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DEVELOPMENT  
OF THE  
AMERICAN ATLAS:  
1790-1980

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JUNE 1989

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California Map Society



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## **ABOUT THE AUTHOR. . .**

Judith A. Tyner is a longtime member of the California Map Society. She served as Southern California Vice President for a number of years. Dr. Tyner received her doctorate from the University of California at Los Angeles with a specialty in cartography. Her dissertation addressed persuasive cartography - how maps were used to persuade people. Currently, Dr. Tyner is Chair of the Geography Department at California State University, Long Beach. She is involved in two research projects: 1) the study of early Philadelphia map makers and 2) the study of embroidered maps. She is looking forward to completing an introductory textbook on Geography in the near future.

## **DEVELOPMENT OF THE AMERICAN ATLAS: 1790-1980**

Indigenous American atlas cartography had its beginnings in 1795 when the Philadelphia publisher Mathew Carey decided to add an atlas to his line. Since that time, U.S. atlases have undergone many changes, but there has always been a distinctly American style.

History of cartography, like a history of art, can be regarded as a record of changes in styles through time. The style of a work of art or a map is a function of its historical period. The appearance of atlases and maps is influenced by the interaction of three basic categories of factors: technological, which includes printing methods, tools and materials; cultural/social, which includes world events, laws, tariffs, and styles in the other graphic arts; and informational, which includes new descriptive and statistical data about the physical and cultural worlds. In the nearly 200 year history of American atlas cartography several style periods can be identified, and in each period there has been a primary atlas producer who exerted a major influence on atlas styles.

Arthur Robinson has described the history of cartography as a series of cliffs and plateaus or gently sloping plains. The cliffs represent periods of rapid change or revolutions; the plateaus represent periods of little or gradual change. Robinson believes that revolutions come about primarily where there are shifts in the intellectual aspects of cartography, for example mental models and concepts that motivate cartographers, and secondarily from technical factors such as printing techniques, improvements in drawing tools and the like.<sup>1</sup> To these I think a third element, increase in factual knowledge, should be added. The steepest cliffs occur when all of these factors are present--a shift in thinking, the introduction of a major new technology, and an increase in factual knowledge which can be represented spatially. The cultural/social factors, while important in some periods, are a lesser influence.

The nearly 200 year history of American atlas-making covers two major "cliffs" and several smaller inclines. These are reflected in changes in the form and content of atlases and allow us to divide the history into several periods.

My purpose in this paper is to examine changes in the form of general atlases produced in the United States and to provide some explanation for these changes.

Prior to the Revolution, atlases were made in Europe and most of those used in the United States were published in England or France, although some of the individual maps,

especially of the states, were drawn by local cartographers. This situation was due in part to the lack of skilled craftsmen and limited tools and equipment. Even locally produced paper in the colonial period was of poor quality. By the end of the Revolution the situation had changed and a number of elements had combined which permitted American commercial atlas publishing to develop and flourish. These elements were:

1. Independence.
2. Exploration.
3. Development of statistics as a field.
4. National censuses.
5. Rise of thematic cartography.

Independence was, of course, the major factor. The 1790's began a period of deliberate Americanization. There was strong feeling that the new nation should be independent in all fields. In addition, there was an information explosion. Regular censuses were initiated throughout the Western World--the first United States census was taken in 1790--which supplied the new field of statistics with data; scientific exploration, begun in the eighteenth century and continuing throughout the nineteenth century, provided increased knowledge of the physical world. The discoveries of James Cook, Alexander von Humboldt, Lewis and Clark, Long and other explorers produced a wealth of mappable data for cartographers in both Europe and the United States. Thematic maps of various subjects were becoming more common--the nineteenth century is the period of most rapid development of thematic maps. At the same time, population in the new country was increasing rapidly and the westward migration had begun. There was increased need for and interest in, maps and atlases.

In 1790, Philadelphia was the second largest English speaking city in the world. It was the heart of commerce and the seat of government. It was also the center of publishing for the colonies and the newly formed republic. Here could be found printers, engravers, booksellers--all of the necessary ingredients of the book trade. It was inevitable that atlas publishing should have its beginnings here.

Mathew Carey of Philadelphia, who played a leading role in the history of American publishing, literary as well as cartographic, was the first American to integrate all of the factors. In 1795 he published an atlas to accompany an American edition of *Guthrie's Geography*, a popular English textbook, and thereby instituted American atlas publishing. Over the next 30 years the Carey firm published several different atlases, many of which went through multiple editions.

The Carey establishment, unlike European atlas publishers of the period or later American publishers, was primarily a general publishing company, not solely a cartographic firm. It did not employ engravers, cartographers, and map colorists on a full-time basis, but rather employed craftsmen as needed.

From 1795 to 1820, atlases exhibited little uniformity of style. Since each map was drawn and engraved by an individual, there was considerable variation in title style, border and use of illustrative materials. Atlas maps were almost invariably signed by their engravers, and the same limited number of names is encountered repeatedly—Amos Doolittle, Benjamin Tanner, and William Barker especially. Although some engravers specialized in map work, the majority, like Doolittle and Tanner, also engraved illustrations, bank notes, and the like. Few of the American engravers are considered great artists (their portrait work was often crude), but their map work is generally clean and attractive without unnecessary swirls and flourishes. Erwin Raisz compared the appearance of maps in this early period to the architecture of the time because of the clean cut lines, simple border cartouches.<sup>2</sup> Maps in the early period were engraved on copper plates and the pages were 'tipped' into the book. Because they were engraved, the pages were printed on only one side. Color was applied by hand and was most often used along the borders of countries or states. Hand coloring, of course, raised the price of the atlas. Some individual maps bound into atlases bear the notation 'penny plain, twopence colored.' (Carey's *General Atlas of 1817* was \$12 'plain' \$15, divisions colored, and \$16.50, full colored).

There was little use of text pages in these atlases. The volumes were normally simply a collection of maps. Because text and maps were printed by two different methods, letter press and copper engraving, to include maps and text on the same page was a cumbersome and expensive process, and therefore, seldom done. A rare example was the American edition of Lavoisne published in 1820 by Carey and printed by T.H. Palmer in Philadelphia. It was priced at \$30, half bound, a considerable amount which reflected the printing costs.

In most cases the atlases did not have indices or extensive legends. Initially, the index, when included, was more of a table of contents and referred to entire countries, but as time went on, more indices were used to designate specific point locations. The geographic grid was the usual reference system, but since a single prime meridian had not yet been adopted, this presented some problems. In United States atlases the common solution was a dual meridian system. Since the maps of Europe were often made in England or copied from English maps, they, of course, had London as a prime meridian, but those of the United States had both London and Philadelphia (later Washington, D.C.). The longitude from one prime meridian was shown along the top of the map and from the other along the bottom.

Normally, the only symbols indicated in a legend were simple abstract symbols for state capitals, canals, and the like. Symbols used for swamps and woodlands were pictorial and rarely shown in the legend. Apparently such symbols were considered self-explanatory, perhaps because map reading and map symbols were often explained in the geography books of the time. When relief was shown on the maps it was by hachures or molehills.

Content of the atlases tended to be fairly uniform, one or two world maps, maps of individual countries of Europe, the continents, and a series of state maps. The maps were almost exclusively political, but as might be expected, events and activities of current interest were treated in some detail. Thus, during the brief canal building era, canals were shown, and profiles of the canals were often used as insets. Township and rangelines were commonly shown on the maps of Public Land Survey States as well.

From the early days, tables of population for the United States were included, although those data were not always complete. The third edition of Carey's *American Pocket Atlas* bears the statement:

The publication of this volume has been considerably delayed, in the hope of procuring the census of the United States complete. But after waiting above three months, the return from Tennessee is still wanting; and it being absolutely uncertain when it will be received, the publisher is induced to withhold the work no longer.<sup>3</sup>

Tables of exports were also included in some atlases, but no thematic maps were included in the world atlases.

## **1820-1840**

About 1820 subtle changes began to take place in atlas cartography in the United States. One of the most important was that uniformly designed maps were beginning to be used. Although some maps still bore the name of individual engravers and draftsmen, atlases had begun to appear that were produced under the supervision of a single person or firm. Among the earliest of these were the Tanner brothers, Henry and Benjamin. Benjamin was an engraver in Philadelphia who had early specialized in engraving maps. His younger brother, Henry, joined him as an apprentice, and later became one of the major atlas publishers. By the mid 1840's the transition from individual to what could be called 'company' engraving was complete.



The maps in atlases now had uniform titles and borders, both of which became more ornate as the period advanced. Title pages tended to be full of swash lines and complex letter styles. The borders, especially on later Tanner atlases, were very intricate, often one-half inch wide with intertwined leaves or Greek key designs.

Atlases took on a more modern appearance in that they contained the kinds of information that we now associate with atlases. Indices became more common. An index was often given for each map, either on the same page or a facing page. These indices, if latitude and longitude were not used for reference, tended to be quite arbitrary, giving each town a number designation. Size of cities and other gazetteer-type information was often supplied in the index. Prefaces included lengthy discussions of map sources, and the editors were at great pains to certify accuracy.

There was still no internationally accepted prime meridian, so the custom of dual meridians continued. The meridians used were London and Washington.

## 1840-1880

By 1840 the center of atlas publishing, and indeed, publishing in general, had moved to New York. Only the firms of Carey and Lea and Samuel Augustus Mitchell remained in Philadelphia. Mitchell and George W. Colton (a New York firm) were the primary atlas producers. Mitchell took over the Tanner establishment and published atlases yearly from 1847 using the Tanner plates and equipment. The Colton family, which published from 1855 to 1883, not only was a prolific producer but also published atlases which compared favorably in quality with those of European firms.

In mid century, thematic maps and statistical tables used in conjunction with extensive text material became widespread. For the most part, the thematic maps stressed physical geography reflecting the material in the *Physical Atlas* of Stieler in Germany (1845). However, there were some attempts at mapping cultural phenomena, such as a map of morality in Woodbridge's *Modern Atlas on a New Plan*. Text material had increased to the point where some atlases were geographic-historic encyclopedias with more text than maps.

Printing methods were also changing at this time, and this was reflected in the appearance of atlases. Copperplate engraving was a costly process, and the plates wore down rapidly, which meant that large runs could not be printed without re-engraving. Steel engraving, which allowed a longer press run, had replaced copper in some instances, but the major change was the introduction of lithography. Although the technique was invented

in 1798, it was not widely used for maps until the 1840's. In most cases, during this period, the maps were not drawn directly onto a lithographic stone, but rather were converted from engravings to the stone or lithographic plate by a method called lithographic transfer. Litho-transfer was used on Mitchell's *New Universal Atlas* 1846. The linework of the maps had the appearance of engraving, but no plate marks could be felt and cheaper paper could be used. Most important, maps could be printed on both sides of the page.

While it was possible to print in color with lithography, normally maps were still printed in black ink and hand colored; color lithography did not come into extensive use in this country until the 1860's for illustrations and for atlas cartography somewhat later.

In 1842, Sydney Edwards Morse produced an atlas using a new printing technique which was to have a revolutionary effect on the character of American maps and atlases. This technique was wax engraving or cerography which made it possible to create a metal relief plate which was suitable for use in power presses and permitted the inclusion of line illustrations, such as maps with letterpress text. Before this time atlases which included letterpress on the same page as maps required a trip through two presses. Cerography resulted in maps which had a distinctly different appearance from those produced by any other method. For a 40 year period there was experimentation with the technique, but few atlases were made using the process until the 1880's. Its widespread adoption was delayed because the existing major companies did not want to convert to the technique. The Mitchell firm was still using Tanner plates, and change would have been expensive, since it would require all new plates. Colton, in order to compete successfully with European firms, continued engraving to match the quality of European atlases. Thus, it remained for a new company which could start fresh with the new technique to popularize cerography.

## **1880-1940**

The new company was Rand McNally which began printing railway tickets in the 1850's and in the 1870's began to specialize in map making using cerography. Their first general world atlas<sup>4</sup> was published in 1881. The firm credited its use of the 'modern' method of wax engraving with its instantaneous success in map publishing and rapid rise to primary American map publisher.

The impact of wax engraving on American cartography was so profound that there was little change in the overall appearance of atlases until World War II, a period of 60 years. The maps themselves had a distinctive mechanical appearance which was much criticized, especially by Europeans, who had not adopted the technology. In fact, since the technique

was used almost exclusively by American map makers, David Woodward characterized the style of the resulting maps as the "All American Map".<sup>5</sup>

Several new map companies were established at about the same time as Rand McNally, notably George F. Cram and Co. and Donnelly and Sons, both of Chicago, and Matthews-Northrup in New York. C.S. Hammond, who originally worked for Rand McNally began his own publishing firm in the early 1900's. Chicago became the center of U.S. atlas publishing.

All of the new firms used wax engraving and printed their maps in color. For the most part the maps were political and made only a token show of relief by means of hachures. Borders of states and countries were tinted even on many otherwise black and white maps--probably a holdover from the days of hand coloring.

Many of the atlases were quite large--unwieldy folio size with much text. Rand McNally's first general atlas, the *Indexed Atlas*, was 872 pages. The company boasted this atlas was a library in itself.

Also included were detailed instructions on the use of the new index system of a grid of letters and numbers commonly found on maps today.

Abundant illustrative material was included, such as views of cities, flags of the world, and races of mankind. Tables of post offices and county seats were printed in some atlases. Thematic maps of cultural subjects such as agricultural dot maps were small and most often in black and white. Much statistical data was included, and often these data were illustrated by very imaginative color graphs. Maps showed individual states and countries rather than regions.

The maps of the late nineteenth and early twentieth centuries were considered far inferior to those produced in Europe. The appearance of the typeset names was especially offensive to many because it was felt that a cluttered, mechanical, hard-to-read map resulted. The maps were also criticized for poor color registration and a lack of completeness and accuracy.

Although there were some exceptions to this general appearance, notably the *Century Atlas* of 1897, made by Matthews-Northrup, there was no major change in the basic appearance of the atlases and the general technique used. Although the printing method was certainly a major factor, the lack of change is also partially attributable to a tariff which was imposed on the import of books and maps. The tariff was increased for maps after

considerable argument by U.S. map-making firms who did not want European products imported. This certainly limited both competition and diffusion of ideas.

Even without these limiting factors, changes do not usually occur abruptly in atlas publishing, inasmuch as there is a necessary lag of several years between the conception of a new atlas and its actual publication. Thus, there is frequently a period of experimentation or transition between the major periods.

Such a transition period occurred during World War II and the years immediately after. The War itself produced many technological advancements, such as a gradual change-over from wax engraving to photo-offset.

The emphasis of the air age and the beginnings of the space age had an effect on the kinds of projections used and type of relief representation. The sphericity of the earth was 'rediscovered' and azimuthal projections became popular. Erwin Raisz and Richard Edes Harrison both produced atlases based on azimuthal projections. Experimentation with relief or terrain representation resulted in photographs of relief models, naturalistic tints, and plastic shading.

Atlases of the last thirty-five years are quite different from those of the turn of the century in appearance, although encyclopedic atlases reminiscent of those of the later part of the nineteenth century are once again common. Descriptions of peoples, cultures, settlement types and the like are frequent subjects. Thematic maps of all kinds are widely used.

An example of the trend is Rand McNally's *International Atlas* planned in the 1950's and first published in 1960. While it was published by Rand McNally and the maps conform to a standard format, it was an international project. It is printed in 4 languages and has city maps all on a uniform scale; general map coverage is regional. Since the maps in this atlas, with some variation, are used as the most recent Encyclopedia Britannica Atlas, perhaps this is an indication that U.S. published atlases have come of age.

## **The Future**

A new period is beginning, and the changes will be considerable. We have entered the space age and are only at the threshold of the computer era in atlas publishing. In the past two decades the computer has had an impact on cartography which is only comparable to the impact of the printing press. It is very likely that the changes in the next ten to twenty years will be more profound than any we have seen before. Maps viewed on a screen are already available for automobiles, and one of the major producers of street atlases is in the

process of converting atlases to a form for viewing on a computer. In fact, within the lifetime of virtually everyone reading this paper, standard atlases will probably be in machine readable form and maps of any topic, any place, on any scale will be called up on our home computer screens.

## NOTES

1. Arthur Robinson. *History of Thematic Cartography*, Chicago: University of Chicago Press, 1982, p. 13.
2. Erwin Raisz. *General Cartography*, New York: McGraw-Hill, 1948, p. 48.
3. Mathew Carey. *American Pocket Atlas*, 3rd ed., Philadelphia: M. Carey, 1805.
4. The firm produced business atlases earlier.
5. David Woodward. *The All American Map*, Chicago: University of Chicago Press, 1977.