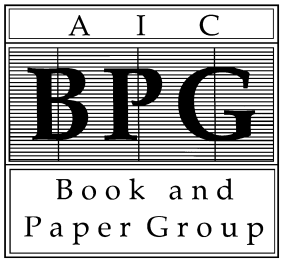

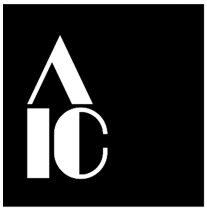

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MARTIN BRÜCKNER

Varnished Maps and Social Chemistry in Early America: A Material History

INTRODUCTION

When I discuss wall maps with students, librarians, or collectors, some of my favorite talking points are about the visual quality of historical maps. Inevitably, the topic of varnish comes up, but not so much as a point of discussion than as an existential question. What I am often asked is: does maintaining a large varnished map make sense, with "sense" standing in for a range of concerns about the object's stability and cost of repair, not to mention the map's visual appearance? As it turns out, for many non-conservators, addressing varnish and historical maps in the same sentence comes with mostly negative connotations. Quickly identified as the cause of discoloration and cracked paper, the consensus seems to be that varnish transforms historical maps into unsightly objects, diminishing both their material and historical value. In my work as a map historian, I have found that in many collections, wall maps tend to be unvarnished after having undergone conservation treatments. This choice of outcome, or perhaps more importantly, what appears to be the collecting market's preference for unvarnished wall maps, is almost diametrically opposite to the ways in which mapmakers and consumers experienced varnished wall maps before 1900.

With varnish being the subject of the 2022 AIC Varnished Wall Map Symposium and the 2023 AIC Varnished Map Colloquium, varnish removal was front and center during presentations. Yet, there also was a conversation about the virtue of revarnishing restored wall maps. Having had the privilege to participate in both events as a non-conservator, I was struck by the way paper conservators who were debating the pros and cons of restoring varnished wall maps were essentially engaging in a debate that also informs historians of cartography who study the "look" and historical uses of maps. While I am not equipped to join the technical conversation, in this article I hope to provide some historical context for better understanding the significance of varnish in relation to pre-1900 wall maps and why I believe in the value of revarnishing them. In what follows, a series of historical contexts illustrate the pervasiveness with which varnish affected map production and consumption in early America. An additional analysis of select varnishing manuals, handbooks, and advertisements examines how varnish acted not only as a crucial ingredient in the transmission of map knowledge but also greatly contributed to map-specific social chemistry. An appendix provides a working bibliography and select excerpts of historical sources discussing map varnish and varnishing practices published between 1666 and 1900.

MAPS AT AN EXHIBITION

By the mid-19th century, varnished wall maps were not only ambassadors of industrial innovation and the fine arts but were at the heart of the greatest map show in early modern history (note 1). The setting was the Crystal Palace in New York, which was hosting the 1853 "Exhibition of the Industry of all Nations." According to the *Official Catalogue*, in a section called the "Machine Arcade," objects like naval equipment (meaning large cannons), textiles (think enormous tapestries), and industrial hardware (imagine power looms) all vied for the visitors' attention. Eye-catching as these goods were, they were staged against an unprecedented spectacle. Along one side of the diamond-shaped arcade hung dozens of varnished wall maps. Conspicuously placed in raking light from the high window panels, they would have created an eye-popping visual effect (fig. 1).

The maps on display were not just any maps providing a glossy background. According to the catalog, they were sample specimens of some of the best-known maps made in the United States. On display were wall maps produced by publishers like Henry Tanner and Samuel Munson, who might have shown their medium-sized "Ornamental" or "Embellished" maps measuring 3 × 4 ft. (fig. 2). Other publishers showed wall maps measuring in the 4 × 5 ft. range, like those made by publishing houses, like Ensign & Bridgeman,

Proceedings from the AIC-sponsored event, "Varnished Wall Maps: A Collaborative Seminar to Investigate Treatment Methodology," September 14–16, 2022.

Fig. 1. Nagel and Weingärtner. *Interior View of the New York Crystal Palace for the Exhibition of the Industry of All Nations* (New York, NY: Goupil & Co., ca. 1853). Lithograph with two tint stones; 102 × 75 cm. Library of Congress, Prints & Photographs Online Catalog. http://hdl.loc.gov/loc.pnp/ppmsca.08321.

Fig. 2. S. Bishop Munson. *A New and Embellished Map of the United States* (Cincinnati, OH, 1845). 92 × 119 cm. David Rumsey Map Collection, David Rumsey Map Center, Stanford Libraries, https://www.davidrumsey.com, Creative Commons License.

or by commercial mapmakers, like Albert Alden, whose *Pictorial Map of the United States* (1845; fig. 3) illustrates the visual intensity of the exhibition's map spectacle. His border elements connected cartography to popular fiction and landscape prints. Located on the top panel is the Catskill Mountain House, made famous by James Fenimore Cooper's novel, *The Pioneers* (1823), which afterward had been reworked by several artists of the Hudson River School, including the painter W. H. Bartlett (1836). The perhaps most impressive maps on display were super-sized works spanning 6 × 7 ft. or 7 × 8 ft. made by the Colton Company of New York or the Mitchell Company of Philadelphia. In form and content, their maps competed against wall maps, such as William Chapin's *Ornamental Map of the United States* (1846/1853; fig. 4), which used washes of watercolor to delineate state and county boundaries but also added iconographic elements that aligned the map with the figurative idea that the nation resembles a physical construct, represented here as an architectural framework replete with Neoclassical pillars and decorative trimmings.

The names of these mapmakers mean nothing to most of us today. Nor do we remember specific maps by title. Looking at historical scholarship, we certainly have not been aware of the presence of maps at the New York exhibition. And lost to us are recollections of the vivid map colorings, the sheer material heft of maps, and the scent of fresh varnish. But in 1853, the maps exhibited at the Crystal Palace entered an arena abuzz with competing expectations about the materiality of maps, including how map varnish entered into American everyday life.

At the time of the New York exhibition, wall maps represented a newly industrialized product. For map producers, the genre of wall maps stood for a scaled technology attracting venture capital and a new labor force affected by mass production. For map consumers, wall maps offered an array of new horizons through which to view the world and how to position oneself in relation to the nation, regions, and local places. In the public sphere, shopkeepers and government officials kept standing orders for the latest map giant, with

Fig. 3. Albert Alden. *Alden's Pictorial Map of the United States of North America* (Barre, MA, 1845). 105 × 134 cm. David Rumsey Map Collection, David Rumsey Map Center, Stanford Libraries, https://www.davidrumsey.com, Creative Commons License.

the goal, as one newspaper keenly pointed out, "to overcome ignorance… and for the information of capitalists" (Brückner 2017, 122). Popular magazines and academic journals debated at length the pedagogic and economic contributions made by maps. Looking at the private sphere, the archive shows that ministers and teachers, businesses, and homes were in a constant shopping mode for the perfect wall map supporting the buyers' aspirational bottom lines, from missionary or imperial politics to commercial or social interests to aesthetic taste and interior decoration. But while expectations surrounding map content were as diverse as the people visiting the Machine Arcade, when it came to the concept of "map form," the expectation raised by publishers as well as the press was rather single minded: according to map orders and advertisements, people wanted maps to come in different sizes, be portable, be colored, and, when possible, be treated with a coat of varnish.

THE MATERIAL CULTURE OF WALL MAPS

Taking our cue from the New York exhibition and setting the stage for talking about the culture of map varnishing, it is important to know that wall maps constituted a unique print genre. The actual term "wall map" is a neologism coined during the 1870s. Modern cartographic handbooks state that a wall map is a map "set or fixed against a wall," intended for periodic display in public and private spaces where they served multiple, often overlapping functions informed by political culture, the decorative arts, and information technologies. This definition is rather general and unwieldy. Any map attached to

Fig. 4. William Chapin. *Ornamental Map of the United States* (1846; rpt. New York, NY, 1853). 125 × 143 cm. David Rumsey Map Collection, David Rumsey Map Center, Stanford Libraries, https://www.davidrumsey.com, Creative Commons License.

a wall would have to be considered a wall map. But if we think historically, since the advent of printed maps during the late 15th and then 16th century, mapmakers and printers advertised "wall maps" as a materially enhanced paper construct. Variously called "large map," "glazed map," "framed map," "hanging map," or "map on rollers," wall maps distinguished themselves from other printed maps by their physical format and material environment (Brückner 2017, 122).

Considering format first, unlike medieval maps, early modern maps were paper products—a fact that is so obvious that scholars tend to overlook it, even though by the 18th century, European and American paper mills were producing special "map paper." In 1796, the Brandywine Paper Mill in Wilmington, Delaware, provided special map paper for Mathew Carey's first American atlas. This kind of paper was described as "thin, hard, and sized paper . . . with special reference to strength and flexibility" (Brückner 2017, 59, 93). Yet, it was also considered soft enough to retain heavy inks and thick washes of watercolor and varnish. Strong paper was needed because wall maps were printed on imperial- or elephant-sized paper that had to be sturdy enough to bear the weight of rollers and withstand frequent handling. Large wall maps were multisheet affairs, printed in sections, with each sheet containing a portion of the map's overall design. Only when fully assembled would wall maps become fully legible, their legibility frequently being guided by the contents of the map's ornamental cartouches, legends, or other graphic inserts. Map engravers and printers accommodated the wall map's sectional makeup by using extra wide margins for stronger paper joints. During the production phase

Fig. 5. Jan Van der Heiden. *Beschryving der nieuwlijks uitgevonden en geoctrojeerde slang-brand-spruiten* (Amsterdam: Jan Rieuwertsz, 1690). Special Collections, University of Delaware Library, Museums and Press, Newark, DE. Folio TH9557.H45 x1690.

called "map finishing," wall maps were further equipped with linen or cotton backings to stabilize the paper; rollers and knobs were attached for display and storage purposes; watercolors and varnish were added to the map surface; silk, linen, or cotton ribbons were sewn into the paper edges for additional protection; and finally, packaging hardware, ranging from metal rings to leather straps, and pulley systems to wooden cases, all added to the material heft of a generic wall map.

Turning to the material environment next, if we go back in history, we discover that display practices from the Renaissance paved the way for the 19th-century map spectacle in New York City. Although the concept of the wall map emerged during the 16th century, it was not until the 17th-century fascination with "map galleries," maintained by European monarchs and courtly institutions like the Paris Observatory or government offices like the British Board of Trade, that wall maps gained public exposure. It was during that period that wall maps emerged as prized possessions of the emerging middle classes, as documented by genre paintings such as Jan Vermeer's *Officer and Laughing Girl* (1658) or technical engravings like Jan Van der Heiden's *Beschryving der … Slang-Brand-Spuiten* (1690; fig. 5), a handbook describing fire-fighting technologies. In these illustrations, wall maps presided conspicuously over other large-sized wall decorations. Shown next to tapestries, mirrors, and paintings, wall maps ascribed to sitters and viewers the role of the worldly traveler or imperial geographer who was consuming maps as people were rapidly consumed by a burgeoning commodity culture.

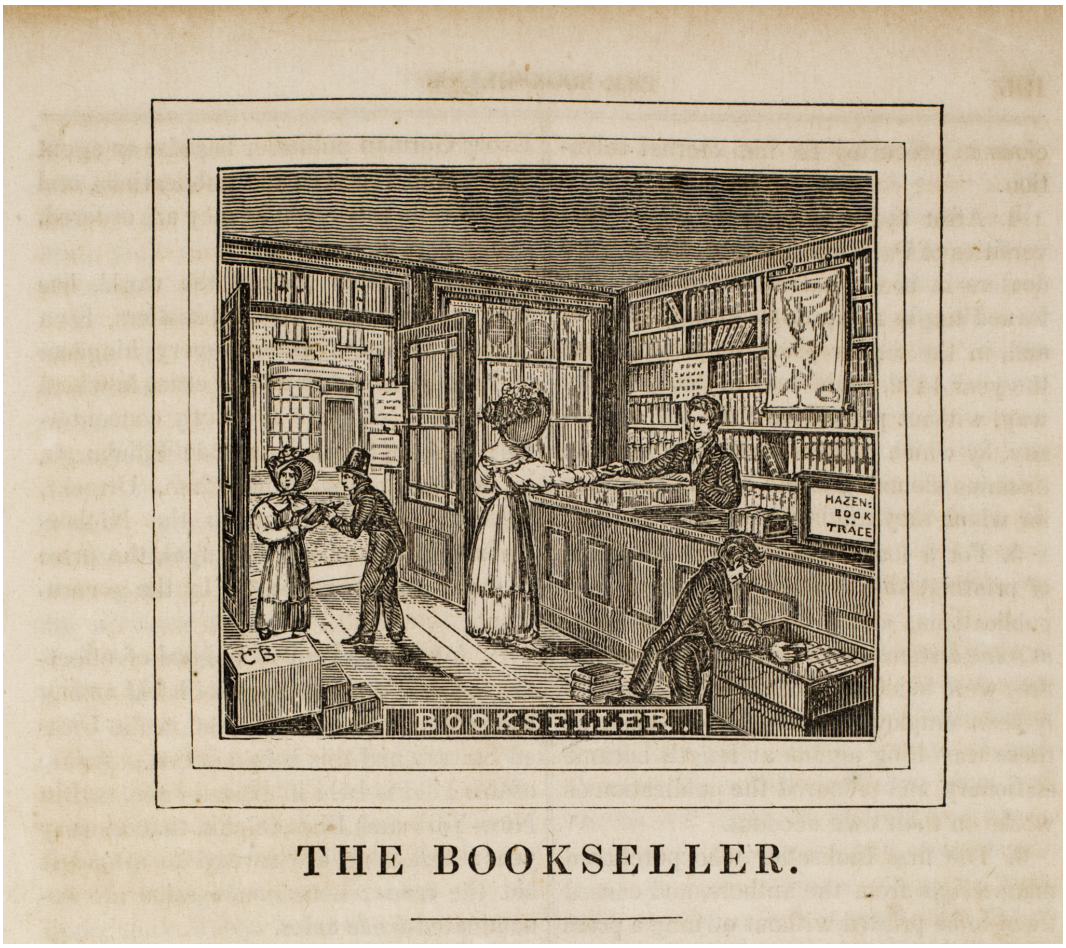


Fig. 6. Edward Hazen, *The Panorama of Professions and Trades; or Every Man's Book* (Philadelphia, PA, 1836). Courtesy, American Antiquarian Society.

If we jump forward to the New York map exhibition, it also was rooted in a more recent culture of commercial marketing. Already by the mid-18th century, colonial American shopkeepers hoisted up wall maps in front of shelves or behind shop windows (fig. 6). When in 1816 John Melish opened the first map business exclusively devoted to making and selling maps in the United States, it coincided with an insatiable demand for new wall maps triggered by the War of 1812. Advertising campaigns intent on bringing maps into American shops, offices, and schools were amplified by commercial exhibitions. There, map displays were a regular feature at urban fairs, like those hosted by the American Institute in New York or Baltimore's "Exhibitions of American Manufactures," or at national fairs, such as Philadelphia's Centennial Exhibition of 1876 (fig. 7) or Chicago's World's Fair of 1893.

In American homes, wall maps were staple displays since the early 18th century. Estate inventories indicate that wall maps were decorative objects competing for visual attention along with other large wall hangings, such as mirrors, prints, and wallpaper. Unwieldy, disproportioned in relation to most house objects, and difficult to handle or store, the maps' very materiality readjusted people's visual horizons and offered a unique training ground for prospective map users. Importantly, by the late 18th century, new educational schemes carried large varnished maps from American homes into schools and back again.

Beginning in 1783, when Noah Webster's famous spelling book promoted catechistic map lessons, varnished wall maps entered the school curriculum, thereby creating their own pedagogic rituals and social patterns of material use. By the 1820s, the educator Joseph Lancaster had introduced the monitorial teaching method to public schools, which resulted in widely advertised interactive map exercises (fig. 8), especially map-pointing. By the 1840s, map lessons were also turned into a form of song. Schoolteachers like Frances Willard commented that "[students] sing the capitals and [the] bound[aries of] the states…, while they point out the places on the map" (Brückner 2017, 290). Some educators took the sing-the-map exercise on the road. In 1851, a Massachusetts broadside advertised a lyceum-style "geographical concert and public

Fig. 7. Centennial Photographic Co., A. S. Barnes and Co.'s Exhibit, 1876. Courtesy of the Free Library of Philadelphia, Print and Picture Collection. Dig # c021049.

Fig. 8. Alexander Robb. *Specimen of Printing Types and Ornaments* (Philadelphia, PA, 1846). Courtesy of the Winterthur Museum, Garden, and Library. Z250 R63.

Fig. 9. Universal Exhibition of Vienna. American rural schoolhouse, interior. Amerikanische Schule: Inneres (n.p., 1873). Library of Congress, Prints & Photographs Online Catalog. http://hdl.loc.gov/loc.pnp/cph.3b07391.

recitation," showing a student performing her map knowledge in front of a super-sized wall map. That varnished wall maps were portrayed as an integral part of American education can be seen in photographs from the 1873 Universal Exhibition of Vienna (fig. 9). By then, as captured by the photograph's depiction of glossy map surfaces, we can assume that varnished maps not only had gone mainstream but that as mass-produced commodities and display objects, they were indicative of a new phase in map circulation and map meaning.

A BRIEF HISTORY OF MAP VARNISH

So far, I have shown different contexts in which varnished maps were consumed between 1700 and 1900. They were popular display objects in public and domestic interiors and staples of the emerging American school curriculum, and when examining inventories and wills, they were treated as prized possessions listed next to decorative art objects. When looking closely at some of the preceding illustrations, varnish has crept into the visual record documenting historical maps. Zooming into high-resolution images of maps made available by digital databases, like the David Rumsey Map Collection or the Library of Congress, further reveals the often unstated presence of varnish. An additional layer of evidence is provided by late 19th century photographs of maps and their settings. Cameras not only captured the sheen of map varnish but also the way in which light tended to bounce off unevenly from the varnished map's surface.

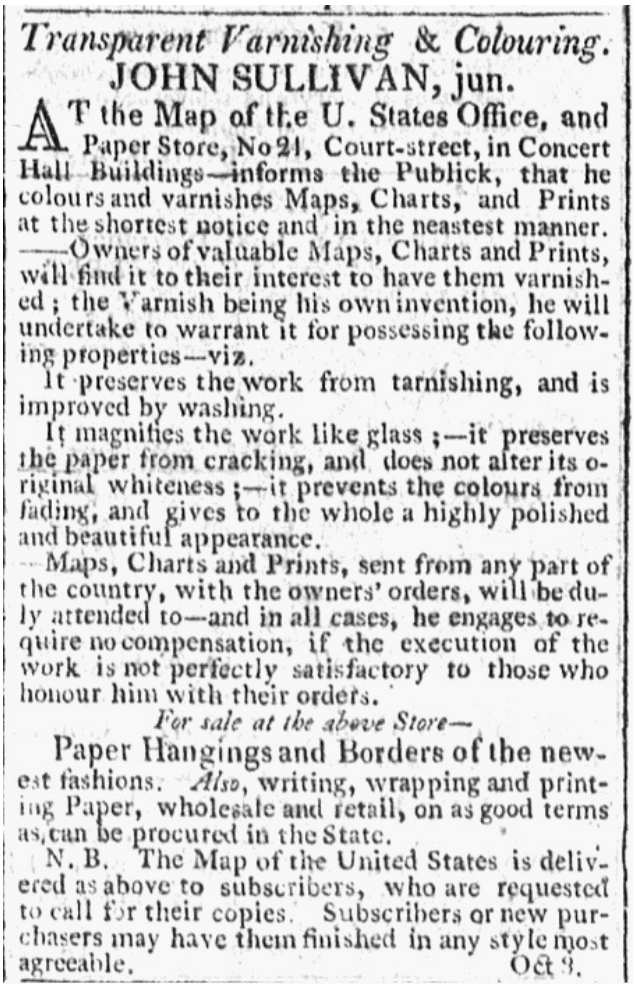
Prior to photographic evidence, the best sources for tracking the relationship between varnish and mapmaking in the English-speaking archive consist of handbooks, broadsides, and newspaper advertisements. Two of the earliest published references to the practice of varnishing maps appears in the handbook *Academia Italica. The Publick School of Drawing, or, The Gentlemans Accomplishment* (1666) or in William Salmon's *Polygraphice; or the Art of Drawing, Engraving, Etching, Limning, Painting, Washing, Vernishing [sic], Colouring and Dying* (1672). Both manuals mention varnish more in passing than as a focused concern, with the former's advice centering on backing maps with additional paper before coloring (and how to use ear wax for fixing mistakes). The latter includes instructions on the "Washing … of Maps and Printed Pictures in proper Colours, or else … to vernish [sic] them" (p. 201).

Although the late 17th and early 18th century saw a massive increase in the circulation of handbooks and advice

literature—much of which was driven by the scientific publications of the Royal Society of London—digital databases, such as *Early English Books Online* (EEBO), *Eighteenth-Century Collections Online* (ECCO), and *Early American Imprints* (EAI), are surprisingly silent on the topic of map varnish. Keyword searches for the period between 1600 and 1780 frequently register the term "varnish"—but just not in conjunction with maps. Over the decades, the most popular reference to varnish was metaphorical, describing human or physical attributes, followed by handbooks describing varnish's role in oil paintings and the production of varnish as such. The 18th-century sales catalogs published by premier London map sellers, such as John Bowles or Robert Sayer, also fail to mention varnish. Having looked closely at advice literature published between the 1670s and 1770s, the pattern I found is that although mapmakers advertised maps as ornamental engravings that came with a variety of material choices (wide margins, watercolors, pasted-on paper, cloth-backing, or mounted on rollers, etc.), no mention was made about varnishing maps as a concern or practice.

Of course, advice literature is carefully worded by authors addressing a select customer base. In that context, we need to remember that for handbooks or sales catalogs not to offer advice on how to varnish maps did not mean that maps were not varnished. I say this because once I started researching 18th-century newspapers, it appears that beginning in the early 1760s, British American advertisers added the term "varnish" when selling maps. Consider, for example, Robert Kennedy's advertisement that he "varnishes papered Rooms or Hangings, Family Pieces, Maps and Prints of all Kinds, &c. Paper thus varnished is much admired by People of the best Taste and Fashion in England, for its good Qualities (excells [sic] all others) as it will bear washing when soiled, and proves as lasting as the Plaister it is put on, and looks always bright, &c." (Kennedy 1). In 1762, Kennedy still needs to explain why varnishing a map would be in the consumer's best practical interest. A decade later, in 1774, the American mapmaker John Reed considers varnish to be a simple matter of map aesthetics when he states: "Any Gentleman inclining to have their Maps framed, painted, gilded and varnished, may have them done in the neatest manner" (Reed 4).

By the early 1800s—and here I can only speak for the U.S. marketplace—newspaper ads, shop inventories, and business papers suggest that the practice of map varnishing permeated the work orders of shopkeepers and artisans. In an 1806 ad published in the Boston newspaper *The Repertory*, John Sullivan, the owner of a Boston paper shop, describes a new set of expectations concerning varnished maps (fig. 10). Having "inform[ed] the Publick, that he colours [sic] and varnishes Maps, Charts, and Prints," he tells "Owners of valuable Maps, Charts, and Prints" that the varnish is his own invention. He proudly lists its virtues, namely that it preserves the work from tarnishing and is improved by washing; that



Transparent Varnishing & Colouring.

JOHN SULLIVAN, jun.

AT the Map of the U. States Office, and Paper Store, No 21, Court-street, in Concert Hall Buildings—informs the Publick, that he colours and varnishes Maps, Charts, and Prints at the shortest notice and in the neastest manner.

——Owners of valuable Maps, Charts and Prints, will find it to their interest to have them varnished; the Varnish being his own invention, he will undertake to warrant it for possessing the following properties—viz.

It preserves the work from tarnishing, and is improved by washing.

It magnifies the work like glass;—it preserves the paper from cracking, and does not alter its original whiteness;—it prevents the colours from fading, and gives to the whole a highly polished and beautiful appearance.

Maps, Charts and Prints, sent from any part of the country, with the owners' orders, will be duly attended to—and in all cases, he engages to require no compensation, if the execution of the work is not perfectly satisfactory to those who honour him with their orders.

For sale at the above Store—

Paper Hangings and Borders of the newest fashions. *Also*, writing, wrapping and printing Paper, wholesale and retail, on as good terms as can be procured in the State.

N. B. The Map of the United States is delivered as above to subscribers, who are requested to call for their copies. Subscribers or new purchasers may have them finished in any style most agreeable. Oct 3.

Fig. 10. Sullivan, John. "Advertisement." *Repertory*, vol. III, no. 83 (October 17, 1806).

varnish "magnifies the work like glass," that it "preserves the paper from cracking, and does not alter its original whiteness," and so on. What makes the Sullivan ad unique is that it offers his varnishing services along with the sale of a specific map listed by name and title. Sullivan is selling Osgood Carleton's wall map, *A New Map of the United States* (1806; fig. 11), showing the nation before the Lewis and Clark expedition and, important for our purposes, illustrating how local commercial venues sent varnished wall maps into circulation.

That varnished maps circulated in large numbers during the first decades of the 19th century we can deduce from the account books kept by Philadelphia map finishers like Lydia Bailey. Widowed in 1808, Bailey found herself learning how to manage a print shop without a partner. While seeking to reboot the business and to make ends meet, Bailey turned to the business of "map finishing," which involved map painting, framing, and, above all, varnishing. A transcript of her account book's entry for June 8, 1808, shows the range of supplies and materials involved:

Fig. 11. Osgood Carleton. *A New Map of the UNITED STATES, OF AMERICA Including part of Louisiana Drawn from the Latest Authorities* (Boston, MA: John Sullivan Junr., 1806). 120 × 139 cm. David Rumsey Map Collection, David Rumsey Map Center, Stanford Libraries, https://www.davidrumsey.com, Creative Commons License.

12 Pair Nobs [sic]	.75
4 Sets Rollers	.75
6 yards muslin @ 25 cts per	1.50
2 quarts varnish	3.28
16 Sets nobs for Mr Careys maps	1.00
2 Sets ditto	.12½
12 Sets ditto for Hills [Survey of Phila]	.75
1 pint Spirits of Terpentine	.19
1 Gill varnish Copal	.25
6 Peases Tape	1.12½

(Bailey, Account Book, Vol. 4; see the appendix)

Bailey placed orders like this on a regular basis from 1808 until 1841. References to muslin and tape, nails, knobs, and rollers acknowledge materials necessary for the assembly of wall maps. Ordering large amounts of copal varnish, turpentine, or isinglass, however, is evidence that in Bailey's map business, the application of varnish was a crucial work step before the maps were returned to her customers.

Indeed, Bailey's account book reveals how varnished maps circulated in the city of Philadelphia. For more than three decades, she recorded the names of people who placed map finishing orders. Scanning these, we discover orders made by

Philadelphia's commercial elite, like the merchant Stephen Girard or the publisher Mathew Carey, or by major institutions, like the City Library and the Philadelphia Athenaeum. The largest number of map orders came from young women, either attending local academies or participating in after-school map exercises (Brückner 2017, 308–309). With dozens of individuals placing map finishing orders per year, Bailey's account book conjures up the image of a Philadelphia streetscape that would have included frequent scenes of young women dropping off maps at Bailey's shop at No. 10 North Alley Street or, conversely, carrying newly varnished maps back to their homes or school buildings. Unfortunately, Bailey did not write down the women's addresses, but a brief effort of cross-referencing their names with city directories indicates that from the 1810s to at least the 1830s, varnished maps measuring on average 4 square feet were at the center of a vast, young adult social network.

The pervasive presence of varnished maps is perhaps best explained when we realize that map varnishing was becoming vertically integrated into the workflow of early 19th-century map manufacture. When the nation's first independent map publisher, John Melish, went bankrupt after the financial crisis of 1819, the Philadelphia court provided a shop inventory that can also be interpreted as an organizational chart of Melish's business model. Located in a four-story townhouse on Chestnut Street, his map shop included multiple departments ("Store," "Printing," "Binding," etc.), including a separate "Varnishing Department." On the day of Melish's bankruptcy, the assessor recorded "6 Gall copoll [sic]" and assorted "varnishing brushes" (Brückner 2017, 75–78, 330). A decade later, in 1834, when a reporter for the *National Gazette* wrote a puff piece about the "Geographical Establishment" of Melish's competitor, Henry Schenck Tanner, the essay's tour of the map factory ended inside a varnishing shop and, given the emphasis on how maps were "nailed upon rollers," a major clue about the prominent role varnished wall maps played in the mapmaking business:

> *Every part of this business is performed by females. The process of mounting is commenced by stretching a sheet of canvass [sic] over a square frame, on which the several sheets composing the map (previously coloured [sic]) are joined and pasted. When sufficiently dry, two or three coats of transparent size are applied, intended to produce a uniform surface and to present the varnish (which is subsequently spread over its face) from sinking into the paper. When the varnish is thoroughly dry, which is usually the case in two or three days, according to the state of the weather, the map is cut from the frame, bound on two of its edges, nailed upon rollers, and thus prepared, it is ready for use. (National Gazette 1834, 2)*

The exposé about the Tanner business was published at the onset of three major technological innovations that would change everything concerning basic mapmaking lore. By the 1830s, the invention of machine-made paper diversified and granted greater access to the raw material of maps while diversifying the quality and size of map paper. The printing technique of lithography transformed the look of maps, allowing for more detail and speedy corrections while also lowering overall production costs. The third change in technology affecting map production and consumption emerged from the use of steam-powered rotary presses (especially the ones capable of handling large printing plates; see fig. 12). For comparison, prior to steam power, a manually operated printing press generated about 12 large prints per hour, and a steam-powered press allowed for print runs of nearly 1000 copies per hour (Brückner 2017, 93–95). Varnish continued to be a central part of map production. An 1877 commercial pamphlet, printed for itinerant map sellers by the "Haasis & Lubrecht Map and Chart Establishment" in New York City, not only indicated that map publishers specialized in the production of wall maps but that varnished maps were standard goods and selling wholesale "Finely Colored, Varnished and Mounted on Rollers" (Haasis and Lubrecht 1877, 4).

Fig. 12. Detail from "Haasis & Lubrecht Map and Chart Establishment." Advertisement. Coll 214, 84x85. Joseph Downs Collection of Manuscripts and Printed Ephemera, Winterthur Library. Courtesy of the Winterthur Museum.

VARNISHED EXPECTATIONS

This is where my expertise ends in setting up the historical context for future conversations about the treatment of varnished wall maps. Having plumbed the commercial history and cultural practices linking maps and varnish, my major takeaway for paper conservators today is that since the late 17th century, the practice of varnishing maps had created—and here I borrow a term from literary theory—a unique "horizon of expectation." Producers and consumers alike expected varnish to fulfill a set of different functions. Skimming through the sources collated in the appendix, readers will find that these functions included the following expectations:

- Varnish protects the map and enhances its longevity.
- Varnish allows maps to be washed if soiled; map hygiene is a perennial talking point.
- Varnish not only allows but encourages tactile engagement with maps, including the drawing and erasing of school assignments.
- Varnish serves the function of protective glass and, according to one handbook, literally enhances the look of a map like a magnifying glass.
- Varnish maintains map colors.
- Varnish adds polish and luster.
- Varnish was offered as an optional refinement of the final product, raising the map's price but also adding to its social capital; during the long 18th century, catalogs put maps on equal footing with pictorial prints.
- Varnish was considered an integral component of the finished wall map by the mid-19th century.

With handbooks and advertisements raising these expectations, the people who did the actual map varnishing regularly consulted manuals and encyclopedias, professional periodicals, and DIY recipes. The sources compiled in the appendix offer select access for finding detailed varnish recipes, step-by-step descriptions of the varnishing process, or even registering concerns about chemical poisoning and the varnisher's health.

Upon examining the texts listed in the appendix, my additional takeaways as a nonconservator but consummate reader of technical handbooks are fourfold. First, two kinds of varnish recipes come up repeatedly, namely spirit wine varnish and copal varnish seem to be the go-to materials for map varnishers (one handbook advocates the use of caoutchouc). Second, map varnishing continued to be part of the map production process far into the 20th century, meaning that varnish continued to be integral to the materiality of the finished map as well as to the map users' expectations vis-à-vis wall maps and its attending rituals. Third, textual descriptions linking varnish to maps became increasingly proficient over time. Although early entries mentioned map varnishing only in passing, by the 19th century, it was common for advice literature to provide detailed instructions—like Charles Tomlinson writing in *Cyclopaedia of Useful Arts* (1854): "*Crystal varnish* for maps, prints, coloured drawings, &c.—Dissolve 2 lbs. of mastic, 2 lbs. of damar, without heat, in one gallon of turpentine; or mix Canada balsam and oil of turpentine in equal parts" (p. 898).

By the end of the 19th century (if not earlier), and that is the fourth takeaway, the process of varnishing maps had jumped scales from being part of industrial manufacture to entering the home as a DIY practice. Publications like *Blakelee's Industrial Cyclopedia. A Simple, Practical Guide for the Mechanic, Farmer, Housewife and Children* (1884) included instructions like these:

> *Varnish for Maps.—A good varnish for mechanical and architectural drawing, maps, etc. is obtained by dissolving in one quart of alcohol, one-fourth pound of white shellac, one ounce of camphor, and half an ounce of balsam fir. This varnish dries rapidly.*
>
> *Another Formula.—A good varnish for maps is made of one ounce Canada balsam and two ounces spirits of turpentine. This is laid on with a soft brush over a thin coating of isinglass previously dried." (p. 170)*

The expansion from industrial to DIY map varnishing is underscored by professional journals like *The English Mechanic & World of Science*, where on March 8, 1889, readers reported their varnish recipes in forum-styled entries like the one selected next (fig. 13):

> *[67966.]—Varnishing Maps.—Try sizeing [sic] with very weak glue (soak the glue all night before melting), and then varnish with white rosin 1 lb., gum Arabic 2 oz., Venice turpentine 2 oz., linseed-oil 2 oz. First melt the rosin and strain it very hot, steep the gum in olive-oil till dissolved, and strain it. Put to this the turpentine and rosin, and mingle them over a slow fire till dissolved. Use it hot. Bournemouth. Miles." (p. 37)*

***

In conclusion, and I return to the essay's opening, my foray into the world of varnish and its effect on the history of pre-1900 wall maps has me wonder this: knowing that maps were varnished on purpose for a host of economic, social, and aesthetic reasons, what is our responsibility when restoring varnished wall maps? For many collectors and also scholars, stripping old maps of all varnish is often considered the preferred path, the assumption being that the clean and unvarnished map gives more immediate access to the map's unvarnished truth, meaning the fantasy that we may get to see the map in its original state as if it was coming fresh of the printing press in black ink on white paper and thus uncorrupted by the damage caused by varnish exposed to light or soot or flies, not to mention the coarser signs of physical map use. However, as this article hopes to have demonstrated,

whistle, shutting off steam, ringing a bell, placing a miniature signal arm to danger, exploding a fog signal, and even applying a continuous brake. I have examined models and apparatus during the past few months which claim to carry out all these objects. Of course they may all work very well in model form, or experimentally; but in daily practice dust, dirt, ice, and snow would render such appliances perfectly unreliable. It therefore follows that if a man has to be employed to watch the self-acting fog-signalling appliances to see that they work, he may just as well place the fog signals on the rails by hand.

CLEMENT E. STRETTON, C.E.

[67954.]—**Dynamo.**—Your machine should give 45 to 50 volts and 6 amps. at 1,800 revs. per minute. Five 20c.p. lamps are the most you can expect. I would advise lamps of a lower candle-power, say, 16, and requiring only 1 amp. each. No. 14 gauge will do for the mains, and carry the current with very little loss, the resistance for the distance being barely ½ an ohm. An engine to do the work comfortably should not be less than ¾H.P.

W. A. WALTON.

[67955.]—**Book-Keeping.**—Perhaps if "Trader" will add his "trading expenses" and "bad debts" to his net profit, he will arrive at what he wants; but if he will advertise his address, probably I can help him. ACCOUNTANT.

[67955.]—**Book-Keeping.**—I am not acquainted with Pitman's system by name; but, if "Trader," provided in the mean time he has not discovered his difference, can manage to let me see a statement of his accounts, from which, if explicit enough, I shall be able to help him, without reference to any entries; but the latter may be necessary.

W. E., Chartered Accountant.

[67957.]—**Voss Machine.**—For full information on influence machines, see paper by Dr. S. P. Thompson—"The Influence Machine from 1788 to 1888," *Journal* of the Society of Telegraph Engineers, Vol. XVII. No. 74. pp. 569 et. seq.

W. PERREN-MAYCOCK, A.I.E.E.

[67957.]—**Voss Machine.**—Has "W. B. C." thoroughly warmed his machine before using it?—for if it has been put aside for some time, no doubt it has got damp. Thoroughly overhaul the machine, warm and dry it, and put a little amalgam on rubber, and then try. F. W. MASON.

[67957.]—**Voss Machine.**—There was a full description of the Voss machine in the back volumes of the ENG. MECH.; but as mine are at the binder's I cannot quote the number. Perhaps our kind Editor can oblige you by quoting the volume. In all probability your machine is dirty. Clean all the spaces between the bosses with a little bit of flannel dipped in benzoline. Dry well before the fire (not too near, lest you crack the plates).

S. BOTTONE.

[67958.]—**Centres of Shafting.**—No rule as to distance—generally a matter of convenience. But you should not be less than 20ft. between centres.

Bristol. T. C.

[67959.]—**Engine Query.**—If this is to be condensing, have l.p. cylr. 26in., and h.p. cylr. 15in. Cut off at ¼ in h.p. and ⅛ in l.p. It is called 9 expansions under the circumstances you name. Use a double belt (on wheel 15ft.) 30in. wide. Why not drive with 1¼in. hemp or cotton rope (7 ropes)?

Bristol. T. C.

[67959.]—**Engine Query.**—You could not do with smaller cylinders than the following:—h.p. 11¼in., cut-off ·5; mean pressure 48lb.; l.p. 22½in. diam., cut-off ·5; mean pressure 14lb.; terminal pressure 6lb. above back pressure. The above mean pressures are those which would be found in actual working, not theoretical pressures, which are useless in practice. Rule for rate of expansion = ratio of cylinders ÷ cut-off, or 3 ÷ ⅓ = 9. A 20in. single belt would be a good size to use. The diam. of flywheel is rather small; the usual size is between 3—4 times the stroke. Weight would be 4½ tons; or 5½ would be better, as the load will be an irregular one. MCGILL.

[67960.]—**Starting Compound Condensing Engine.**—1. Without seeing arrangement it would be difficult to say. They may be for starting, if opening into cylinder; if not, for steam to jackets. 2. If you keep the injection open while air-pump is not working, you stand a great chance of filling the cylinders with water and blowing cover off. The best way of starting is to blow all air out through snifting valve, then close blow-through and snifting valves, and admit a little injection water to get vacuum. MCGILL.

[67960.]—**Starting Compound Condensing Engine.**—1st. The valve mentioned on the l.p. cylinder is no doubt an auxiliary valve. This valve is placed on nearly all compound engines so as to render them handy at starting at any position of the cranks, live steam being admitted either on the top or bottom of the l.p. piston. 2nd. The injection valves should be opened before starting. 3rd. If the condenser will not take the injection, stop the engine and throw a few buckets of water over the condenser so as to cool it; this will get you over the difficulty.

Longsight. J. STOKES.

[67962.]—**Bluing Solution for Steel.**—The object of the process is evidently to form a thin film of sulphide. SIX.

[67962.]—**Bluing Solution for Steel.**—I am afraid "W. T. E." will not get much of a result from that he mentions. I tried it some time back, and am sorry to say I cannot recommend it.

F. W. MASON.

[67965.]—**Aquatic Beetles.**—Wide-mouthed bottles of a fair size containing a little meat fastened to the bottom, and sunk upright in the ponds, may suit the purpose, especially if the inquirer adds some arrangement of string and a lid, whereby they may be closed before being drawn up.

Uttoxeter. N. S. R.

[67965.]—**Aquatic Beetles.**—If "Dytiscus" will procure a half-dozen wine hamper, remove the lid and fasten a strong cord to each handle, then place a brick or large stone inside, and get a companion to pull one cord while he pulls the other, by drawing this arrangement through the ponds he will be able to catch dytiscus. Should more be taken than wanted, a supply of males would oblige.

Great Yarmouth. J. J. OWLES.

[67966.]—**Varnishing Maps.**—I spoilt my first in same way, but now use the size (made of gelatine or clear glue) cold, so as to keep it on surface of paper. I like mastic varnish best. KANET.

[67966.]—**Varnishing Maps.**—Dissolve some isinglass in water by simmering it over a fire, and strain it through fine muslin. If the size glistens when applied to moderately warm paper, it is too thick; if it sinks in it is too thin; it should merely dull the surface. Give your map two or three coats of it when you have got it right, and then varnish with the best mastic. J. S. MANDANE.

[67966.]—**Varnishing Maps.**—I do not know anything about "patent size," and possibly the fault may lie there. One coat of gelatine (1oz. to 10 of boiling water, strain, and keep hot on a sand bath) I find to work very well. Paper varnish not being so deeply coloured as ordinary copal, suits better for maps.

Plymouth. B.Sc.

[67966.]—**Varnishing Maps.**—Try sizeing with very weak glue (soak the glue all night before melting), and then varnish with white rosin 1lb., gum arabic 2oz., Venice turpentine 2oz., linseed-oil 2oz. First melt the rosin and strain it very hot, steep the gum in olive-oil till dissolved, and strain it. Put to this the turpentine and rosin, and mingle them over a slow fire till dissolved. Use it hot.

Bournemouth. MILES.

[67967.]—**Engine and Boiler.**—If your boiler is well made it could be worked with 60lb. on safety-valve, taking care to keep crown-plate of furnace well covered. You would get 2H.P. by running your engine at 350 revolutions. MCGILL.

[67967.]—**Engine and Boiler.**—If the boiler is properly constructed you could carry a pressure of 150lb. in perfect safety. Assuming that you have a pressure of 100lb., engine making 200 revolutions per minute, and with a cut-off at ⅔ stroke, the engine would develop 2 horse-power.

Longsight. J. STOKES.

[67972.]—**Dynamo.**—It is pretty evident that there must be very serious leakage of current somewhere for you to be able to get a spark from the F.M. wires, even when the commutator is not in contact with brushes. This is further proved by the fact that it will not work as a motor. If you can't find out the fault, send it to me (carriage paid), and I will put it right for you, free of charge.

Carshalton. S. BOTTONE.

[67973.]—**Small Dynamo.**—1. The armature or field-magnets leak. 2. The wire is too fine to give a large current. 3. The resistance of the bell is too small to allow the field-magnets to excite themselves to the full. Insert a yard or so of No. 30 iron wire between the dynamo and the bell, and try again. S. BOTTONE.

[67975.]—**Bottled Fruits.**—Consult a cookery book, e.g., Mrs. Beeton's "All About Cookery."

SIX.

[67978.]—**Fucus.**—This is one of the "brown sea-weeds" or Melanophyceæ — the chlorophyll corpuscules being brown. The branches of the thallus of Fucaceæ often contain air-cavities for floatage (hence the term "bladder-wrack"), and the cell walls are very gelatinous. The reproductive cells occur at the ends of certain "fertile" branches of the thallus, and line depressions or pits (conceptacles). The female cells (oospheres) are developed from mother cells called oogonia, each oogonium producing four or eight oospheres. In other conceptacles the male cells (antherozoids, each a body or "brown spot" with two long hairs) arise from antheridia, each antheridium producing many antherozoids. The fertilised egg (oospore) at once develops into a new fucus. In Fucaceæ the epidermis adds to the growth of the plants, unlike its behaviour in higher plants, where it remains a simple layer. "H. W." will see that I have supposed him somewhat familiar with technical terms and general reproductive phenomena of plants.

Uttoxeter. N. S. R.

[67979.]—**Elementary Biology.**—Morgan's "Biology," published by Rivingtons, is just the book I fancy "H. W." is in need of. It is written for the Inter.B.Sc. (London) Exam., which, I fancy, "H. W." has in view. I used it for this exam. Huxley's "P. Biology," new and revised edition (10s. 6d.), will enable one to get a practical knowledge of the development of "Rana." McNab's "Classification of Plants" (1s. 6d.) has a short account and drawings of the several parts of the plant "fucus." SUTTON-ON-HULL.

[67979.]—**Elementary Biology.**—Foster and Balfour's "Elements of Embryology" will be "H. W.'s" best aid to a knowledge of the history of the chick and rabbit. He should add as much practical work to his reading as possible, and, of course, should have dissected the adult forms before he begins. When he has gone through the above carefully, he will be able to understand Balfour's "Comparative Embryology," Vol. II., or Haddon's smaller "Introduction to Embryology," for the differences presented by amphibian development; but if he has done no embryology before, he must stick to the chick till he masters it.

Uttoxeter. N. S. R.

[67980.]—**Recovering Sulphate of Copper.**—Precipitate the copper by means of solution of sodic hydrate (caustic soda); collect this, strongly heat, boil in strong sulphuric acid, evaporate down low, then stand and let crystallise; dissolve again, and recrystallise. F. W. MASON.

[67980.]—**Recovering Sulphate of Copper.**—Filter off through slag-wool or asbestos; evaporate in earthen vessels until it crystallises on cooling. Collect the crystals. If not pure enough, redissolve in clean hot water and recrystallise. Or precipitate all the copper by adding scrap-iron or zinc to the filtered solution as long as any brown copper powder is precipitated. Collect this, wash it on a filter, redissolve it in dilute sulphuric acid, and crystallise. This will give a very pure sulphate.

S. BOTTONE.

[67981.]—**Accumulators.**—To light an 8-volt 5c.p. lamp for four hours you will need four cells, exposing 9in. by 9in. of positive surface. You will have to run your dynamo for six hours.

S. BOTTONE.

[67984.] — **Forming Accumulators.** — The plates rapidly improve by continuous usage.

No SIG.

[67984.]—**Forming Accumulators.**—At best, your accumulators will not give much more than two ampère hours. To form, send the current in one direction till the acid begins to boil briskly. Now let the cells discharge. Now reverse the connection of the battery, and charge the contrary way. Again discharge, reverse, and repeat these operations till your plates retain as you desire. Then afterwards always charge in one direction, and do not entirely discharge. S. BOTTONE.

[67985.]—**Engine.**—This will run at 290 revs., according to size of ports. If steam is carried ⅔ of stroke you may get ¼H.P. Vertical boiler, say, 16in. by 9in., with firebox. Burn fine coke and coal or gas, as will suit you.

Bristol. T. C.

[67986.]—**Practical Electric Bell-Fitting.**—Try nitrate of silver, 30 grains; common salt, 30 grains; cream of tartar, 3½ drachms. Mix, and moisten with water for use; or you can immerse it in a solution of cyanide of potassium, which will silver it. F. W. MASON.

[67986.]—**Practical Electric Bell-Fitting.**—I have found the following a good silvering paste for brass-work. Pour 1oz. strong nitric acid into a gallipot; set this on the hob near the fire. When the acid boils throw in about 1dwt. of silver wire; when this is dissolved add a good tablespoonful of common salt; then make the whole into a paste with powdered whiting. As soon as the action ceases you can use the paste. But you must be very careful not to inhale the fumes given off when you add the silver, as they are very poisonous. Have your work quite clean and free from grease, rub a drop of dilute sulphuric acid over it, and then rub some of the paste on with a bit of rag tied round the end of a stick. A coating of silver quickly forms, which can be polished with an old wash-leather.

Forest Hill. J. MINUTO, Electrician.

[67990.]—**Counting Speed of Quick-Speed Engines.**—Use an ordinary counter; but if speed is very high, gear down the counter with a pair of wheels 5 to 1.

Bristol. T. C.

Fig. 13. DIY map varnish recipes. *English Mechanic & World of Science* 49 (1250): 37. March 8, 1889.

varnished maps were varnished regularly and for many different purposes, thus providing a different entry point to the maps' cultural and material history because, as varnished objects, they fulfilled specific social functions and stood for unique historical experiences. Varnished maps were meant to be put on display in broad daylight, to be touched and handled, and, following the advice of good housekeeping or educational instruction, washed and rewashed. Varnished maps were used objects, and the varnish itself was as much part of the map's material structure as it is now the patina reflecting its historical experience. If technology allows, I root for refurbishing historical wall maps with some kind of modern noninvasive varnish so that we may recapture their historical function in all its messy forms.

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I am profoundly grateful to Seth Irwin for inviting me to join the discussion of all things related to varnished wall maps. Meeting him and the working group was inspiring, and I am indebted to our many conversations.

APPENDIX. "MAP VARNISH"—SELECT PRIMARY SOURCES, 1666–1900

The following working bibliography of primary sources cross-references terms related to "varnish" and "map." Assembled in chronological order, its sources include handbooks, sales catalogs, newspapers, and magazines, among others. Sources were cross-checked using databases like EEBO, ECCO, EAI (Part 1), *America's Historical Newspapers* (AHN), ProQuest's *American Periodicals*, or *Google Books*. Select quotations are included, with "map" and "varnish" bolded for easy reference.

1666. *Academia Italica. the Publick School of Drawing, or, the Gentlemans Accomplishment* 2nd ed. London: Printed by Peter Lillicrap, 1666.

*"How to make Prints and **Maps** lie smooth and even on Cloth or Paper" (14)…*

*"…. Then hang them up on Lines to dry, and when they are you may prepare them to make them bear Colours [sic] and **Varnish**." (p. 14)*

1672. Salmon, William. *Polygraphice; or the Art of Drawing, Engraving, Etching, Limning, Painting, Washing, Vernishing [sic], Colouring [sic] and Dying…* London: Printed for Richard Jones, 1672.

"Ch XIX. Of Washing, and the Materials thereof.
*By washing, here we intend nothing else, but either to set out **Maps** or Printed Pictures in proper Colours [sic], or else to **vernish** [sic] them." (p. 201)*

1762. [Kennedy, Robert]. "To be TAUGHT, THE ingenious and curious Amusement of Painting on Glass, in its Perfection, by ROBERT KENNEDY." *Pennsylvania Gazette*, no. 1762 (July 29, 1762): 1.

*"He likewise **varnishes** papered Rooms or Hangings, Family Pieces, **Maps** and Prints of all Kinds, &c." (p. 1, supplement)*

1774. [Reed, John]. "Advertisement." *Pennsylvania Gazette*, no. 2381 (10 Aug. 1774): p. 4.

*"Any Gentleman inclining to have their **Maps** framed, painted, gilded and **varnished**, may have them done in the neatest manner." (p. 4)*

1793. [Reading, Howell]. "Advertisement." *Federal Gazette* (10 Jan. 1793): p. [3].

*"THE SUBSCRIBER Has now the pleasure presenting to you, and the World at Large, His MAP of the STATE ... He colours [sic], **varnishes**, and fully completes the said **Maps**, on Rollers, or Frames, in a style superior to those done in London." (p. 3)*

1804. Tingry, P. F. *The Painter and Varnisher's Guide*. London: G. Kearsley, 1804 (see also 1830 and 1832 editions).

*"The word **varnish** is a general expression used to denote every dry or liquid substance, the extension of which over solid bodies gives to the surfaces of them a certain lustre [sic] by a combined effect of the reflection and refraction of the rays of light." (p. 104)*

1806. [Sullivan, John]. "Advertisement." *Repertory*, vol. III, no. 83 (17 Oct. 1806): 4.

*"Transparent Varnishing & Colouring [sic]. John Sullivan, Jun. […] [I]nforms the Publick [sic], that he colours [sic] and **varnishes Maps**, Charts, and Prints …" (p. 4)*

1808–1841. Bailey, Lydia. Account book, MS, Historical Society of Pennsylvania, Philadelphia.

1811. [Cottu, Mr.]. "Advertisement." *Evening Post*, no. 2720 (11 Feb. 1811): 1.

*"MAPS, PAINTINGS, & DRAWINGS Varnished at the shortest notice … Mr. Cottu respectfully informs the public, that he has on hand, a constant supply of superior varnishes, &c. … **Spirit wine varnish for maps**, &c." (p. 1)*

1815. Melish, John. "Geographical Establishment in Philadelphia." *The Port-Folio, Vol. 6*, Iss. 5 (Nov 1815): 519.

*Mr Melish will shortly publish by subscription, … A six sheet map of the United States … The map will be either mounted on rollers and **varnished**, or put in the portable form like a book. (p. 519)*

1816. [Street, John]. "Advertisement." *Poulson's American Daily Advertiser*, vol. XLV, no. 12359 (27 June 1816): 1.

*"**Copal Map Varnish**—this is a substitute for spirit of wine **varnish**, and has been proved by several to be superior to any heretofore used for varnishing on papers; its elasticity and quality of resisting water, whereby it can be washed and freed from dirt, are the principal advantages—one coat of this gives the paper a beautiful gloss, whereas two or three of the other is requisite." (p. 1)*

1817. [Street, John]. "Advertisement." *Poulson's American Daily Advertiser*, vol. XLVI, no. 12625 (12 May 1817): 1.

"Copal Map Varnish—this is a substitute for spirit of wine varnish, and has proved superior to any before used for paper or maps—it resists water so that maps or rooms varnished with this varnish, can be cleaned at pleasure." (p. 1)

1824. Parker, Dr. M. *The Arcana of Arts and Sciences, or, Farmers' & Mechanics' Manual; Containing a Great Variety of Valuable Departments of Human Knowledge, Many of which were Never before Published*. Washington, Pennsylvania: Printed by J. Grayson, 1824.

*"**VARNISHES** are those smooth, glossy, enamel-like coverings which are laid on metals, wood, leather, and paper, &c for the purpose of adding to the beauty of their surface, and to preserve them from the effects of dampness, dust, &c.*

*"Thus lacquers, Japan liquors, &c. are a kind of varnishes, as well as those used by cabinet-makers for their furniture, and the **map** and picture-makers to preserve their work from being soiled by dust, flies, &c…. (p. 156)*

*"A **Varnish** for Copper Plate Prints or **Maps**. …*
"19. First lay on a coat of water (in which some isinglass has been dissolved) with a very fine brush; then another made of true spirit of wine, half a pound; gum elemi, two drachms; and sandarac, three drachms, dissolved together." (p. 160)

1827. [Leggett, Charles]. "Advertisement." *Providence Patriot*, vol. 25, no. 22 (17 Mar. 1827): 3.

*"Looking-Glass Manufactory.… Glasses repaired, **Maps varnished** and mounted, and window Cornishes furnished, at short notice." (p. 3)*

1831. [Mackenzie, Colin]. *Mackenzie's Five Thousand Receipts in all the Useful and Domestic Arts*. Philadelphia: James Kay, Jun. & Co., 1831. (4th American Edition).

[From chapter on "Varnishes."]
To prepare wash colours [sic] for **maps**.
For yellow. *Dissolve gamboge in water; or French berries steeped in water, the liquor strained, and gum Arabic added. …* For red … For blue … For green … *To keep water-colours [sic] from sinking… If the prints are to be varnished, wash them all over with white starch, before beginning to lay on the colours [sic]." (p. 53)*

1841. "NEW YORK SCHOOL APPARATUS." *Connecticut Common School Journal*, Vol. 3, No. 8 (15 February 1841): 127.

*"The cards and **maps** in the following list are neatly put upon binder's board, bordered with red paper, and **varnished**; and are fitted to be hung, as literary ornaments, on the walls of a school room." (p. 127)*

1842. *The Practical Mechanic and Engineer's Magazine*. Vol. 1 (Glasgow, Scotland; March 19, 1842): 158.

*"How is **Map Varnish** Prepared?*
Take 1 part of pulverized gum mastic, 1 balsam of Canada, 2 spirit of turpentine; mix and keep it in a warm place until the ingredients are dissolved, and the varnish is fit for use. N.B.—The maps must be sized with isinglass, before the varnish is applied,—J.A.E."

J. Stanton, of London, gives a recipe nearly the same as the above, and adds the following:—Dilute ¼ lb. Venice turpentine, with about a gill of spirit of wine, which will make a varnish of about the consistence of milk, but which when dry will be perfectly transparent. (p. 158)

1854. Charles Tomlinson. *Cyclopaedia of Useful Arts, Mechanical and Chemical, Manufactures, Mining, and Engineering… Vol. II* (London: George Virture & Co., 1854).

"Varnish. **Crystal varnish *for maps***, *prints, coloured [sic] drawings, &c.—Dissolve 2 lbs. of mastic, 2 lbs. of damar, without heat, in one gallon of turpentine; or mix Canada balsam and oil of turpentine in equal parts. (p. 898)*

1859. Thompson, Francis Benjamin (ed.). *The Universal Decorator*. Volume the Third. London: George Vickers, 1859.

"186. **Crystal Varnish for Maps**, Prints, Charts, Drawings, Paper Ornaments.—*Procure a bottle of Canada Balsam, draw out the cork, and set the bottle at a little distance from the fire, turning it round several times, until the heat has thinned it; then have something that will hold as much as double the quantity of balsam; carry the balsam from the fire, and, while fluid, mix it with the same quantity of good turpentine and shake them together until they are well incorporated. In a few days the varnish will be fit for use, particularly if it be poured into a half-gallon glass or stone bottle, and kept in a gentle warmth. (p. 34)*

1866. *The Country House: A Collection of Useful Information and Recipes: Adapted to the Country Gentleman and His Household, and of the Greatest Utility to the Housekeeper Generally*. London: Horace Cox, 346, Strand, W.C., 1866.

*"**Varnish** for Pictures, **Maps**, Etc.*
No. 1.—Equal parts of Canada balsam and spirits of turpentine, applied as thin as possible. The picture must first be sized. To make size, boil down strips of leather; an old white kid glove will do. They should boil till nothing is left of them but a sort of residuum, which comes to the top of the liquid. The mess, when cold, becomes a perfectly strong jelly." (p. 13)

1873. "Winter and Early Spring Flowers." ***Godey's Lady's Book*** **(Philadelphia: September, 1873): 289.**

"SAVE THE LEAVES.— It is becoming a favorite amusement to select the rarest variegated autumn leaves; … To prepare these leaves, press them under heavy weights for a few weeks, ***varnish*** *them with* ***map varnish*** *if you desire a shiny surface, and arrange them as fancy dictates." (p. 289)*

1875. "Advertisement." ***Columbian Register*****, vol. LXIII, no. 3243 (16 Jan. 1875): 3.**

"BIG INVENTION. Lloyd, the famous map man, who made all the maps for General Grant and the Union army,… has just invented a way of getting a relief plate from steel so as to print Lloyd's Map of the American Continent … on one entire sheet of bank-note paper, 40 × 50 inches large, on a lightning press, and colored, sized and ***varnished for the wall*** *so as to stand washing and mailing anywhere in the world, for 25 cents, or unvarnished for 10 cents. (p. 3)*

1877. "Haasis & Lubrecht Map and Chart Establishment." Advertisement. Coll 214, 84 × 85. Joseph Downs Collection of Manuscripts and Printed Ephemera, Winterthur Library.

1882. Andres, Erwin. ***A practical treatise on the fabrication of volatile and fat varnishes, lacquers, siccatives, and sealing-waxes*** **… trans. and ed. by William T. Brannt. Philadelphia: Baird, 1882.**

"Insoluble **Varnishes** for Copper-plates and **Maps**
When copper-plate engravings, maps, and paper in general are to be coated with a thin layer impervious to water, but nevertheless elastic, the following process is used…" (p. 140)

"**Caoutchouc Varnishes**"
"Caoutchouc varnishes possess the exceedingly valuable property of offering a complete resistance to the influence of water, and in this respect surpass all other varnishes. … [A]rticles coated with this varnish will show no cracks." (p. 172)

1884. Blakelee, George E. ***Blakelee's Industrial Cyclopedia. A Simple, Practical Guide for the Mechanic, Farmer, Housewife and Children of every Thrifty Household in Town and Country*****. New York: Baker & Taylor, 1884.**

"Varnish for Maps." (p. 170)

1888. Fenner, B. ***Fenner's Complete Formulary, Being the Sixth Edition of Fenner's Formulary, ... A Complete Formulary and Hand-Book of Valuable Information for Pharmacists, Manufacturers of Chemical and Pharmaceutical Preparations, Physicians, and Students of Pharmacy and Medicine*****. Westfield, N.Y.: B. Fenner, Publisher and Proprietor, 1888.**

*"***Crystal Varnish** *is made from Canada Balsam mixed with an equal volume of Oil of Turpentine. It is also known as* **Map Varnish** *and is used diluted with oil of turpentine for making tracing paper…." (p. 1193)*

1889. Map Varnish recipes. ***English Mechanic & World of Science*****. Vol. 49, No. 1250 (March 8, 1889): 37.**

*"[67966.]—**Varnishing Maps**.—I spoilt my first in the same way, but now use the size (made of gelatine or clear glue) cold, so as to keep it on surface of paper. I like mastic varnish best. Kanet" (p. 37)*

1897. Ebert, Albert E. and A. Emil Hiss. ***The Standard Formulary: A Collection of Nearly Five Thousand Formulas for Pharmaceutical Preparations, Family Remedies, Toilet Articles, Veterinary Remedies, Soda Fountain Requisites, and Miscellaneous Preparations Especially Adapted to the Requirements of Retail Druggists*****. Chicago: G.P. Englehard & Co., 1897.**

*"**Varnish, Map**.*
Saturated solution of borax……..fl.oz. 12
Shellac, fine powder……av oz. 6
Shake together, but apply no heat." (p. 468)

1899. Livache, Ach. ***The Manufacture of Varnishes, Oil, Crushing, Refining and Boiling and Kindred Industries. Describing the Manufacture and Chemical and Physical Properties of Spirit Varnishes and Oil Varnishes; Raw Materials, Resins; Solvents and Colouring [sic] Principles; Drying Oils, Their Extraction, Properties and Applications; Oil, Refining and Boiling, The Manufacture, Employment and Testing of Various Varnishes*****. Translated by the French. London: Scott, Greenwood & Co., 1899.**

*"***Map Varnish**.—*A gutta-percha varnish is the one particularly selected for coating maps and manuscripts. Ten parts of gutta-percha cut into thin strips and well dried are placed in a vessel containing 40 parts of bisulphide of carbon and 20 parts of eucalyptus oil; the whole is allowed to digest and agitated from time to time until the whole is dissolved, after which it is set aside to clarify and the clear liquid decanted. If this solution be too thick it is thinned down with benzol. Objects before being covered with this vanish ought to be very dry. It is very durable, and its surface can be written upon, which is an advantage." (p. 208)*

1900. Dick, William B. ***Encyclopedia of Practical Receipts and Processes. Containing Over 6400 Receipts, Embracing***

***Thorough Information, in Plain Language, Applicable to Almost Every Possible Industrial and Domestic Requirement*. New York: Fitzgerald Publishing Corporation, 1900.**

> *"2920.* ***Map Varnish*** *is prepared by pulverizing 1 ounce of sandarach, ¼ ounce mastic, ¼ ounce elemi, dissolving them in ½ ounce of Venice turpentine, and adding to it a solution of 4 ounces shellac, and 3 ounces oil of lavender, in 12 ounces of alcohol." […]*
>
> *"2935.* ***French Transparent Colorless Vanish****. To make white French transparent colorless vanish for maps, the solution…. has to be bleached…" [followed by long recipe] (pp. 267–269)*

NOTE

1. The paper draws on research from Martin Brückner, *The Social Life of Maps in America, 1750–1860* (Chapel Hill: University of North Carolina Press and Omohundro Institute of Early American History and Culture, 2017). Sources referenced in the essay are cited in the appendix.

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