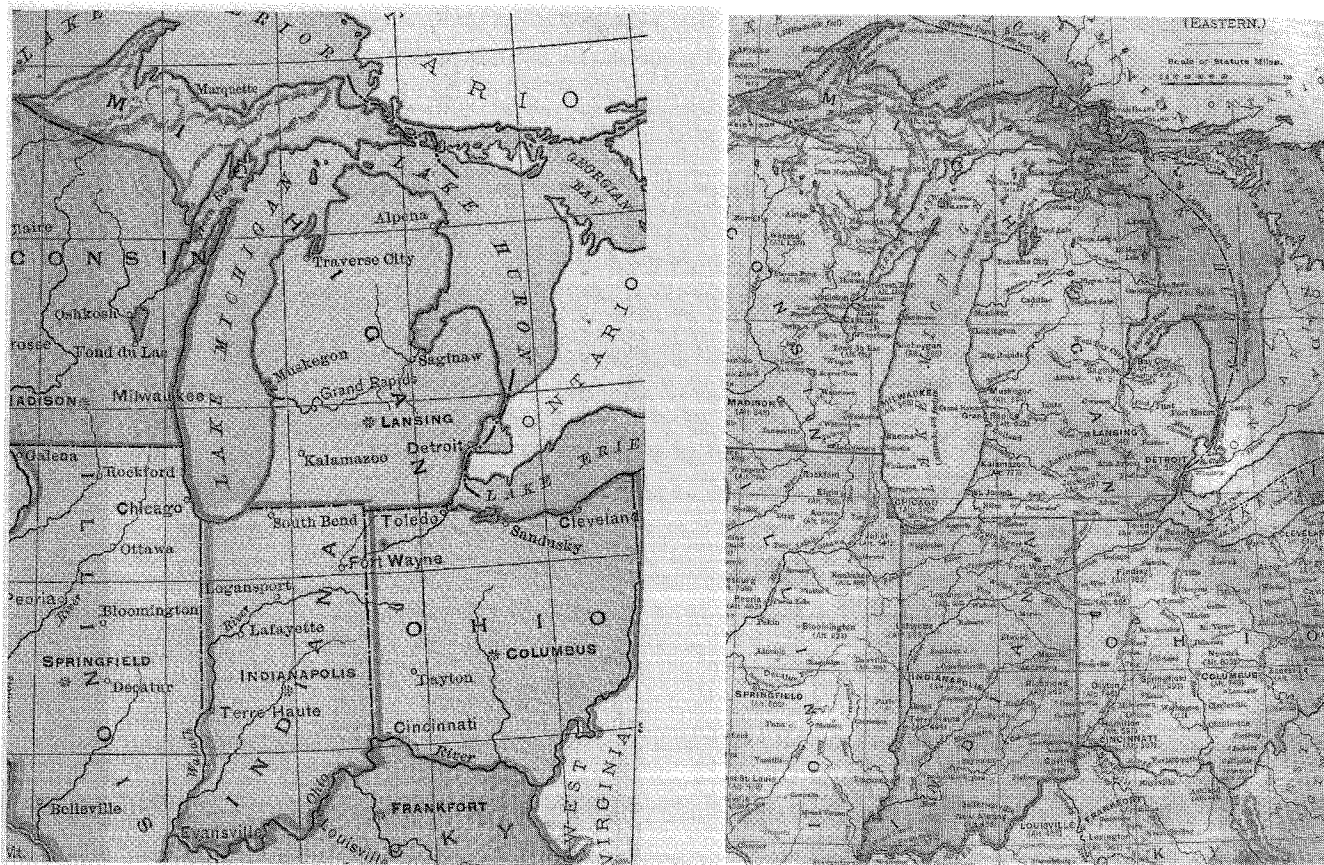


Figure 16. Map on the left is from Rand McNally "Primary School Geography" (1894) and the map on the right is from their "Grammar School Geography" (1894). The most common method for making maps grade appropriate was by regulating the number of place names.

"... in Van Waters' book, the definitions of terms and geographical descriptions of the states and nations of the world were all presented in rhyme:"

One of the most novel methods for helping young students to learn and memorize geography was George Van Waters' *Poetical Geography* (1851). The book covers the same material as other geographies of the day, but in Van Waters' book, the definitions of terms and geographical descriptions of the states and nations of the world were all presented in rhyme:

Maps

A Map's a picture, of the whole or part,
Of the earth's surface, to be learned by heart.
The top is North, while South points to your breast;
The right hand's East, the left hand's always West.
More Maps than one, bound up for school or college,
Is called an Atlas, and contains much knowledge.

Volcanoes

Volcanoes, from their craters, vomit fire
And smoke and lava, in a steam, most dire

South Carolina

Columbia stands upon the *Con-ga-ree*;
And Georgetown dwells upon the *Great Peedee*, —
As Charleston lives just seven miles from sea.
Hamburg, by the *Sa-van'-nah*, keeps her station,
Just at the head of steamboat navigation.

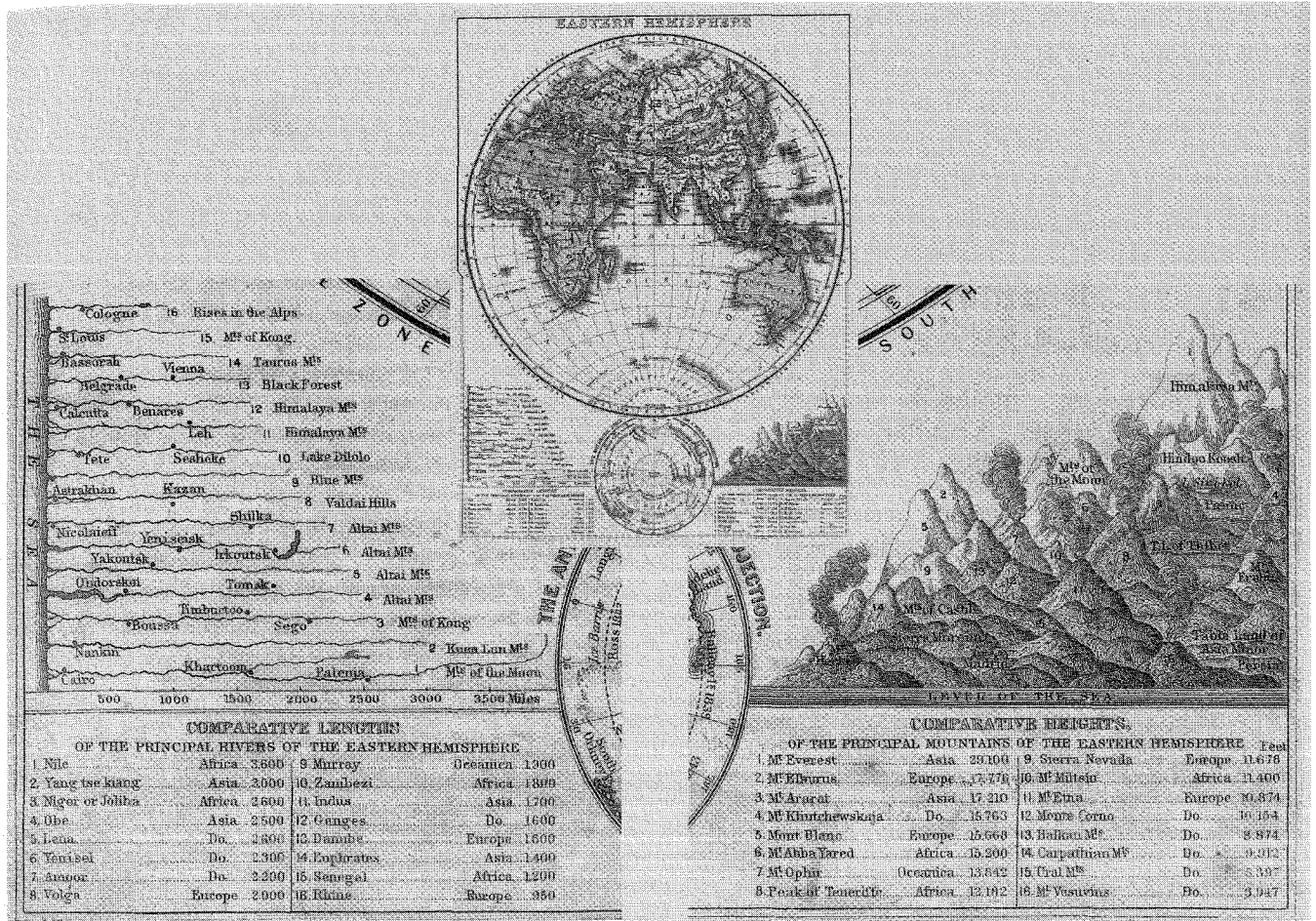


Figure 17. The widely used globular projection left large spaces in the four corners of the page. A common practice was to include a comparative chart of river lengths and mountain heights. Note the inclusion of the legendary Mountains of the Moon on this chart from an 1875 Mitchell school atlas.

At the end of *Poetical Geography* Van Waters appends the rules of arithmetic, including how to multiply and divide decimals, determine cube roots, and calculate compound interest—all in rhyme! In a review of *Poetical Geography*, the New York Evening Post wrote, "It will prove as effectual in fastening the principal facts of Geography upon the memory, as the common verse of 'Thirty days hath September, &c.' is in fixing the days of the month" (quoted on the back cover of the *Poetical Geography*).

The memorization pedagogy may have been seen as particularly appropriate for the teaching of geography, as geography in the nineteenth century was viewed as a mainly descriptive science. Especially useful, then, were the comparative charts which portrayed the highest mountains, longest rivers, greatest islands, etc. It is interesting that what is often considered the fundamental underpinning of maps, spatial relationships, is missing from these diagrams. Lake Victoria could be situated next to Lake Superior and Mt. Everest flanked by Kilimanjaro and Rainier, in a sort of geographic disembodiment. Here also, the artistic ability of the cartographer could and did shine (Figure 17). Some of the comparative charts were exquisitely engraved, but in fact a simple bar chart may have been more effective if one simply wanted to show the length, size, or height of geographic phenomena.

The ideas of the noted Swiss educator, Johann Pestalozzi (1746-1827) began to gain acceptance by a number of American geographical educators

"Lake Victoria could be situated next to Lake Superior and Mt. Everest flanked by Kilimanjaro and Rainier, in a sort of geographic disembodiment."

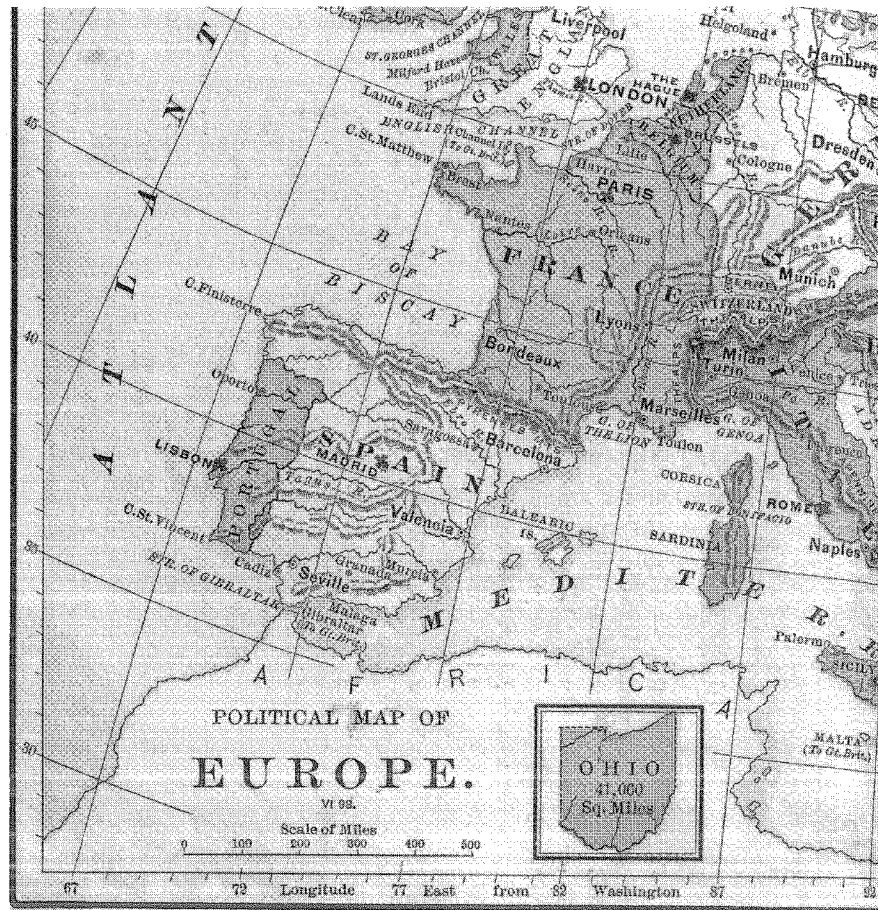


Figure 18. Including a map of a familiar state as a visual scale of size was a common practice toward the end of the nineteenth century. The portion of the map shown here is from Harper's School Geography (American Book Co, 1894).

"... 'Instead of commencing the study of maps with the map of the world, which is the most difficult to understand, the pupil here begins, in the most simple manner imaginable, to draw the map of his own town.'"

during the 1820s. Especially popular was what he called the "Home Geography" approach to teaching geography (Nietz, 1961). Emma Willard (1826) summarized this approach in the preface to her *Geography for Beginners* saying, "Instead of commencing the study of maps with the map of the world, which is the most difficult to understand, the pupil here begins, in the most simple manner imaginable, to draw the map of his own town." The idea of this inductive method of teaching was to compare the known to the unknown. An interesting manifestation of this concept found on many school maps was the superposition of a map of some familiar area onto a map of a part of the world with which the child was not familiar. For instance, in *Harper's School Geography* (American Book Co., 1894), a map of Ohio is found on each of the maps of the various continents. Ohio is drawn at the same scale as the continental maps, so that a child could easily see how large the countries of that continent were in comparison to a state with which they were familiar (Figure 18). Figure 19 also illustrates the idea of comparing the familiar to the exotic; in this case, various countries and islands of the world are compared to individual states or groups of states.

PROJECTIONS

By 1800, over thirty unique projections had been developed, with about a dozen of those being used by map publishers (Snyder, 1993). However, only two projections were widely used in nineteenth century school atlases for portraying the entire world—the globular projection and the Mercator. Few issues have fanned such passion among present day cartographers as the

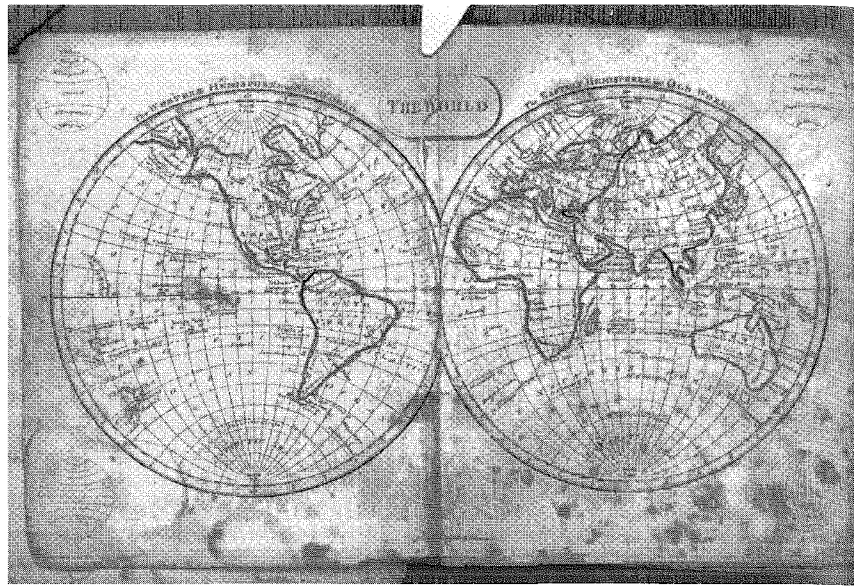


Figure 20. Globular projection of the world from *Atlas to Adams Geography for the Use of Schools and Academies* (Adams 1816). Courtesy Jackson Library, University of North Carolina-Greensboro.

"A major advantage of the globular projection for use with young school children is that it shows the world as being round."

"... by the 1860s, the Mercator projection was used almost exclusively for world thematic maps."

A major advantage of the globular projection for use with young school children is that it shows the world as being round. It is a compromise projection which does a remarkably good job of minimizing distortion in areal relationships without too greatly distorting the shapes of land masses. It may be overly speculative, but its widespread use may have been because it visually matched what many educators considered a logical way of organizing the world—that is, into the Old and the New—Europe and Asia on one side and the Americas on the other, with only the most tentative connection holding them together. Its major drawbacks are its inefficient use of the space on the page and its interrupted design.

Today the advantages of using the Mercator projection for school maps seem minimal, and the disadvantages overwhelming. So why was it used? There are several possible answers. Its rectangular shape fits nicely on the page and it is uninterrupted. It was extremely important for nineteenth century navigation, so atlas and chart makers would have "grown up with it;" thus it may have become the expected view. It is interesting to note that many school atlases referred to the globular projection as a "map" of the world, and to the Mercator projection as a "chart" of the world. Finally, the Mercator projection appears to have become associated with "science". This may be related to the rise of the nationally-sponsored scientific expeditions of the nineteenth century. These expeditions were funded to travel to all parts of the world and were charged with scientifically recording the flora, fauna, weather, geology, and ethnography of the inhabitants whom they encountered. Often the expeditions relied upon naval officers for plotting the precise trace of their travels, and quite naturally they utilized Mercator's projection. These field maps were often incorporated into the official reports.

For whatever reason, by the 1860s, the Mercator projection was used almost exclusively for world thematic maps (Figure 21). Clearly, atlas makers were aware of the impact that the choice of projection had on how a child would see the world. In order to offset the distorted areal relationship of the Mercator projection, many school atlases included a diagram which purported to show more accurately the relative sizes of the world's land masses (Figure 22).

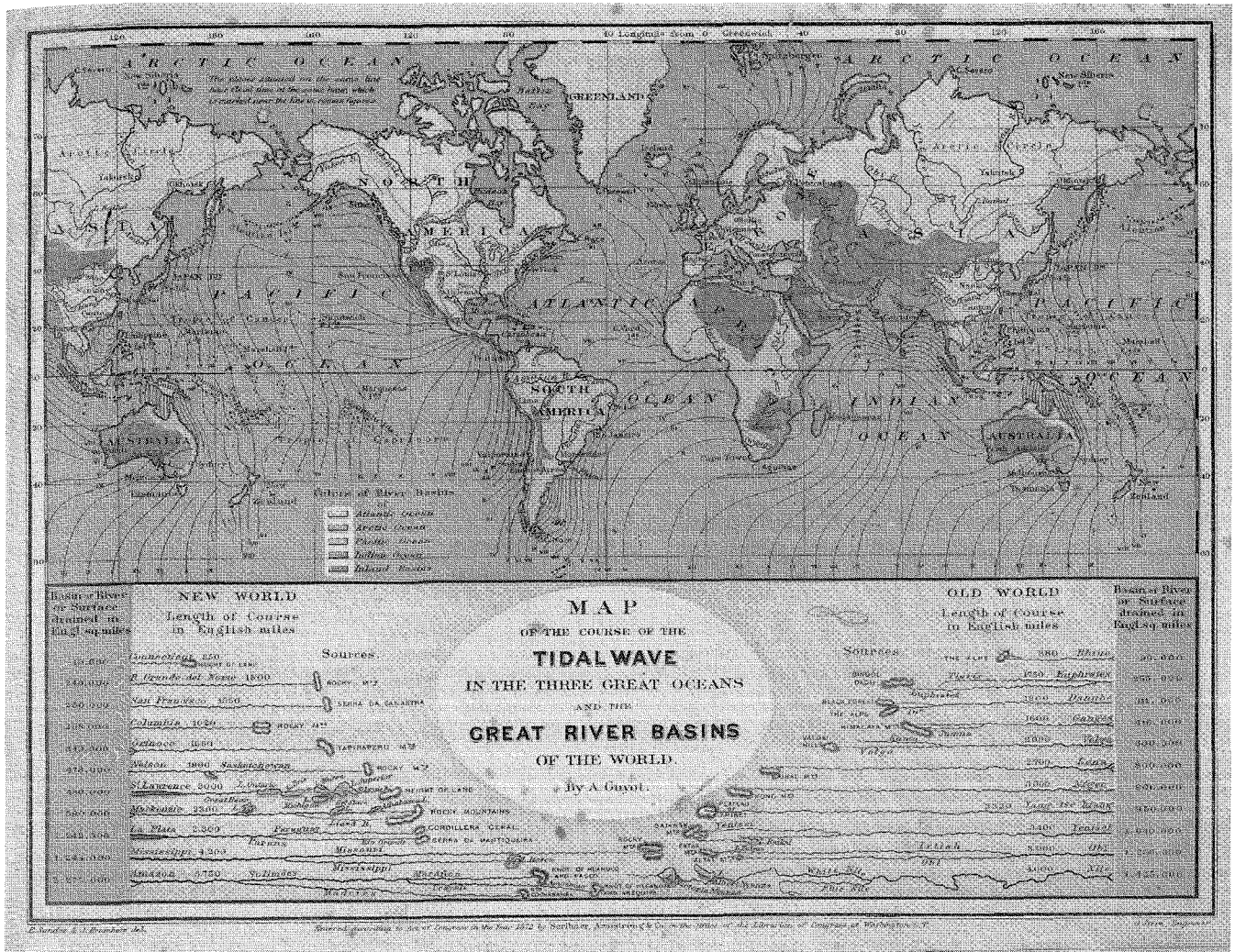


Figure 21. "Map of the Course of the Tidal Wave in the Three Great Oceans and the Great River Basins of the World". Like most thematic maps, especially those displaying quantitative or scientific data, this map by Arnold Guyot (1873) utilizes the Mercator projection. Map courtesy Chris Schierkolk.

For today's cartographers, what occurred during the first few decades of the nineteenth century should seem remarkably familiar. Scientific exploration and surveying of the world brought a new level of geodetic accuracy to nineteenth century maps, much as digital data bases, GPS, and satellites have at the end of the twentieth century. Like inexpensive computer software, color printers, and, most of all, the Internet, nineteenth century advances in printing technology, the introduction of cheap wood pulp paper, and compulsory education, resulted in an explosion in the number of maps and a democratization of access to geographic information. At the beginning of the nineteenth century, the publishing of geographies and atlases was an urban "cottage" industry operating on shoestring budgets; by the middle of that century, maps and textbooks had become a lucrative, intensely competitive business dominated by a handful of large corporations, the historic equivalent of the ESRI, ERDAS, or Intergraph story. Perhaps the most important parallel is that during both time periods, the nature and functions of maps was forever altered. The intellectual opportunities afforded to nineteenth century geographers, educators, and students by the embracing of thematic mapping may have been as great as those

FINAL COMMENTS

"At the beginning of the nineteenth century, the publishing of geographies and atlases was an urban "cottage" industry operating on shoestring budgets; . . ."



Figure 22. A portion of a chart from the Atlas to Accompany Smith's New Geography (Smith, 1839). It was included so students would be aware of the "true" sizes of the world's great land masses.

"... the objectives of thematic cartography and the graphic means to meet them had nearly all come into being by about the mid-nineteenth century"

"... the second half of the century saw the consolidation of cartographic empires ..."

being afforded by geographic information systems and scientific visualization to today's geographers.

A remarkable aspect of the introduction of thematic maps was the rapid rate with which new graphic techniques to portray data were developed and refined. These included the choropleth, dasymetric, proportional symbol, isopleth, and dot map. As Robinson notes, "... the objectives of thematic cartography and the graphic means to meet them had nearly all come into being by about the mid-nineteenth century" (1982, p.26).

While the first half of the nineteenth century saw the introduction of a new mapping paradigm, thematic maps, and great technological advances in printing, the second half of the century saw the consolidation of cartographic empires, the refinement of technology leading to less expensive maps that could be quickly and more easily updated, and map design driven by an educational methodology based on memorization. Many of the companies that started in the second half of the nineteenth century would continue to dominate well into the twentieth. The small print shop opened in Chicago by William Rand, and renamed Rand McNally when Rand made his printer, Andrew McNally, a partner, would become the largest commercial publisher of maps and atlases in the world, a position they still hold today.

The purpose of this paper was to broadly identify the development and characteristics of maps in early American school atlases. Each of the forces covered in this paper that shaped the American school atlas should be examined in more depth and linked to the broader social, cultural, economic, pedagogic, and technologic landscape that was nineteenth century America. As Norman Thrower (1972) reminded us over twenty five years

ago, "the map is a sensitive indicator of the changing thought of man, and few of his works seem to be such an excellent mirror of culture and civilization" (p.1). School atlases are perhaps a unique and unclouded "mirror." The material found on their pages was presumably carefully considered and reviewed, so that the selected information was that which one culture believed its children should come to know. During the nineteenth century, tens of millions of school atlases were sold and generations of American school children came to know their world as it was presented between the scuffed covers of their Mitchell, Cornell, Rand McNally, or Colton school atlases.

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ACKNOWLEDGMENT

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