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ABSTRACT

This paper discusses the use of lithography in the United States in the early 1800s. Highlights include: the development of lithography in Germany between 1796 and 1798; early expectations for lithography; competition against the existing technology for the production of images--relief prints and copper-plate engravings; examples of 18th-century book illustrations using these earlier technologies; advantages and disadvantages of lithography; examples from the lithographed illustrations from the collection of the American Antiquarian Society; and prominent American lithography firms. (Contains 19 references.) (MES)

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1

The Introduction and Early Use of Lithography in the United States

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Just over two hundred years ago, between 1796 and 1798 in Germany, Alois Senefelder developed a new means of reproduction that became known as lithography. His initial discovery was rather serendipitous, and the first commercial application of the technology was for the printing of hand written plays and music. Senefelder realized the commercial importance of his discovery and soon exported the technology to England, France, and Italy through a system of licenses. Within a decade, lithography reached American shores; the earliest experiments occurred in New York. As early as 1808, the National Intelligencer and Washington Adviser announced that "Dr. Mitchell of New York received a lithographic stone and inks from Paris and made some experiments in this new art."[1] Unfortunately none of Dr. Mitchill's experiments are known to survive. The American Philosophical Society received a German lithographic stone in 1818 from the publisher Thomas Dobson so that its members could experiment with the new technology.[2] Bass Otis was one of those artists who experimented with the stone; he produced several prints in Philadelphia that have the appearance of being something other than traditional intaglio prints. For example, the portrait of Abner Kneeland that appeared in 1818 as the frontispiece to his Series of Lectures and the mill scene in the July 1819 issue of The Analectic Magazine that bears the inscription, "Bass Otis Lithographic" share certain technical characteristics.

That lithography came to the United States from France is of great interest and reflects, perhaps, an enlargement of American relationships with European countries. Earlier printmaking techniques--both relief cuts and intaglio processes--came to the American colonies from Great Britain. American print publishers, acting as entrepreneurs, brought skilled French immigrants to the United States together with printing equipment and stones. Others traveled to France and learned the basic skills required.

The early expectations for lithography were high. In the pages of the Western Review & Miscellaneous Magazine edited by William Gibbes Hunt in Lexington, Kentucky, it was suggested that

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lithography would "save the labor, the delay and the expense of engraving. It will furnish the most perfectly made copies without the possibility of an error." The editor of the American Journal of Science and Arts wrote: "The great recommendation of lithography is the comparative cheapness and dispatch, with which designs are executed by it." In the Boston Monthly Magazine, it is recommended as "of great importance to the world."[3] One question we should ask is whether the new technology completely lived up to these enthusiastic expectations.

What interests me about the introduction of lithographic technology into the American print-producing industry is how it competed against the existing technologies for the production of images--relief prints and copper-plate engravings. The ongoing assumption always seems to be that new technology supplants older technologies. Was this the case for lithography? Although lithography successfully competed against intaglio printmaking technology for the production of separately published prints, it did not do so for the production of book and periodical illustrations. Examining the reasons why lithography did not become the preferred medium helps us understand a great deal about the production of illustrations and the needs of publishers.

Let us begin by looking a couple of examples of eighteenth-century book illustrations. Among the most commonly found genre of prints were portraits of authors. On the left is James Hodder, the author of Hodder's Arithmetick published in Boston in 1719. This was copied by James Franklin (1697-1735) as a relief cut from an English engraving.[4] On the right is James Turner's engraving of Dr. Isaac Watts published as the frontispiece to his Sermons on Various Subjects issued in Boston in 1746. The portrait of Hodder was incised on a plank of wood. James Franklin gouged out the areas that print as white, leaving the lines to be printed to stand out in relief. The portrait of Hodder is actually very bold and decorative. This medium had two distinct advantages. First the materials were inexpensive. Wood or the alternative material for the matrix--type metal--was easily found and the ink that used was printer's ink. Knives and gouges were used to remove the area around the lines. Secondly, the relief cut, whether made of wood plank or type metal, could be placed in a form and printed with type. Copperplate engravings, as suggested by the portrait of Dr. Watts, were finer, but the technique required greater expertise and was more expensive both in terms of materials and labor. Instead of wood, the print was made on a very smooth, polished copperplate. Special tools were required to incise the lines into the plate. The engraver had to be skilled to apply the correct amount of pressure to achieve a range of tones. Deeper lines retained more ink when printed than shallow lines that printed paler. The printer, usually not the engraver, used an ink formulated for engravings, forced the ink into the incised lines, and then removed excess ink from the plate. Engravings required a specialized press that exerted a substantial amount of pressure. Illustrations printed as engravings were usually inserted at appropriate places in the text block; rarely was an engraving printed on a sheet that had been printed letterpress.

Another pair of examples will illustrate these factors well with different subject matter. On the left is an illustration of Franklin's fireplace design from his Account of Fireplaces printed in 1744. Note how the printer was able to place the printed explanation adjacent to the text. On the right is an engraving by Paul Revere for Edmund Quincy's Treatise of Hemp-Husbandry published in Boston in 1765. The explanatory text is printed as part of the pamphlet's text.

Until the nineteenth century, these were the two technologies available for printing book illustrations. Relief blocks were printed in large numbers in inexpensive books and pamphlets, particularly almanacs and children's books. Engraved illustrations were used for books intended for a wealthier, elite clientele. From the 1820s we can contrast a hand-colored engraved illustration from Thomas Say's American Entomology and Constantine Rafinesque's Medical Flora of 1828. In the latter book, Rafinesque commented that "Works of general utility ought to be accurate, complete, portable and

cheap. . . . The popular knowledge of the natural sciences has been prevented in the United States, by the first works published on them, having followed the model of the splendid European publications intended for the wealthy."[5] Say's book on insects, Alexander Wilson's American Ornithology, and William P. C. Barton's Vegetable Materia Medica of the United States are among the elegantly illustrated and costly productions to which Rafinesque was referring.

Lithography had its own advantages and disadvantages. From the first, it became apparent that no special skills, beyond the ability to draw or write, were required to create an image on the matrix. Novices and professional artists used lithography to produce original designs. However, specialized equipment was required. The only satisfactory material for the production of lithographs was limestone imported from Solnhofen, Germany. Americans tried to find native stone, one print in the collection of the American Antiquarian Society was even printed on Vermont marble, but the imported stone was the best. Kentucky limestone was also suggested as an alternative.[6] Special drawing materials were required. Waxy crayons or ink were chosen because they reacted with the lime in the stone, producing an insoluble lime soap which received ink but repelled water at the time of printing. Finally, the press required to print lithographs was different from others. It had a scraper bar, seen in this lithograph published late in 1876 by Louis Prang and Company.

By using the thoroughly catalogued collection of imprints issued during the 1820s at the American Antiquarian Society, we can identify about 150 that have lithographed illustrations in addition to periodicals illustrated lithographically. Almost all of the lithographs in these books relate in some way to the practice of lithography in France.

The earliest of this group of books is The Children's Friend, Number 3, unique because both text and image are lithographed. The illustrations have been attributed to Arthur J. Stansbury (1781-c. 1845), a licensed preacher and illustrator. Ironically, the title page refers to the illustrations as "engravings," but it also says that they "are engraved in a method entirely new." In any event, the whole pamphlet is lithographed, circumventing the problem of incompatibility of type and lithographed image. Only two copies of this pamphlet are known, and no copies of the predecessor to this item, Children's Friend, numbers one or two are known. The closest parallel to this publication are the Philadelphia productions of William Charles and the firm of Johnson and Warner, whose children's books feature engraved text and handcolored images, as seen in this opening from My Governess published in 1818. The use of lithography to produce the Children's Friend is an attempt to reproduce engravings inexpensively. In both cases, the coloring is applied by hand after printing.

The lithographs for a Children's Friend and a handful of others were printed by the first commercial firm that produced lithographs in the United States formed by William Armand Barnet and Isaac Doolittle in New York in 1821. They also printed illustrations for James E. Smith's Grammar of Botany and Benjamin Silliman's American Journal of Science and Arts in 1822. Barnet & Doolittle learned their craft in Paris. Barnet was the son of the American consul in Paris. The American Journal of Science and the Arts in October 1821 reported that they "availed themselves in Paris of a regular course of practical instruction" and brought the skills and materials and press to New York.[7] The same article also noted that they brought back French lithographs. The firm did not remain in business long and few of their separately published prints or illustrations survive. These two images do demonstrate the usefulness of lithography for the depiction of botanical subjects and technical illustration.

A certain amount of zoological illustration was produced lithographically. One of the earliest scientists to practice lithography in America was the French naturalist, Charles Alexandre Lesueur. He produced a number of drawings that were reproduced in the pages of the Journal of the Academy of

Natural Sciences, including this image of Chichla published in 1822. Lesueur's lithograph was really very experimental, done at a time in Philadelphia when there was not a commercial lithography establishment. The stone was sent to New York to be printed by Barnet & Doolittle.[8] Unfortunately the image lacks precision and definition, probably because Lesueur was not experienced with the technology. He may well have lacked a crayon of a hard enough consistency. Also, the successful practice of lithography was partially dependent on dry conditions. Too much humidity created difficulties for the artist drawing on stone and for the printer.[9]

Barnet and Doolittle faced several difficulties. They were only able to print 100 to 150 impressions a day, which drove up their prices so that they could not compete with copperplate printers. They printed some illustrations for Charles Alexandre Lesueur that cost twice as much as printing the same subject on a copperplate. Business became so difficult that they offered to sell their equipment to him for $1000.[10] Lesueur did not accept this challenge and business folded by June 1822.

What happened to the press and other equipment owned by Barnet & Doolittle? It could be that Peter Maverick acquired it. Maverick began printing lithographs for the publisher of the Annals of the Lyceum of National History of New York in 1824.[11] Among those who drew for him were his two daughters, Emily and Maria, and Arthur J. Stansbury whose work had been printed by Barnet & Doolittle. Maverick also at this time printed copperplate engravings; lithography never supplanted that aspect of his work. He did, however, publish several separately published lithographs that survive.

Anthony Imbert (1794/5-1834) became the foremost lithographer in New York beginning in 1825. Imbert had served in the French Navy and may have come to the United States as a member of the entourage surrounding the Marquis de Lafayette who toured American in 1824.[12] His first major project was Cadwallader Colden's Memoir ... Presented to the Mayor of the City, at the Celebration of the Completion of the New York Canals, issued by the City of New York to celebrate the completion of the Erie Canal in 1825. Among the artists involved in this mammoth undertaking was George Catlin, better known for his portraits of native Americans.

Among the projects that was designed to further knowledge about America's history was Thomas McKenney's Sketches of a Tour to the Lakes published in Baltimore by Fielding Lucas in 1827. At that time there was not a lithographer in that city, and the publisher turned to the experienced New York lithographer, Anthony Imbert, and the Pendleton firm in Boston for the illustrations. Among the plates were the "Indian Canoe" and a portrait of Kay-Way-No-Wut. The canoe was copied by a Lt. Farley of the United States Topographic Bureau from a model of the original by a native Chippeway. In Boston, the draftsman Moses Swett copied Farley's sketch for the lithograph. The other plate was drawn by Mr. McCleary of the garrison at Sault de St. Marie and was "said to be excellent."[13] These illustrations were prepared for a book designed to be popular and not among the finest published by Fielding Lucas, recognized as a publisher of elegant books during the 1820s. Among his best productions was Lucas' Progressive Drawing Book of 1827 featuring nineteen aquatints by John Hill after drawings by John Hazlehurst Boneval Latrobe and twenty engravings by others. The price was $12.00, which placed it in the luxury class at the time.

Imbert lithographed two technical illustrations including two images on one plate: "Sketch to explain the nature of a railroad" and "Sketch of the steam carriage employed on the Hetton rail-way" for Thomas Tredgold's Practical Treatise on Rail-Roads and Carriages (New York: E. Bliss and E. White, 1825). The use of new technology to publicize new inventions seems particularly appropriate.

Imbert also anticipated preparing a publication on lithography, but it never came to fruition.[14] He did issue illustrations for a number of publications including C. S. Stewart's Private Journal of a Voyage

to the Pacific Ocean, and Residence at the Sandwich Islands (N.Y., 1828), The American Toilet, a small volume consisting of twenty lithographed leaves, a novelty book which pairs objects with virtues.

One ambitious project never came to fruition. Alexander J. Davis, who had received training as a lithographic draftsman in Boston in the Pendleton firm, would be responsible for the drawings for Views of Public Buildings, Edifices and Monuments in the Principal Cities of the United States. The first four lithographs, views of New York buildings, appeared in August 1827. A second set of New York views appeared in October; the others never appeared. Another project that faltered was a drawing book with plates drawn by another French artist, Edme Rousseau, a miniature and portrait painter working in between 1826 and 1830. Several plates survive, but no complete copy.[15]

A third lithographic firm established in the 1820s that relied on French expertise was that of William and John Pendleton. Theirs was the first commercially successful firm. Among their first efforts was a series of portraits of the first five American presidents, published by John Doggett, the owner of a looking glass and carpet warehouse in Boston. Doggett exhibited the original paintings by Gilbert Stuart in 1822 and proposed to issue prints based on them. Several years passed before John Pendleton went to Paris with the paintings and returned with lithographic stones bearing the drawings of the presidents by Nicholas-Eustache Maurin, the printing equipment and an experienced French pressman.

The company remained in business as a partnership until 1829 when John moved to New York to establish his own firm. William Pendleton was active until 1835 when he sold the business to Thomas Moore. The Pendleton firm was praised by Benjamin Silliman in 1830 for "aiding the progress of science and the arts, in this country."[16] We can see their contributions by looking at several of their book and periodical illustrations.

One of their major projects was to print the illustrations for William Eliot's Description of the Tremont House (Boston: Gray and Bowen, 1830) which includes one engraving by the firm of Annin & Smith after a drawing by James Kidder and thirty lithographed plates. The engraved frontispiece adds elegance and formality to this book which consists of explanatory text and plates detailing the architectural ornamentation of the new hotel featuring many innovations in terms of sanitation and comfort.

Among the scientific works that the Pendletons supplied illustrations for was James Paxton's Illustrations of Paley's Natural Theology published in Boston in 1827. The illustration of the opposum should be compared to a copperplate engraving in J. D. Godman's American Natural History published in Philadelphia between 1826 and 1828. The lithograph lacks clarity and definition, but it must be admitted that the expense of copperplate engravings often impeded the publication of scientific literature.[17] The economies of lithography made publishing scientific literature possible, particularly before state and federal government subsidies.[18]

An important publication that falls between science and art was A Compendium of Picturesque Anatomy issued by the artist John Rubens Smith. Smith had drawn a remarkably beautiful portrait for Barnet & Doolittle in 1822 so he was not a stranger to the lithographic stone. In the preface, Smith notes that he adapted the plates from a work published in 1660 by Chrysostome Martinez, a Spanish artist who was a student in the College of Montaigu in France. Smith compiled his version to make up for the lack of anatomical studies for American artists. Thie first number consisted of four plates and sold for $2.00. The other two projected numbers never appeared.

Among their artistic productions was a small pamphlet, Rembrandt Peale's Lithographic

Sketches, Memoranda of Form & Character issued in late 1826 or early 1827. It contains eight lithographs, each adhered to a sheet with letterpress titles above and imprint and text below. "The Pier Head" is a lovely marine subject showing a range of tones. Peale could really manipulate the materials to achieve, for example, the translucence of the ocean's wave. "The Soldier's Birth-Right" was copied from a lithograph by Nicholas Toussaint Charlot entitled Y Dit que vous avez une jambe de bois de nassance. It is possible that Peale derived several other of the vignettes from French prints. Another artist working with him at the Pendleton's at the same time, David Claypoole Johnston, owned several other prints by Charlot.

An important scientific book copied from a French publication was Nathan R. Smith's Surgical Anatomy of the Arteries (Baltimore: J. N Toy and W. R. Lucas, 1830). It contains eighteen plates copied from a French anatomical work. These were printed in Baltimore by the firm of George Endicott and Moses Swett, who learned lithography in Boston at the Pendleton firm. Even the market for medical literature in the 1830s was a limited one. Earlier anatomies were produced with copperplate engravings--beautiful, but expensive. Interestingly, the format for Smith's book is large. It measures about twelve inches in height. The larger format makes the great detail possible. The most successful of later scientific books illustrated with lithographed images would share this large format.

William and John Pendleton, like many of their contemporaries, worked in two different ways. On the one hand, they issued their own separately published prints. They also served as job printers, accepting commissions from books publishers and others, including merchants who needed views of their stores or products. Artists of considerable talent produced the finest of the separately published prints and it is this contribution to American art that Silliman praised in 1830. However, some of the work produced for book and periodical publishers falls into this category as well.

Some literary magazines featured illustrations. Mrs. Katharine A. Ware, the editor of The Bower of Taste published in Boston in 1828 and 1829 wrote: "We have at considerable additional expense, presented in our last volume, four plates, all expressly designed and executed for our paper, and the encouragement offered by the public, the same number will be furnished for the ensuing year." Typical of the plates in this magazine are the "Insane Hospital" drawn by Mrs. Margaret Snow and "The Pirates" drawn by Thomas Edwards. Lithographs by Mrs. Snow were praised in The Bower of Taste for the "peculiar softness in her style, a smoothness in the gradations of light and shadow, that give her prints the appearance of finished engravings."[19] Note that the two media were compared and it is suggested that engraving is the more elegant and acceptable of the two. The illustration on the right was created to accompany a prize winning story. Although this image is well enough drawn, the scale is small, and crayon lithography is not suited for this scale, although occasional draftsmen can create pleasing images in spite of this factor. Probably harder crayons were not available. Interestingly, although the Pendleton firm had already published a several dozen competent bust-length portraits, the portrait that appeared in this biography was a copperplate engraving by John B. Longacre after a Gilbert Stuart portrait.

Artists found that lithography was a perfect medium for the production of inexpensive topographical views. Aquatints such as those by John Hill for Picturesque Views of American Scenery published from 1819 to 1821 were issued in limited numbers; probably fewer than one hundred impressions of these prints were produced. The image of each measures about 13 by 9 inches. The publishers originally advertised that thirty-six views would be issued; only nineteen plates were published. In the decade of the 1820s, however, small lithographed illustrations were not very successful. Among the least skilled is this example by Daniel Wadsworth for Theodore Dwight's Sketches of Scenery and Manners in the United States published by A. T. Goodrich in 1829. Many small topographical views seem to suffer from a lack of focus because the crayons were too soft.

Ironically, this quality was an asset when used for the production of larger format prints to be framed and the best of them could be elegant like Cephas G. Childs' The Natural Bridge or Catherine Scollay's Fourth View of Trenton Falls.

One interesting aspect of some of the illustrated books issued in this decade is that two or even three media are used in a given volume. For example, David Hosack's Memoir of DeWitt Clinton (New York: J. Seymour, 1829) contains two engraved plates, including an elaborate arrangement of portrait heads, and one lithographed plate--the "Map of the Nortern [sic] and Western Canals of the State of New York." Many maps were produced during the decade of the 1820s both as book illustrations and as separately published items.

Another book with both engraved and lithographed plates was George Bourne's Picture of Quebec published in New York by the author in 1830. James Smillie engraved this plate of the Chapel of the Holy Trinity and the Episcopal Church. These vignettes are just an inch or so in height; Smillie's skill was amazing. Lithographers were not able to produce such fine images. The map, however, was lithographed by Prosper Desobry of New York, who most likely was French born. Maps were well suited for lithography because of the necessity of combining text and line. Engraved maps were both slower and more expensive to produce. The printed boards of the cover of the Picture of Quebec have a relief cut ornament.

Did the new technology eclipse intaglio or relief processes in later decades in the production of book illustrations? The answer is a resounding negative. In spite of its relative cheapness and speed of production, the images could not be printed in conjunction with text. For the illustration of popular literature, stereotyped relief blocks became the preferred medium. This technology was first used in the second decade of the nineteenth century and became widespread during the 1820s and later. Michael Winship, in his article on "Printing with Plates in the Nineteenth Century" summarized the widespread use of this technology: "The technique was quickly applied to books that were in regular demand, such as Bibles, catechisms, and textbooks, which formerly had been printed from standing type. During the 1820s popular works of literature, such as those of Walter Scott, James Fenimore Cooper, and Washington Irving, were also stereotyped. By 1834 the firm of Harper & Brothers had published 234 titles, a total of 413 volumes. Of that number 192 volumes, of 46 percent, were stereotyped."[20] Relief blocks were stereotyped along with the text. When the era of pictorial journals arrived in the 1840s, publishers again turned to relief prints for the creation of images.

Lithographs were still produced by book publishers, but for limited purposes, particularly for scientific and technological literature. The audiences for these books were relatively small, in the two or three thousand copy range, as opposed to the 100,000 copy range. Although up to 100,000 impressions could be taken from a stone, they still had to be printed separately from the text, and this step created a burden for binders, and extra expense for the publishers. Because of the possibilities of such large editions, however, job printers, map, print, and music publishers continued to use lithography for their specialized needs, so the medium had a long and important history in the production of images in nineteenth-century America.

End Notes

1. Notice in The National Intelligencer and Washington Adviser, Jan. 8, 1808, quoted by Peter Marzio in "American Lithographic Technology before the Civil War," in Prints in and of America to 1850, John D. Morse, ed. (Winterthur: The Henry Francis du Pont Winterthur Museum, 1970), p. 221. Philip J. Wimerskirch also comments on Mitchill in his article, "Lithographic Stone in America," in Printing History 11 (1989): p. 3.

2. Marzio, "American Lithographic Technology," p. 221; Analectic Magazine 14 (July 1819): 67.

3. Western Review & Miscellaneous Magazine 1 (August 1819): ; American Journal of Science, and Arts 4 (October 1821): ; Boston Monthly Magazine 1 (December 1825): 378.

4. Wendy Wick Reaves, "Effigies Curiously Engraven: Eighteenth-Century American Portrait Prints," in Georgia Brady Barnhill, Prints of New England (Worcester: American Antiquarian Society, 1991), p. 42

5. Constantine S. Rafinesque, Medical Flora (Philadelphia: Atkinson and Alexander, 1828), p. vii.

6. Western Review & Miscellaneous Magazine 1 (August 1819): ; Analectic Magazine 14 (July 1814): 68.

7. American Journal of Science & Arts 4: (October 1821): .

8. George H. Eckhardt, "Early Lithography in Philadelphia," Antiques 28 (Dec. 1935): 252.

9. In 1831 William Pendleton wrote a letter to Ralph E. W. Earl about the difficulties of drawing a portrait of Andrew Jackson on stone in a spell of rainy weather . He explained that "the alkali of the Crayons absorbed so much moisture as to diffuse its qualities with those of the other components of the Crayons below the upper, down to the lower surface of the Stone. This was not perceptible prior to printing but immediately upon subjecting the Drawing to the chemical processes which prepare it for being printed from it became apparent and the blurry heavy appearances particularly about the Dress are irremediable consequences." Quoted in the author's article, "Political Portraiture: Two Prints of Andrew Jackson" in The American Art Journal 18 (no. 4): 92.

10. Sally Pierce, Catharina Slautterback and Georgia Brady Barnhill, Early American Lithography, Images to 1830 (Boston: The Boston Athenaeum, 1997), 12.

11. Pierce, Slautterback, and Barnhill, Early American Lithography, 12.

12. John Carbonell, "Anthony Imbert, New York's Pioneer Lithographer," in Prints and Printmakers of New York States, 1825-1940, David Tatham, ed. (Syracuse: Syrcuse University Press, 1986), 11-12.

13. Thomas L. McKenney, Sketches of a Tour to the Lakes (Baltimore: Fielding Lucas, 1827), pp. 201 and 327.

14. Cabonell, "Anthony Imbert," 19.

15. Carbonnel, "Anthony Imbert," 15-16.

16. American Journal Science and the Arts (Jan. 1830): 212.

17. Several case studies are presented in Georgia B. Barnhill's "The Publication of Illustrated Natural Histories in Philadelphia, 1800-1850" in The American Illustrated Book in the Nineteenth Century, Gerald W. R. Ward, ed. (Winterthur: The Henry Francis du Pont Museum, 1987).

18. See Ann Shelby Blum's Picturing Nature: American Nineteenth-Century Zoological Illustration (Princeton: Princeton University Press, 1993) for a thorough analysis of this subject.

19. The Bower of Taste 1, no. 12 (March 22, 1828): 190.

20. Michael Winship, "Printing with Plates in the Nineteenth Century," Printing History 5 (1983): 23.

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