A Journal of the
MAP AND GEOGRAPHY ROUND TABLE OF THE AMERICAN LIBRARY ASSOCIATION
No. 15, 1999

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CALENDAR

ALA Annual Meeting:
New Orleans
June 24-July 1, 1999

IFLA Annual Conferences:
Bangkok
August 19-28, 1999

International Conference on the History of Cartography:
Athens
July 11-16, 1999

Meeting and exhibit announcements should be sent to the Editor.

NEXT ISSUE
GIS in Libraries at the Millenium

This end-of-century issue will include articles by David Cobb (GIS Impact on Library Services); Patrick McGlamery (Role of Statewide GIS Services); James Boxall (GIS in Libraries in Canada); Nick Millea (GIS in Libraries in the UK); Mary Larsgaard (Alexandria Project and Beyond?); Tom Parris (Harvard’s GeoSpatial Data Liboratory); and perhaps another surprise contribution or two. This issue looks at the role of GIS services in libraries and will review several ongoing applications.

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Editorial

This special issue of *Meridian* was guest edited by Judith Tyner, Professor of Geography at California State University at Long Beach. We are indebted to her continued interest and expertise in the subject of women in cartography. Readers are reminded that *Meridian* also has shown an interest in this subject with previous articles: "Pre-Twentieth Century Women Mapmakers" by Alice C. Hudson (No. 1, 1989) and "Women's Contributions to North American Cartography: Four Profiles" by Mary McMichael Ritzlin (No. 2, 1989).

This particular special issue continues to add to the important role that women have played in the history of cartography. While that role is receiving its due recognition, there remains considerable research to be undertaken. *Meridian* not only encourages this research but would invite results of such research to be submitted for publication.

Dymon and Kaye’s "Maps and Women" addresses the issue and names of those women who were hidden behind the men in the field of mapmaking. We are introduced to the wives, daughters, widows, and teachers who made significant contributions and shown where additional research is needed.

Ritzlin’s "Sweeping the Skies" reveals the significant role that a small minority of women contributed to the field of astronomy. Their names may not be familiar to everyone, but they show that a struggling single mother, a Yankee librarian, and a one-time concert performer may provide inspiration for a new generation of women scientists.

Tyner’s "Millie the Mapper and Beyond" article reviews the notable role of women in the growth of cartography during World War II, and their continued role in academic disciplines and professional organizations after the war. During this post-war period, women increased in their numbers and moved from often "invisible" positions to more visible and responsible ones.

This issue also includes a Memorium for Helen Wallis by Norman Thrower and a Research Note from Alice Hudson concerning her project on women in cartography.

Readers are encouraged to submit papers, research notes, and other publication materials to the editor.

David Cobb
January 1999
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Maps and Women

Ute J. Dymon,
Associate Professor of Geography,
Kent State University

and

Margit Kaye,
Librarian,
Yale University Map Collection

What is done or learned by one class of women becomes, by virtue of their common womanhood, the property of all women.

-Elizabeth Blackwell

Women cartographers have made many contributions to the field of cartography over the years. However, women's contributions in the field of mapping were absent in the documentation of the history of cartography. In recent years, scholars have identified that women mappers often were hidden behind initials or husbands' names, making it difficult to identify them. Other women whose names appeared on maps and globes are just now starting to be discovered and recognized for their part in advancing the science of mapping. Identifying the role these women played within society provides us with an understanding of their contribution to the field of mapping as well.

The fascinating contributions of women cartographers through the ages have been overlooked by most scholars attempting to present the history of cartography. Therefore, many female cartographers were delighted to learn that Penny Barckley and Alice Hudson started their research project on early women map makers. The absence of women's names in the history of cartography was highlighted with Norman Thrower's book, Maps and Man, which inspired the title of this paper. In Thrower's updated version of this book, the title became Maps and Civilization.

Others have picked up on the gender topic of women in cartography. Judith Tyner conducted a research project on Westtown School. Her depiction of the cartographic roles women filled during and after World War II supports the notion of a "Millie the Mapper" striving in that war effort in tandem with women factory workers. After teaching the History of Cartography several times, I became plagued by the question, "Where are the women in our cartographic history?"

Despite the absence of references to women in publications about the history of cartography, recent historical research reveals that many women made major contributions in the field of mapping. Like their male counterparts, women were map sellers, engravers, publishers, cartographers, colorists and globe makers. Brian Harley (1989) suggests "that we should encourage an epistemological shift in the way we interpret the nature of cartography," and he claims that a deconstructive turn of mind may allow cartographic history to take a fuller and richer direction. By identifying and recognizing women's contributions to the field, our understanding of
What motivations or reasons led women to choose this unconventional profession?

Widowed with nine children to raise, Mary Biddle received significant assistance from her father...

Traveling extensively throughout Canada with her husband, Elizabeth Simcoe kept a diary which included many maps and drawings of the landscape.

The Daughters
Many daughters who became involved with a family map business at an early age learned the trade while growing up. They can be found in all aspects of mapping. Continuing her father’s work after his death in 1651, Virginia Farrar published an updated version of her father’s Map of Virginia which bears the name “Domina Virginia Farrar.” Her father’s progressive thinking allowed Virginia to receive an excellent education for a girl of her time, resulting in her ability to complete and update the map her father started (Ritzlin, 1989).

Widowed with nine children to raise, Mary Biddle received significant assistance from her father, who not only maintained his own family, but also his grandchildren. In 1762, Mary Biddle edited a map of Philadelphia by her father, Nicholas Scull, which bears her name.

The work of Eliza Colles, a woman engraver who started working for her father by the age of thirteen, was documented by Walter Ristow (1980). Her father announced a proposal for the publishing of a Survey of the Roads in the United States of America. The Survey was to be published in parts; however, it did not receive financial backing and was never completed. He embarked on another project, The Geographical Ledger and Systematized Atlas. This project also failed to receive financial support, and only parts of it were published. Eliza’s name is engraved on several plates of her father’s Geographical Ledger and Systematized Atlas, revealing her skillful work. Without formal schooling or training, the assumption can be made that her father was her mentor who taught her the skills of engraving. Unfortunately Eliza died in 1799, at the age of twenty-three, and we will never know whether or not her name would have appeared as an anomaly on the list of the great male mappers.

The Wife
Traveling extensively throughout Canada with her husband, Elizabeth Simcoe, the wife of the Governor General of upper Canada, kept a diary which included many maps and drawings of the landscape (Ritzlin, 1989). An artist and a keen observer, she enjoyed sketching and drawing her experiences. Elizabeth produced small and large maps including her famous birch bark map made around 1792.
The Widows

Colette Hondius continued her husband's business after his death in 1612; however, Jodocus Hondius still received credit for the maps and atlases published by his wife. Similarly, the widows of Guillaume De L'ille and Jodocus Jansson continued to publish maps after the deaths of their husbands (Tyner, 1997).

Mary Overton, the second wife and widow of Philip Overton who died in 1744, took over his map publishing business and advertised in the Scottish General Advertiser the availability of a catalogue of about 800 maps and plans of both ancient and modern geographers. A copy of the catalogue has never been found. (Riet Van Alkemade Clements, 1998). Mary is mentioned several times in Donald Hodson's County Atlas of the British Isles. Three years after her husband's death, she sold the business to Robert Sayer. Tooley (1979) mentioned Philip Overton in his detailed inventory of mapmakers but did not mention Mary. She, like most women of her time, continued her work under her initials, rather than her full name. Clearly, to maintain their livelihoods, these women continued their husbands' businesses but made their own contributions to these business ventures.

The Teachers

By the end of the 18th century, women educators appeared and made cartographic contributions mainly for the purpose of educating pupils. In some schools such as the Westtown School, a Quaker boarding school near Philadelphia, the construction and use of globes became an established part of the curriculum. Judith Tyner's documentation of the Westtown School describes the experience of young women making a globe (Tyner, 1996).

Emphasizing the use of globes and maps in the classroom, Emma Hart Willard (1787-1870) changed the educational experience for young women by introducing map making and new teaching methods in geography. She not only taught her students how to produce hand-drawn maps, but included in her lessons how to use surveying techniques. She also co-authored with William Channing Woodbridge an American school atlas (Lutz, 1974).

By the early 1800s, the increased use of globes may have been another improvement in geography education. Elizabeth Mount (1806-1850) was the only child of Judge John S. Mountby of Setauket, Long Island. She was only 16 when she produced a terrestrial globe in 1822. This large size globe, 72.5 x 69.5 cm in diameter, has exceptional details. The globe has soft maple legs, a black cherry.

Figure 1. New Terrestrial Globe by Elizabeth Mount, Setauket, Long Island, 1822. By courtesy of the Yale University Garvan Collection.
constructed in the British Isles in the 1770s, and later this type of sewing art diffused to America where needlework was taught in the schools. An 1818 map sampler of Europe by Lydia Smith can be found in the Yale University Map Collection. (Figure 2).

Amelia Giddings was only nine years old when she embroidered in 1815 a map of England. The counties are outlined in colored silk. Country names and major points of interest are carefully embroidered. The map was recently purchased for the Yale University Map Collection (Figure 3).

**Conclusion**

The contributions of women map makers are numerous. Just as the status of women in science as a whole is improving, we are just scratching the surface to identify the accomplishments of women cartographers. With the increasing opportunities for women to receive a high tech education today, a standout woman cartographer has emerged and has been recognized on the international scene. A far cry from sitting at home wielding a sewing needle is Jerrie Cobb, age 67, who qualified as an astronaut, but NASA never gave her the opportunity to fly in space. Several South American countries have honored her for her mapping of dangerous areas in the Andes.

Each discovery of the contributions of women to mapping enriches all of us and hopefully the “hidden cartographers” will become part of any History of Cartography published in the future.

**Literature Cited**


Personal Conversation with Riet Van Merdick
Figure 3. Map Sampler of England by nine-year-old Amelia Giddings, 1815. By courtesy of the Yale University Map Collection.
INDEX AND CARTO-BIBLIOGRAPHY OF MAPS, 1789–1969

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Edited by Donna P. Koepp, Government Documents and Map Librarian, University of Kansas

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The Index and Carto-Bibliography of Maps is being produced under the editorial direction of Donna P. Koepp, government documents and map librarian at the University of Kansas. The indexing work was done at the University of Kansas with support from the University. Additional support was provided by National Endowment for the Humanities grants and by a U.S. Department of Education Title II-C grant.

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While women were seldom encouraged to study the sciences in centuries past, botany and astronomy seem to be exceptions. In several instances, contributions by women were not only acknowledged in their lifetimes, but also praised. Why is this?

Botanical specimens might be brought from afar or merely collected in one's own garden, but they would usually be studied and painted at home. Likewise, astronomical observations were conducted from one's own rooftop; calculations were made in one's own study. Generally, these pursuits could be accomplished close to home, no doubt reassuring to society.

In my search for pre-20th century "map ladies," names of women astronomers keep appearing. This article will discuss a few of these pioneers such as Sophia Brahe, Maria Cunitz and Elizabeth Hevelius. These led the way for more familiar names — Caroline Herschel, Maria Mitchell, and the more numerous late 19th century women who set their sights on the heavens.

Even before Linnaeus' work popularized the study of botany for both sexes, even before the Enlightenment created educational opportunities in ever-widening circles, a book on astronomy — aimed particularly at a female audience — was published in France. It was de Fontenelle's *Entretiens sur la pluralité des mondes*, and its success was such it went through many editions in the western European countries, as well as France.

Bernard Le Bouyer De Fontenelle (1657-1757) was the nephew of Pierre Corneille. A man of wit and letters, he wrote on a variety of topics, occasionally skirting accusations of heresy; his wide-ranging interests led him to the study of astronomy. The heliocentric theory was not widely held in France, and de Fontenelle took it upon himself to "get the people of France — or at least the ladies of the Salons — to understand the rotation and revolution of the earth, and the Cartesian theory of vortices" (Durant 1963, p. 618).

First published in 1686 and purporting to be an account of five evenings (six, in his next edition) spent in the company of the charming but imaginary Marquise de G., lecturing her on the solar system. Not without errors, it was revised by de Fontenelle for successive editions to 1742 (DSB, Vol. V, p. 59).

The first English translation appeared in 1688 and is significant on several levels, for the translator was a woman — the notorious Aphra Behn (1640-89). Considered the first woman to earn her living by her pen, the one-time spy and woman of letters explains in her dedication (to the Earl of

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The heliocentric theory was not widely held in France, and de Fontenelle took it upon himself to "get the people of France...to understand the rotation and revolution of the earth..."
Behn’s defense of Copernicus, and her comparing Biblical explanations of geometry, chronology, and astronomy versus theories of the new sciences could have been very disturbing to her more orthodox readers.

Drumlangrig) that she found the French book amusing. And “I thought an English Woman might adventure to translate anything a French Woman may be supposed to have spoken...”

But it is Behn’s preface — an essay of more than 20 pages to a work of approximately 150 pages — which is remarkable. Behn’s biographer, Maureen Duffy, writes “In many ways the introductory essay is one of the most daring things she ever wrote. It defined her religious position unequivocally, it defied St. Paul’s law about women preaching even though it wasn’t done in a pulpit, and the world’s law that the new sciences were for men” (Duffy 1979, p. 272).

Filled with now obscure references to 17th century political and religious controversies, with many pages devoted to comparative philology, Behn also criticized the Frenchman on his handling of the character of the Marquise. He “introduceth a Woman of Quality whom he feigns never to have heard of any such thing as Philosophy [science] before,” and “he makes her say a great many very silly things...” (Behn, 1688, unpaginated preface).

“It is hard for us today to understand the boldness of what she has done,” writes Duffy (p. 273); Behn’s defense of Copernicus, and her comparing Biblical explanations of geometry, chronology and astronomy versus theories of the new sciences could have been very disturbing to her more orthodox readers. But Behn concludes that the Bible may be taken allegorically on these subjects. It was nearly the last of Behn’s writings and may serve as a fitting epitaph to a remarkable life.

Behn’s skill in creating lively conversation for the Restoration stage is evident in her translation which shines compared to a more pedestrian version in 1715 by William Gardiner, though his edition did include a frontispiece. The upper half showed the planets set among clouds, while the lower half had a scene of the author and the Marquise in her garden. The popularity of this work in England is evidenced by yet another edition in 1728. In 1719 John Harris published his Astronomical Dialogues Between a Gentleman and a Lady... And as late as 1841, American astronomer and educator Denison Olmstead published a spin on astronomy for women in his Letters on Astronomy, Addressed to a Lady.

The number of translations, over an extended period of time, suggests that the educated woman’s interest in astronomy was no passing fad. Yet even before de Fontenelle’s imaginary lady appeared in print, several women had not only interested themselves in astronomy, but had made real contributions to the field.

One of Tycho Brahe’s “able assistants” at Hven was his younger sister, Sophia (1556-1643), whom Tycho addressed as “Urania” — while modestly calling himself “Apollo” (Cade 1947, pp. 88-89). Sophia was the only one of his siblings to share his interest in astronomy.

“The lunar eclipse of the eighth December, which he had computed in the book on the new star [of 1572], was duly observed, and he was on that occasion assisted by his youngest sister, Sophia, at that time a girl of 17 years of age, highly educated, and not only conversant with classical literature, but also well acquainted with astrology and alchemy, and therefore in every way fit to assist her great brother” (Dryer, 1890, p. 201).

Sophia could also cast horoscopes, dabbled in medicine (inventing an anti-plague elixir), and involved herself — ruinously as it turned out — in alchemy.

This aristocratic and educated lady often visited Tycho at
Uraniborg, and whenever she did "was received with open arms, for she was rather a helpmate than a guest" (Gade 1947, p. 131). Sophia even met her second husband at Hven, astronomer Erik Lang; they married in 1602. Tycho named one of his daughters after Sophia, but neither the younger Sophia nor any of his other daughters seems to have taken an active interest in astronomy (Gade 1947, p. 193).

A near contemporary of Sophia was Maria Cunitz (1610-1664), the "Silesian Pallas" (EB 1910, Vol. 7, p. 633). Educated at home by tutors, her studies came under the guidance of Dr. Elias von Loven who encouraged her interest in medicine, poetry, painting, music, mathematics and languages. They married, but their happiness was marred by the disruptions of the Thirty Years War. Once they were forced to take refuge in a cloister, but in 1648 Maria was able to resume her studies and correspondence with other scholars (Ogilvie 1988, pp. 63-64).

Maria Cunitz produced a simplified version of Kepler's Rudolphine Tables, correcting some of his errors but making others of her own. Her Urania Propitia sive Tabulae Astronomicae mire faciles, vim hypothesim physicarum a Kepplero... was published in 1650, and contained three plates. It is extremely scarce.

This erudite lady shares a fate with several women in cartographic history—misidentification. The Dictionary of Scientific Biography gives her no listing of her own, although "M. Cunitz" is mentioned in the Kepler entry. In the general index she is identified as "Martin Cunitz."

Still another learned lady is Catherine Elisabetha Koopman (1647-?), the second wife of astronomer Johannes Hevelius. A wealthy businessman and amateur astronomer, Johannes built "what became, for a short period, the world’s leading astronomical observatory" (DSB, Vol. VI, p. 360).

Elisabetha, 36 years younger than Johannes not only presented him with three daughters, but also "played a considerable part in the running of the observatory" (DSB, Vol. VI, p. 360).

The daughter of a wealthy merchant, and very well educated, Elisabetha is shown working with Johannes in two illustrations from his Machinea Coelestis, (1673). As he also provided most of the engravings for his work (in addition to running a successful business and taking part in the civic life of Danzig, Johannes was a skilled engraver), we can deduce he was proud of his trophy wife—beautiful and intelligent.

Using a brass sextant with a six-foot radius (modeled on the one used by Tycho Brahe at Hven), Elisabetha "would keep the fixed radius aligned on the first star, while her husband directed the adjustable radius toward the second star, and then read the required angle on the scale" (CIH of A 1997, pp. 203-204) (FIGURE 1). This was not a job for weaklings; working year round in the open air in northern Europe, operating heavy machinery in the dark is not for the faint of heart. No wonder Johannes represents Elisabetha and himself in fur-lined garments while at work.

Their home and observatory was destroyed by fire in 1679, but they rebuilt, and by 1681 were at work again. After his death in 1687, Elisabetha edited and published Johannes' best-known work, the Prodromus astronomiae exhibens fundamenta qua tam ad movum plane et correctionem stellarum... with the accompanying atlas. The Firmamentum Sobiescianum sive Uranographia contained 56 copper-plates engraved by Johannes before his death; the text and atlas were published in 1690 (Warner 1979, pp. 112-113).

These ladies of the privileged classes were the precursors of the educated women for whom de Fontenelle was writing.
classes were the precursors of the educated (or at least intellectually curious) women for whom de Fontenelle was writing. But if any of those women who purchased and read his book were inspired to pursue astronomy in a serious way, they left few public records. The next woman to make an impact on the history of astronomy came from an almost Dickensian background — she had actually been apprenticed to a milliner in her youth. Her name was Caroline Herschel.  

"Great men and great causes have always some helper of whom the outside world knows but little..." writes Maggie Herschel in the forward to her aunt’s memoirs. But "these helpers and sustainers, men or women, have all the same quality in common — absolute devotion and unavering faith in the individual..." (Herschel 1879, pp.v-vi).

Caroline, eighth child and fourth daughter was born to a regimental bandmaster and his peasant wife in Hanover on March 16, 1750. Twelve years younger than her famous brother William, she endured a hardscrabble childhood, with her father often absent. Her unwavering faith was put to the test more than once. When Caroline was only a toddler, William (age 14) enlisted in his father’s band in the Hanoverian Guards. After the Seven Years’ War he moved to England where he made his living as a music copyist and organist (CIH of A 1997, p. 231).

Though Caroline never speaks ill of anyone, it is apparent her mother was hostile to Caroline’s ambitions. She was denied all but the most basic education — a younger brother was kept from private lessons at home, since Caroline would have also benefited. This was a blow to the young woman, whose ambition was to learn French and music so she could become a governess. "...I could not bear the idea of being turned into an Abigail [lady’s maid] or housemaid..." (Herschel 1879, pp. 20, 21). Yet her mother insisted on Lina’s being apprenticed to a local milliner (EB 1910, Vol. 13, p. 391).

On a return visit to Hanover, William rescued his sister by taking her to England with him. In 1772, Caroline (after a few misadventures on sea and road) arrived in Bath where William had established a musical career. He immediately began to teach her music and voice, English — even simple bookkeeping since she was also to keep house. By way of "...relaxation we talked of astronomy and the bright constellations," Caroline recalled of her early...
days in Bath (Herschel 1879, p. 32).
As William’s hobby developed into a vocation, Caroline joined in wholeheartedly, giving up a promising career as a soloist. She “carried out extensive routine calculations, prepared catalogs and papers for publication, and even ground and polished mirrors…” (DSB, Vol. VI, p. 322).
She paid a price for her devotion to William and his almost obsessive interest in astronomy. On the night of December 31, 1783, she suffered a serious accident:

“The evening had been cloudy, but about 10:00 a few stars became visible, and in the greatest hurry all was got ready for observing. My brother, at the front of the telescope [the 20-foot telescope], directed me to make some alteration in the lateral motion, which was done by machinery, on which the point of the support of the tube and mirror rested. At each end of the machine or trough was an iron hook, such as butchers use for hanging their joints upon, and having to run in the dark on the ground covered a foot deep with melting snow, I fell on one of these hooks, which entered my right leg above the knee. My brother’s call, “Make haste!” I could only answer by a pitiful cry, “I am hooked!” (Herschel 1879, pp. 54-55).
William and his workmen rushed to help, but “they could not lift me without leaving nearly two ounces of my flesh behind… I was obliged to be my own surgeon…” When the local doctor tended to her injuries, he told Caroline “if a soldier had met with such a hurt he would have been entitled to six weeks nursing in a hospital” (Herschel 1879, p. 55).

Caroline kept a diary for several years, and her entries record a mixture of the sublime and mundane—from cleaning brass-work on telescopes and calculating revisions for Flamsteed’s Catalog, to entertaining Queen Caroline’s brother (who wanted to visit the Herschels’ observatory), to cutting out ruffles for the shirts which she made for her brother (Herschel 1879, pp. 60-61).
She was to discover eight comets between 1785 and 1797, some with the “comet sweeper” telescope William designed for her use. Although an extremely modest person, Caroline’s achievements did not go unnoticed in her lifetime. She received many letters of congratulations from leading astronomers. In 1787 she received a salary of £50 from King George in her capacity as assistant to William (EB 1910, Vol. 13, p. 391) and honors from the Royal Society (DSB, Vol. VI, p. 323), which published her revision of Flamsteed in 1798. The title block on John Cary’s New and Improved Celestial Globe credited new information obtained “from the Works of Miss Herschel…” (Van Der Krogt 1984, p. 85), and various numbers of the Mémoires Academie des Sciences contained maps with Miss Herschel’s latest discoveries (Warner 1979, pp. 184-185).
Nearing 50, William married a widowed neighbor. This was a shock to Caroline, who then lived separately but continued to work closely with her brother. She eventually extended her love and devotion to his only child who was born in 1792. Later to become a famous scientist and astronomer in his own right, achieving a knighthood, little John “may have been saved from being a withdrawn solitary by the remarkable relationship with his Aunt Caroline…” (DSB, Vol. VI, p. 323).
On William’s death in 1822, Caroline returned to Hanover, but continued her astronomical studies for many years. Not many likenesses exist of Caroline Herschel, and, apparently, only one survives from her youth: a silhouette cut shortly before her coming to England (CIH of A 1987, p. 233). However, a sensitive portrait of an aged but alert Caroline was made the year before her death in 1848 by Georg Buss, engraver to the court of...
Children of both sexes were introduced to astronomy as a pleasant educational activity...

Hanover. Demure in a cap and high-necked gown, Miss Herschel is seated at a small table, pointing to a chart of the solar system spread before her. With unaccustomed pride or vanity, she is not wearing her spectacles, but they are suspended from a ribbon around her neck (Friedman 1997, Entry 24).

Caroline Herschel's achievements were many, her honors far from inconsiderable. But by the end of the century, she rated only two slight mentions in Agnes Clerke's *Popular History of Astronomy During The Nineteenth Century* — and one of these a mere footnote (Clerke 1889, pp. 14, 112).

With the spread of public education, technical advances in telescopes and other scientific equipment, and exciting new discoveries, amateur astronomers of both sexes multiplied in the 19th century.

Many texts were published for the use of children and families such as Margaret Bryan's *Compendious System of Astronomy...* (1799, 1805), *Burritt's Atlas, Designed To Illustrate The Geography Of the Heavens*, (1835, 1856), and Eliza A. Bowen's *Astronomy by Observation* (1888) which contained four double-column pages of notes for teachers (pp. 4-8). “So numerous are the works on Astronomy, that some will think another not needed” wrote Asa Smith, apologetically, in the preface to *Smith's Illustrated Astronomy* (1850).

If you lacked a star atlas of your own, you could use the celestial globe at school, usually paired with a terrestrial globe. Should you wish to view the night sky but could not afford a telescope, you could purchase inexpensive “star-finders,” heavy cardboard devices with volvelles, offered by such publishers as Barritt-Serviss or Whitall (FIGURE 2).

Children of both sexes were introduced to astronomy as a pleasant educational activity, and before the explosion of modern light pollution, it was a hobby to be enjoyed at little cost. “No elementary science is so independent of expensive apparatus in schools as astronomy,” writes Bowen in the preface to her text (p. 8). In contrast to today's tight school budgets, a grammar school in Highland Park, Illinois, built an observatory for the children's use as late as 1930.

Many 19th century American girls were exposed to astronomy at an early age, some to follow it as a career, not a hobby.

“I have never forgotten [father's] calling me to the door in my eighth year and showing me the planet Saturn. My age at this period I calculated many years afterwards from the position of the planet.” Thus Maria Mitchell, America's first
woman astronomer, recalls her earliest encounter with the beauties of the night sky (Howe 1888, pp. 437-8). She also observed the eclipse of 1831 with her father, an equally memorable experience (Wright 1949, p. 2).

Born in Nantucket on the first of August, 1818, Maria was the third child in a family of ten. To support his large family, William Mitchell turned his hand to many trades from teaching, to serving as cashier of the Pacific Bank on Nantucket, to building a small observatory and compiling information for the U. S. Coast Survey (NAW, Vol. II, p. 555). He also rated chronometers for Nantucket whalers, a job Maria successfully filled as a young teen, during her father’s absence (Wright 1949, pp. 21-2).

After studying a year at Cyrus Pierce’s school (the first normal school in America), Maria returned to Nantucket and opened a girls’ school (NAW, Vol. II, p. 555). She was also employed as the librarian for the Nantucket Athenaeum.

With her love of mathematics and astronomy, Maria used her father’s observatory to study the night sky for her own enjoyment. On the evening of October 1, 1847, she discovered what became known as “Miss Mitchell’s Comet” (NAW, Vol. II, p. 55).

In spite of controversy over who spotted the comet first (there were several observers in Europe), Maria’s claim was upheld. She was even championed by British admiral and astronomer W. H. Smith who described her as a “young lady, industrious and vigilant, a good astronomer and mathematician” (Wright 1949, p. 64).

Congratulations poured in: Dr. Alexander Bache sent his regards to the “lady astronomer in whose fame I take personal pride having in some degree helped foster... We congratulate the indefatigable comet-seeker on her success; is she not the first lady who has ever discovered a comet? [Poor Caroline Herschell!]

The Coast Survey is proud of her connection with it” (Wright 1949, p. 65).

Elias Loomis devoted a chapter to “Miss Mitchell’s Comet” in his Recent Progress of Astronomy Especially in the United States, and Dr. Joseph Henry of the Smithsonian sent a congratulatory letter with a $100 prize, “gallantly awarded to Miss Mitchell” (Wright 1949, p. 65). In 1850 Louis Agassiz nominated Maria for membership in the American Association for the Advancement of Science, and the women of America presented her with a five-foot Alvan telescope (NAW, Vol. II, p. 555).

Along with the accolades came a gold medal from King Frederick IV.

With her love of mathematics and astronomy, Maria used her father’s observatory to study the night sky...

FIGURE 3. A Map of the eclipse of Feby. 12th in its passage across the United States, a copperplate engraving from The American Almanac and Repository of Useful Knowledge, For the Year 1831. Viewing this eclipse from her home on Nantucket at age 12 made an indelible impression on Maria Mitchell.
Her visit was covered by the local press, describing Maria as "the most distinguished lady mathematician and astronomer in the United States."

She sounds slightly apologetic; perhaps her frugal Yankee background made her feel that hired help was ostentatious.

Maria was an inspirational teacher, though somewhat unconventional regarding grades, attendance, and dress codes.

The Athenaeum, which arrived by mail on October 5, 1848, nearly a year after spotting the comet (Wright 1949, p. 64).

Maria continued as librarian at the Athenaeum as well as working as a "computer," collecting data for the U.S. Nautical Almanac Office, by whom she was employed 1849-68 (DSB, Vol. IX, p. 421). She also travelled, first to Chicago to visit the family of Gen. H.K. Swift in 1857. Her visit was covered by the local press, describing Maria as "the most distinguished lady mathematician and astronomer in the United States." They compared her only with Britain's Mary Somerville (Wright 1949, p. 99).

That same year Miss Mitchell traveled to Europe, where she met the leading scientists of the day, including Mrs. Somerville and Sir George Airy, Astronomer Royal. She also met Sir John and Lady Herschel (editor of Caroline's memoirs) (Howe 1888, p.445).

After her mother's death in 1861, Maria purchased a house in Lynn, Massachusetts for herself and her father. With his pension of $300 a year, and her salary of $500 from her work for the Coast Survey, they lived comfortably, but "...we were obliged to keep a [hired] girl, for I, having to support myself by computing, could not do housework" (NAW, Vol. II, p. 556). She sounds slightly apologetic; perhaps her frugal Yankee background made her feel that hired help was ostentatious.

Maria Mitchell then received an offer that was hard to refuse—an appointment as Professor of Astronomy at the newly organized Vassar College. To sweeten the deal, an observatory with a twelve-inch telescope (the third-largest in the U.S.) would be built for her (NAW, Vol. II, p. 556). Though concerned about uprooting her elderly father, she accepted after receiving his assurances he would not mind the change of scene (Howe 1888, p. 455).

After her father's death, she continued to live at the observatory. Her assistants were chosen from among her pupils, and it was their duty "...to photograph the sun at noon every pleasant day, and daily observations are several times taken upon temperature, clouds and rainfall" (Parton 1886, p. 329).

Maria was an inspirational teacher, though somewhat unconventional regarding grades, attendance, and dress codes. "In class Miss Mitchell is abrupt but kindly, expecting and obtaining from each student the best that she can do. With the plodding, modest girl, possessed of no brilliant qualities, but willing to work, she is always patient...to the superficial and conceited she shows little mercy..." (Parton 1886, pp. 328-329).

But Miss Mitchell had her playful side; every year she gave a "Dome Party" for her current and former students. Breakfast was served in the observatory dome "upon tables arranged in a circle around the walls, a rosebud and a tiny photograph of the dome being laid at each plate." The meal was followed by word games, poetry recitation, and singing; the event was described as "the unique social event in the college year" (Parton 1886, pp. 329-30).

Mitchell continued to travel; to Burlington, Iowa (1869) and Denver (1878) to observe solar eclipses; and to Europe once again in 1873 (NAW, Vol. II, p. 555). While on this journey she met Otto Wilhelm Struve, Director of the Pulkova Observatory in St. Petersburg, and his wife. Mme. Struve told her that a great many women in Russia were studying medicine, but not the other sciences because they "did not pay." "Neither did medicine pay to women until it was studied by them as a science. Ways open up when they are steadily sought," replied the forthright Miss Mitchell (Howe 1888, p. 458).

"She has always been noted for her liberal and enlightened opinions..."
upon religious and social affairs..." and was not afraid of speaking her mind (Parton 1886, p. 330). Mitchell was a member of the Association for the Advancement of Women, and served as president of that organization in 1870 (DSB, Vol. IX, p. 421).

Mitchell was beloved by her students, many of whom went on to carve careers in the sciences; twenty-five former students were to be listed in Who’s Who, including her successor, Mary Whitney (NAW, Vol. II, p. 556).

Honored and respected in her own time (the New England Women’s Club of Boston held annual “Maria Mitchell’s Day” celebrations for many years), Maria retired in 1886 and was named professor emeritus.

“Well, if this is dying, there is nothing very unpleasant about it,” she said shortly before her death on June 28, 1887 (American Heritage Magazine, Aug., 1967, p. 27). It is unfortunate that Maria’s sisters destroyed many of her papers after her death, deeming them too “personal.” Surviving notebooks and letters are housed in the Maria Mitchell Library in Nantucket (Wright 1949, p. 241).

Most portraits of Mitchell show her in late middle or old age (FIGURE 4); her strong features contrast oddly with her delicate lace cap and corkscrew curls. However, a charming three-quarter portrait of Maria as she looked in 1851 serves as the frontispiece in Helen Wright’s biography Sweeper In The Sky: The Life of Maria Mitchell.

Probably painted by a local amateur, Helen Dassel (not in Fielding), the painting shows Maria with her telescope. She looks youthful, her features refined, her hair braided into a coronet on the back of her head. Demure in her dark dress and lace collar, her smiling face hints at the young woman who was the toast of Europe and America.

There is no doubt, given the honors she received in her lifetime that Maria Mitchell served as a role model to young American women of the late 19th century. Her reputation as an astronomer, her gifts as a teacher, were well-known and provided inspiration not only to her students at Vassar, but to those young ladies able to attend the colleges and universities opening to them.

Mitchell’s successor at Vassar, Mary Watson Whitney (1847-1921), born the year of “Miss

...Maria Mitchell served as a role model to young American women of the late 19th century.

FIGURE 4. Portrait of Maria Mitchell at around age 65; from Daughters of Genius, a collection of biographical sketches by James Parton (1886).
Mitchell's Comet," was a member of the class of 1865. Her talents were such that Mitchell urged mathematics Professor Benjamin Pierce at Harvard to invite Mary to attend his class. He was happy to do so but was obliged to personally escort her to class, Harvard being closed to women in 1869 (NAW, Vol. 3, p. 603).

Upon her appointment as Astronomy Professor at Vassar, Miss Whitney also served as a mentor to her girls: "As a result of [her photographic studies] program, students trained at Vassar were soon in demand in the leading observatories in America" (NAW, Vol. 3, p. 603).

Mary Watson Whitney also left a memorable death-bed farewell. "I hope when I get to Heaven I shall not find the women playing second fiddle" (NAW, Vol. 3, p. 603).

Other women of Whitney's generation chose careers in astronomy, some with unlikely backgrounds. One was Williamina Paton Fleming (1857-1911), who emigrated from Scotland as a newlywed in 1878. Abandoned by her husband and left with an infant son to support, Mrs. Fleming worked as a domestic in the home of Edward C. Pickering, head of the Harvard College Observatory (DSB, Vol. V, p. 33).

In 1881 she began working at the Observatory as a copyist and "computer." But through her "studies of the objective prism spectrum plates...Mrs. Fleming became the leading woman astronomer of her day," discovering more than ten novae. She classified 10,351 stars for the Draper Catalog. "Like Maria Mitchell before her, she was during her lifetime the most famous woman astronomer in America" (NAW, Vol. II, p. 629). Her methods were later refined by one of the young women she supervised at the Observatory, Annie Jump Cannon (DSB, Vol. V, pp. 33-34).

In contrast, Annie Cannon came from a background of privilege and comfort not available to her mentor. Annie studied at Wellesley and Radcliffe before joining the staff at the Observatory in 1896. She developed the "definitive Harvard system of spectral classification," discovering along the way 300 variable stars. She became one of the first women to receive a Harvard Corporation appointment (as William Cranch Bond Astronomer in 1938). Her work on the Draper Catalog and the Draper Extension assures her a place in the history of modern astronomy (DSB, Vol. III, pp. 49-50).

Like Maria Mitchell, Annie Cannon's love of astronomy started early in life. While Maria was inspired by her father, Annie was influenced by her mother, who had taken an astronomy class as a girl. Had Mrs. Cannon read Olmstead's book as a youngster? Or studied from Burritt's star atlas?

As Mitchell gave her annual "Dome Party," Miss Cannon sponsored Easter egg hunts at her home, Star Cottage, for the children of neighbors and friends. And when she received a substantial prize for her work, she used it to establish the Annie J. Cannon Prize for women astronomers. Miss Cannon stipulated the prize take the form of a brooch, which one could wear daily rather than a medal, good only for display (NAW, Vol. I, p. 283).

This brief overview touches on the lives of but a few of the women who have made contributions to astronomy. Their names may not appear on stellar charts, but their discoveries, pioneer work in observation, in "computing," and stellar and planetary photography helped build our ever-expanding picture of the universe. From a struggling single mother, to a one-time seamstress and concert performer, to a Yankee librarian, the lives of Williamina Fleming, Caroline Herschel and Maria Mitchell can still provide inspiration for a new generation of women scientists.
NOTES

1. The author has not examined this edition and cannot say whether it is also a translation, or if Harris was simply inspired by de Fontenelle.

2. Among the letters received were those from Astronomer Royal Nevil Maskelyne, who referred to her as "My worthy sister in astronomy," and from Sir Joseph Banks who thanks Caroline "for advancing the science you cultivate with so much success." In July of 1790 French astronomer Joseph Jerome Le Francois De La Lande sent a letter addressed to "Mlle Caroline Herschel, Astronome Celebre, Slough." He saluted her as "Ma Chere Et Savante Commere" (Herschel 1879, pp. 87-90).

3. Maria's salary at the Nantucket Athenaeum was $60 her first year, raised to $75 her second year. She received another increase in her third year to $100 per annum; it remained at this level for the rest of her 20-year tenure at the Athenaeum.

4. Daughter of Vice-Admiral Sir William Fairfax and his second wife, Mary Somerville was born in 1780. Encouraged in her intellectual pursuits by her father and two successive husbands, she made her name through a reworking of Laplace's "Le Mecanique Celeste." This she did for the Society for the Diffusion of Useful Knowledge (1831), "which raised her at once to the first rank among scientific writers" (DNB, Vol. XVII, pp. 662-3). Somerville Hall at Oxford University is named for her.

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Millie the Mapper and Beyond: The Role of Women in Cartography Since World War II

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December 17, 1941, President Roosevelt signed a bill providing for an additional appropriation to the Army for the national defense effort. This bill included funds for expediting the completion of needed mapping in areas that the army designated as strategic.

"The agencies concerned will need a large increase in personnel. This is estimated at from 1,000 to 2,000 additional employees during the next year. The men needed should, of course, be young and able-bodied, and should preferably have a scientific background and have completed a short course especially directed toward this work." [italics mine]

A funny thing happened on the way to the war.

The Birth of Millie the Mapper

Even before the United States entered WWII, it was recognized that our maps were inadequate—out of date, insufficient coverage, and scattered in many collections. After December 7, 1941 there was an urgent need to correct the inadequacies and major training programs were initiated. The open letter to the fledgling Congress on Surveying and Mapping from the Committee on Education and Training for Defense Mapping detailed the plans. The Army Corps of Engineers would receive the money and USGS, the Forest Service, Soil Conservation Service and the Tennessee Valley Authority would be assigned funds as subcontractors to produce maps for areas that would be assigned. In order to provide the 1,000 to 2,000 personnel, the Committee hoped that engineering schools would establish recommended courses preferably for engineering juniors and seniors as well as for liberal arts students. The five recommended courses were topographic map drafting, two courses on use of surveying instruments and surveying field procedure, planimetric topography, and photogrammetry. Completion of any of these courses would permit a student to qualify for the Federal Civil Service examination and earn $1,440 to $1,620 per year.

From January 1, 1942 to April 15, 1942, 99 proposed courses related to topographic mapping were approved by 57 institutions in 30 states. There were two surprises. H.A. Sawchuck of the Civil Service Commission read a report of the Committee on Education and Training for War Mapping in which he commented, "An interesting feature is the growing tendency to enroll female students in these courses. Some of the Federal agencies concerned have indicated a preference for female eligibles for certain types of work such as drafting, computing, and photo-

Even before the U.S. entered World War II, it was recognized that our maps were inadequate.
The role of Millie the Mapper and the emergence of cartography as a discipline are closely intertwined.

At the American Congress on Surveying and Mapping annual meeting in June 1943, Douglas Trowbridge, a professor of Civil Engineering at New York University, noted that in his course on topographic mapping “24 students, mostly girls, completed our course last summer and 16 of them obtained positions in the office of the U.S. Coast and Geodetic Survey in New York City.” In fact, during the course of this program, the training courses in cartography and topographic drafting had a larger proportion of women than men. Even though photogrammetry had a mathematics prerequisite, about one-fourth of the students were women. Millie the Mapper was born.

The second surprise was that although the 14 member Committee on Education for Defense Mapping consisted entirely of professors of civil engineering or surveying, some of the departments involved in training cartographers were geography departments, and many of those involved in mapping at other government agencies, such as the OSS, were geographers, not civil engineers. Geographic cartography rapidly became, as John Wolter described it, “an emerging discipline.” The role of Millie the Mapper and the emergence of cartography as a discipline are closely intertwined.

Women in Cartography in WWII

By the end of WWII, thousands of women had been involved in cartographic activities at all levels. The main areas were drafting, geographic research, libraries, and training in cartography and map reading.

The majority of women were employed by the government at “sub-professional” levels as drafters, with titles such as Jr. Engineering Draftsman (or cartographic, topographic, or photogrammetric draftsman), the lowest level, to Chief Engineering Draftsman, the highest of the subprofessional grades. The reason for the large numbers of women enrolled in training courses for these positions is usually assumed to be the lack of available men. Although this was certainly a factor (one instructor lamented that the draft board took some of his students before the end of the course and that few men applied for work after the courses because they were drafted), but probably a major reason was that salaries were good and there were not many positions for women that paid as well.

The Tennessee Valley Authority was a major employer of women. Beginning in March of 1942, the Maps and Surveys Division of the TVA began employing and training women for work as draftsmen, computers, cartographers, and photogrammetrists. By early 1944, 230 women had been employed, of whom 185 were college women, mostly graduates. Fifteen women held professional positions. Although in that two year period, 57 women left, only five left because they couldn't handle the job.

One might also assume that the women were taking such jobs only "for the duration," but examining the rosters of the American Congress on Surveying and Mapping belies that assumption. The first meeting of the Congress was in June 1941, and all 163 founding members were male, but by April of 1942, the Congress had grown to over 400 and four women had joined. One of those was Elizabeth Platt of the American Geographical Society, and another was Miss Laurie Newsome, a topographic engineer with USGS. Each list of new members, especially in 1944, added a few more women's names, including Clara Le Gare of the Library of Congress and six assistant engineering draftsmen ("Engineering Draftsman" was the official designation listed for both
men and women) from the TVA. By the end of the war, 24 women were members of ACSM, most of whom were drafters. It would seem these women would not join a professional organization unless they had career intentions.

Not all women were employed in sub-professional fields. During the war, more than 200 professional geographers were called to Washington by the federal government, and many of these were women. Some were employed in higher level cartographic positions, not simply as drafters; others were researchers who provided the data to be mapped. The Office of Strategic Services, whose cartographic division was headed by Arthur Robinson, employed professional women geographers for research work and also for photogrammetry. By 1943, the Civil Service Commission reported that the need for geographers in general was not so critical as for other fields, but the demand exceeded the supply in cartography. Women with cartographic skills were urged to apply for civil service positions. However, the number of women employed as professional cartographers by the government was small. There were two at the US Coast and Geodetic Survey and a few at USGS; Evelyn Pruitt was listed in the 1946 roster of the Congress on Surveying and Mapping as a cartographer at the Coast and Geodetic Survey. The TVA employed ten women as photogrammetrists.

The military also recruited women trained in geography for cartographic work. The Navy offered special training in cartography to WAVE officers. While they preferred women with college majors in geology or geography, those with backgrounds in science, art, or architecture, were also employed in cartographic work.

Not all women were directly employed by government agencies. Edith Parker, on the faculty at the University of Chicago for many years, was involved in the Cartographic Institute at the University of Chicago from 1942-43 training cartographers. She also served as the Educational Director of the Army Map Service Corps of Engineers.

Map librarians played an important role. They were engaged in the collection and distribution of maps for the war effort. Not only was the need for new maps urgent, the War Department was desperately seeking older maps, city plans, port plans, gazetteers, guide books, geography journals, and place name lexicons for all places outside of the US and Canada as reference materials for intelligence work and for creating new maps. They especially wanted materials published in the previous ten years. Through requests in the *Bulletin of the ACSM* and other relevant journals, the public was asked to donate or loan the material for the duration or until it could be reproduced. Maps were to be mailed to Miss Viola Klipell, Head of the New York Library Branch, Army Map Service. The New York Public Library became the major source, and next door at Rockefeller Center was the Geography Section of the War Department's New York Office of Military Intelligence, which was the major user of the maps. Notable female map librarians during this period were Clara Le Gear, the Assistant Chief of the Division of Maps of the Library of Congress, and Dorothy Lewis who served as Map Librarian for the Department of State.

Women were also employed at the professional level in state agencies and began to participate in professional organizations (although not in great numbers). Elizabeti M. Herlihy, Chair of the Massachusetts State Planning Board, made an impact by presenting a paper at the 1944 meeting of the ACSM. The report on the

Women with cartographic skills were urged to apply for civil service positions.

Map librarians...were engaged in the collection and distribution of maps for the war effort.

The Navy offered special training in cartography to WAVE officers.
He lamented that the immediate use of women in surveying and mapping had been "greatly impeded by a tendency...not to encourage women to take courses in science, mathematics, and mechanical drawing."

By 1948 the outlook as expressed by the Women's Bureau of the U.S. Department of Labor was even more positive.

What actually happened when Johnny came marching home? Did women give up cartography?

Meetings stated:
Miss Elisabeth M. Herlihy, the first woman to appear on a Congress program, glamorized surveying and mapping. She covered a broad field of state planning and pointed out specific cases with respect to the importance of surveying and mapping information. She won the attention and hearty applause of all those present, and even the "hard boiled" engineers and surveyors were made to realize that woman's place transcends the boundaries of the home.

Although somewhat paternalistic, the reviewer clearly was impressed, and Miss Herlihy's paper was published as an article in the Bulletin in January of 1945.

When Johnny Came Marching Home

By 1944, the numbers of women in the field had made an impact, and post-war possibilities were being considered. A. O. Quinn of the TVA, a major employer of women cartographic drafters, published an article in the ACSM Bulletin on "Women in Surveying and Mapping." In his article, he reviewed women's training, employment problems, and the post-war probabilities. He lamented that the immediate use of women in surveying and mapping had been "greatly impeded by a tendency on the part of colleges not to encourage women to take courses in science, mathematics, and mechanical drawing," so that employers had to provide training courses. However, the wartime experiences were changing the outlook of colleges, and Mr. Quinn expected that there would be more and better qualified women. In his post-war probabilities he noted that it was clear that women could succeed in such work but doubted that large numbers of women would be trained and working as engineers after the war.

The call of the home will still be with us, and the investment of time and effort involved in a complete engineering education is greater than is warranted by the relatively brief space during which the average girl works between the end of her school days and the beginning of married life. There are some successful women engineers who have made this work their life careers. This group will undoubtedly increase in the future, but probably will not amount to a very large proportion of the professional surveyors and map makers.

Of course, we must remember that Quinn was writing over fifty years ago when it was uncommon for women to combine marriage and a career, and cartography was taught in engineering departments. The rise in cartography training in geography departments occurred in the 1950s, and certainly he did not foresee the great social changes that would occur in the second half of the century.

Not everyone shared Quinn's opinion that women's numbers would be few. Hubert A. Bauer, in a 1945 vocational and professional monograph on cartography noted that "with several years of excellent work to their credit, women's place in cartography appears to be established. In fact, there are several phases of cartographic work for which women seem particularly well fit. This is true for government and private employment alike." By 1948, the outlook as expressed by the Women's Bureau of the US Department of Labor was even more positive. Although this bulletin pointed out that women who were interested in specializing in cartography needed background in math and civil engineering as well as photogrammetry and that few universities had the costly equipment, they felt that instruction in cartography was advancing rapidly and that with increased numbers of map collections, there might be opportunities for a few additional women to serve as map librarians.

What actually happened when Johnny came marching home? Did women give up cartography and go
home? Some certainly did, but women’s role in cartography has been increasing since WWII and not just in the sub-professional positions. A few numbers support this. In November of 1946 there were 110 women members of the American Society of Professional Geographers, 20% of whom expressed an interest in cartography. The ACSM listed 20 women in its 1948 roster, the Association of American Geographers made a preliminary list in 1952 of AAG members with a special interest in cartography; 252 members responded, 40 of whom were women.

What were these women doing? The ACSM members didn’t list their positions, but the majority had Washington, D.C. addresses which would indicate government employment. Others, especially the AAG and American Society of Professional Geographers members, were teachers, map librarians, editors, and researchers.

Frances Hanson is a notable example of the immediate post-war period. Determined not to be caught short again, the Army Map Service instituted an applied cartography training program in 1951. Frances Hanson, who received her Ph.D. from Pittsburgh in 1948, was selected to be program director. She not only directed the program for 25 colleges and universities, but also developed the visual and textual materials used in the program.

Women and the Emergence of Academic Cartography
By the 1950’s major changes were taking place in academic cartography for both women and men. Before WWII it was unusual for women to teach cartography because the courses were offered in schools of engineering where women were not encouraged to apply as students or faculty. However, after the war geographic cartography emerged, and cartography became an academic subject in geography departments. Young men who had been employed as geographers and cartographers during WWII and Korea, notably Arthur Robinson, George Jenks, and John Sherman, began teaching and changed the face of cartography. Increasing numbers of geography departments offered courses in cartography and photogrammetry, and young women as well as men enrolled. As the discipline emerged, it slowly became acceptable to write a thesis or dissertation on technical subjects. The earliest American cartographic dissertation was Arthur Robinson’s *Foundations of Cartographic Methodology* at Ohio State in 1947.

Robinson, Sherman, Jenks, Norman Thrower, and Richard Dahlberg, all were early mentors to women graduate students in cartography. There was a lag between the first dissertations by men and those by women; several women wrote masters theses in the early 1960s, and in 1966 Mei-Ling Hsu wrote the first true cartography dissertation by a woman. The 1970s and early 80s brought a burst of activity for both men and women with 42 cartography dissertations between 1969 and 1982, 11 of which were by women. Those women were the first cadre of female cartography professors and were also instrumental in professional organizations: Judy Olson, president of AAG; Trish Caldwell, president of ACSM. Others assumed executive positions in private industry, notably Barbara Bartz Petchenik at Donnelly and Sons.

Numbers have gone up overall as well. By 1987 out of 813 members of the American Cartographic Association (a division of ACSM), 127 or about 16% were women. 34% of these were academics, 23% were federal employees, 33% in private industry, and 10% in state agencies.

The Cartography Specialty Group of the AAG currently lists determined not to be caught short again, the Army Map Service instituted an applied cartography training program in 1951.
over 500 members, 153 of whom are women, and the North American Cartographic Information Society (NACIS) in 1995 listed 126 women members or 33 percent of the membership.

It is the period since WWII that has seen the greatest rise in the number of women involved in cartography and from "invisible" positions to highly visible.

NOTES


7. Membership Rosters of the American Congress on Surveying and Mapping.


10. Outlook for Women


12. ACSM Bulletin, 1943


18. Hubert A. Bauer, Cartography (Map Making), Boston: Bellman Publishing Co., Inc., 1945, 31 pp. (Vocational and professional monograph No. 60)


20 years ago a little research project was initiated, which ended up being a long-term, if not lifetime, project—and that is, researching the names of women who worked the field of mapmaking prior to the 20th century.

Penny Barckley, formerly map librarian at SUNY Farmingdale, and the late Maud Cole, formerly Curator of Rare Books, Center for the Humanities, N.Y.P.L., were the instigators of this project in 1977. Penny worked with me on this for several years before her retirement. I then continued to plug away, in off hours, away from my job as head of the Map Division, N.Y.P.L. In more recent years, Mary McMichael Ritzlin, map dealer from Highland Park, IL, who had also independently been working on women in cartography, joined with me to continue the work.

We go along with Ronald Vere Tooley, who mentioned in his Dictionary of Mapmakers that "There is scarcely any biographical information on the greater number of the names recorded...One of the main aims of this work was to place a name within a given period, where possible with the dates of birth or death or, alternately, the dates of the first and last publication...Unfortunately, a high percentage are known from only a single entry." This remains very true today for our work in finding women in cartography.

At present, our approach is almost passive-aggressive! We both are fortunate to revel in the maps that cross our paths daily, in the George Ritzlin Maps & Prints shop, in Highland Park, IL, and in the New York Public Library. In addition to just looking carefully at every old map that passes through our hands in our home situation, we also see maps at map fairs, in dealers' inventories, and in the many antiquarian catalogs. So we spend time watching and waiting for new names, and for new maps and atlases, to link to names already on hand.

Perhaps the most valuable tools we have now are friends and associates in cartography who supply us with names which they have come across. Following is the most recent example of professional courtesy and generosity, and a model for all of you out there!

Jane Renwick's manuscript maps are found in the American Geographical Society library in Milwaukee, at the University of Wisconsin. Christopher Baruth kindly sent along quick copies of her maps for review. The maps are fairly large manuscript maps of Connecticut and Maine. The map of Connecticut is based on an earlier published map, perhaps from a school atlas, and is signed "Jane Renwick, June 17, 1813." It is a typical early 19th century classroom exercise, surprising to us today for its accuracy and skill. These classroom maps are found in public and private map collections across the U.S., and are prized for their rarity, and often, for their beauty. However, the young girls who created them were not professional mapmakers by any means. This sort of mapmaking was commonly produced by students in girls' schools, most notably Emma Willard's school. Miss Willard is a noted producer of 19th century school atlases.
Who was Jane Renwick? She was a 12-year-old student when she drew the Connecticut map. The map of Maine is dated 1836 and may have been drawn later in life. Her brother James was involved as a commissioner, in 1840, in the settlement of the boundary between Maine and New Brunswick, Canada, but this map seems not to be related to that project, as Northern Maine is omitted.

Because these are maps created for school projects, technically, she does not fall within the framework of our research project, but at the same time, these maps are quite skillful productions. These manuscript school maps are often seen in dealers’ catalogs and need to be familiar as a type.

Jane’s family connections are of great interest. Her map of Connecticut is signed "Jane Renwick, June 17th, 1813." Because of a flourish at the end of her signature, it has been misspelled "Renwicke," which is incorrect. Within the cartouche is a later handwritten note which states "She was wife of Chas. Wilkes." The map has a plate glued in the lower right corner with the following message, partially in manuscript: "Am. Geographical & Statistical Society. From the Heirs of Prof. Renwick Donation 5 May 1868. 404" and the date [1813?] is handwritten in the lower right hand corner of the sheet.

She was born June 3, 1801 and was the daughter of William Renwick, a New York City businessman, and his wife, Jane Jeffrey Renwick, daughter of a Presbyterian clergyman. Jane’s brother was James Renwick, noted engineer and professor at Columbia University, and she was the aunt of James Renwick, architect of St. Patrick’s Cathedral, New York City. One of nine children, Jane was probably born in Scotland and came to the United States with her parents. She was a member of a well educated and socially prominent family. Jane later married Charles Wilkes, or Commander Wilkes, of the famous United States Exploring Expedition.

Another woman involved in cartography was Lydia R. Bailey, the City Printer for Philadelphia, from ca. 1830-1850. Some 40 master printers in 19th century Philadelphia apprenticed under her. Recently her logbooks describing transactions in her map coloring business have been discovered by a graduate student working in Philadelphia. It is hoped an examination of these materials will enhance our awareness of the day-to-day operations of this busy printer’s operation. Leona Hudak in her classic study, “Early American Women Printers and Publishers, 1639-1820,” provides much of the biographical information we have on Lydia but makes no mention of these recently discovered materials.

Mary Ritzlin and I are continuing to gather names but are also now working to polish off the database as it stands and publish it within a year or two. We are not academics with tenure pressures, but time does press on, and issues like retirement loom, inspiring us to get these names in print for others to then take, research and fly with—revealing ever more of the long and complicated history of women and maps.

The generosity of folks such as Phil Hoehn, Deborah Warner, Patrick Dempsey, and on and on...make this work ever so much more satisfying and complete. We very much appreciate the generosity of fellow map folk as we plug away at this directory. If, indeed, like the folks at A.G.S., you run into names of pre-twentieth century women in cartography: publishers, printers, cartographers, colorists, mapsellers, etc., etc., please do contact us at the addresses below:

Mary Ritzlin
George Ritzlin Maps & Prints
473 Roger Williams Avenue
Highland Park, IL 60035
847-433-2627 [847-433-A-MAP]
847-433-6389 fax

Alice Hudson
Map Division, N.Y.P.L.
5th Avenue & 42nd Street
New York, N.Y. 10018-2788
212-930-0589
212-930-0027 fax
ahudson@nypl.org
Helen Wallis, who only rarely used her middle name or initial, was a remarkable person. She had a number of firsts to her credit including first woman Superintendent of the Map Room of the British Museum, 1967, and on the creation of the British Library, first Map Librarian, 1973-1986. She joined the Map Room in 1951, after receiving her B.A. in Geography from Oxford University, as Assistant Keeper II under R.A. Skelton whom she eventually succeeded.

Whilst working at the British Museum, Helen completed her D. Phil (Oxon) writing on the *Exploration of the South Sea*, 1519-1644 and was promoted Assistant Keeper I in 1954. During her early years at the British Museum, Helen’s travels were limited, but later she journeyed extensively, especially to conferences and to give lectures in many parts of the world. After her retirement in 1987, she was able to take up longer-term overseas appointments. It was on one of these, as first Mitchell [Library] Scholar in Residence in Sydney, Australia in 1994 that her health, already poor at this time, deteriorated. Helen died early the next year in England. She was never married.

The recipient of many honors, Helen Wallis valued especially the Order of the British Empire (OBE) announced in the Queen’s Birthday Honours, 1986. There were also honors from France and the United States, and she was the first woman awarded an Honorary Fellowship from the International Cartographic Association, 1991. On receiving the International Map Collector’s Society R.V. Tooley award in 1986, she was presented with a bound copy of a bibliography of her writings.

The publications of Helen Wallis are numerous and distinguished, and those up to her retirement are recorded in *The Map Collector*, 40, 1987, 30-38. They begin with an article, "The First English Globe: A Recent Discovery," *Geographical Journal*, 117:275-290, 1951. Globes were a continuing research interest of Dr. Wallis as was geographical discovery, the subject of her dissertation as noted above. Her first book was *Carteret’s Voyage Round the World*, 1766-1769 (two volumes) 1965, published by the Hakluyt Society of which she was a long time member and officer. A work of which she was justly proud was *The Maps and Text of the Boke of Idrography Presented by Jean Rotz to Henry VIII now in the British Library*, Oxford: The Roxburghe Club, 1981. Commissioned by Viscount Eccles, this book gave rise to a number of publications detailing her ideas on Java-la-Grande (Australia?). Arguably, her most important of several joint publications is *Cartographic Innovations: An International Handbook of Mapping Terms to 1900* (with Arthur H. Robinson) for the International Cartographic Association, 1987.

In addition to her larger works are journal articles, chapters in books by others, re-
views, obituaries, and so forth. A special feature of her publications (with colleagues) are catalogs of British Museum/British Library commemorative exhibitions including *The American War of Independence* (1975); *Sir Francis Drake* (1977); and *Sir Walter Raleigh* (1985). Because these exhibitions were seen by many visitors in the British Museum and at international venues where they traveled, they were particularly influential.

Helen Wallis was an accomplished pianist and a devotee of the theater. She was optimistic, friendly, and democratic, feeling particularly at home in the United States and Australia. In all activities such as organizing conferences and the day-to-day routine of librarianship, she went the second mile. Helen Wallis was a lady of great faith, and when this reviewer telephoned her only a few days before her death from cancer, she remarked that she was ready to go, having had a good life.

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### 1998 Ristow Prize Winners

Each year the Washington Map Society (WMS) awards the Ristow Prize for cartographic history and map librarianship in honor of Walter W. Ristow, one of the nation's premier map librarians and cartographic authors. Dr. Ristow was for many years head of the Geography and Map Division at the Library of Congress and was founding president of the Society.

The first place winner for 1998 is Ken Mitchell, a graduate student in the History Department at the University of Minnesota. His prize winning paper is entitled “Juan de la Cruz Cano y Olmedilla’s Mapa Geografico de America Meridional.” Mr. Mitchell’s winning entry will be published in *The Portolan*, the journal of the WMS. He received a cash award of $500 and membership in the WMS for the coming year.

This year the WMS received a number of excellent papers. Three individuals submitted papers that were judged to be worthy of Honorable Mention, and the papers will be published in future issues of *The Portolan*. Lucy Chester, a graduate student in the PhD program of the Department of History at Yale University, submitted a paper entitled “Mapping Imperial Expansion: Colonial Cartography in North America and South Asia.” Lisa Davis-Allen, a doctoral candidate in the history program at the University of Texas at Arlington, submitted a paper entitled “The National Palette: Painting and Map-Coloring in the Seventeenth Century Dutch Republic.” Jennifer Turnham, a doctoral candidate in history at the University of Minnesota, submitted a paper entitled “Mapping the New World: Nicolas Sanson’s ‘Amerique Septentrionale’ and French Cartography in the Seventeenth Century.” These individuals will receive a membership in the Washington Map Society for the coming year.