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Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s

Sarah S. Wagner

Quality, permanence, and artistry have been touchstones in photography since its inception. With the commercial introduction of William Willis Jr.'s (1841–1923) Platinotype process in 1879, permanence was considered achieved with a stable image metal (fig. 1).[1] Likewise, the paper support contributes equally to the longevity and appearance of the print and directly impacts successful image formation.[2] Advertisements for photographic paper emphasized the importance of purity in the raw paper stock used for its manufacture, often claiming that "the pictures are as permanent as the paper itself" (fig. 2).[3] As the popularity of Platinotype and competing platinum papers grew, many companies sought to achieve the aesthetic ideals of the process with matte silver emulsion papers, referred to in this essay as *faux platinum* (fig. 3).[4] In turn, platinum papers were manufactured with more lustrous surfaces, similar to low-sheen silver papers.[5] The era from the 1880s to the 1920s was particularly noted for stiff competition for market share, when an increasing variety of image tones, paper tints, surface textures, and sheens were developed to satisfy the "platinum craze," changing aesthetic tastes, and the demand for a permanent photographic paper for artistic photography.[6]

Period advertisements, product literature, and journal articles all provide data and insights into the history of manufactured platinum, palladium, and major competing silver *faux platinum* photographic papers, their marketplace trends, and competition and consolidation within the industry. Dates of production of commercial sensitized paper products, together with their key physical characteristics, are discussed by decade in this essay. An appendix presents timelines that graph dates of production. Careful examination of the material characteristics of photographic papers within the context of the technical history of their manufacture is crucial to a meaningful understanding of the aesthetic intent of the photographer and the ways a print may have changed over time.[7]

Platinum's Superior Quality, Permanence, and Artistry

In 1900, Willis & Clements proclaimed, "The Essential feature—the feature that wins—in present day photographs, is QUALITY. . . . WILLIS & CLEMENTS' Platinotype Papers possess this charm of QUALITY. If you would succeed you must use the W. & C. papers."[8] "Quality" was also the foremost criterion that the noted Pictorialist and platinum printer Paul L. Anderson (1880–1956) asserted in 1913 as essential for a photographic paper. His six other criteria were permanence, the possibility of printing multiple identical copies, ease of control and manipulation of contrast, ability to modify the image color, and ability to print on papers of varying surface textures.[9] Manufacturers endeavored to meet photographers' demands with a wide variety of platinum and competing *faux platinum* papers.[10]

Figure 1. Alvin Langdon Coburn, *Clarence H. White*, c. 1905. Platinum print illuminated in raking light, 24.2 × 19.4 cm. National Gallery of Art, Patrons' Permanent Fund, 2008.65.2. Clarence White is shown holding a tin of platinum paper much as a painter would hold his palette.

William Willis sought to confirm the permanence of his patented process by referring to an acid test to judge image stability: "You all know that platinum is one of the most permanent substances with which we are acquainted. The prints made in that metal by this process are, practically speaking, impregnable. I have not succeeded in injuring them by any reagent, save only hot *aqua regia.*"[11] The "ferri-cyanide-hypo test," which would bleach a silver image, was often promoted as a way to distinguish between platinum and a less-permanent silver print.[12]

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Figure 2. George Houghton & Son advertisement for "Artisti Platinum Paper." From *The British Journal Photographic Almanac and Photographer's Daily Companion, 1902* (London: Henry Greenwood, 1902), 386. This Artisti platinum paper advertisement highlights the paper's purity and perfection and the permanence of platinum prints produced with it.

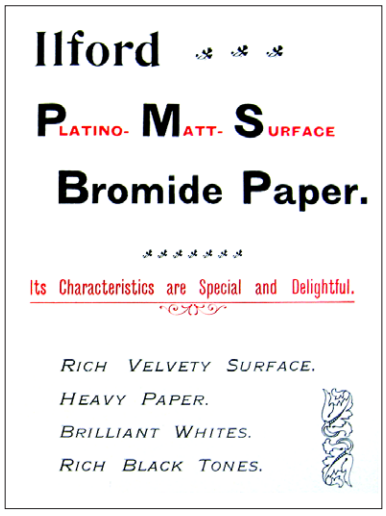

Figure 3. Britannia Works Company Ltd. advertisement for "Ilford Platino-Matt-Surface Bromide Paper." From *The British Journal Photographic Almanac and Photographer's Daily Companion, 1899* (London: Henry Greenwood, 1899), 531. As in this advertisement, the quality of the paper stock and the resulting richness of the print were often promoted.

Platinum papers offered the practical advantage of relatively brief exposure to light when compared with the common silver printing-out processes of this period, but they required chemical development of the platinum image. Once a photographer had adjusted to these changes in working methods and learned to create a negative with the appropriate contrast, consistent results could be achieved at a cost similar to that of silver papers.[13] The shorter exposure also facilitated wintertime printing for both the amateur and commercial enterprise.

Platinum photographs could be made on different types of paper, adjusted with various additives to the sensitizer and/or developer, manipulated locally by brush development, toned to achieve other hues, printed consistently, and enlarged for commercial applications. These aspects of the artistry of platinum photographs are addressed in detail in other essays in this volume.[14]

Manufacturers' Classifications and Advertising

Manufacturers described their ready-sensitized platinum papers to indicate the key features of each product. For example, the Platinotype Company of London described its products' image colors as black, sepia, or warm black; paper base colors as white or buff; thicknesses as medium, heavy, or extra heavy; and textures as smooth, rough, or extra rough. Surface sheen was also sometimes described as having a matte, semigloss, or eggshell finish. The Platinotype Company referred to its various grades of paper using alphabetical designations, such as AA, CC, or KK, while its American agent, Willis & Clements of Philadelphia, slightly modified this coding system to describe the same papers (fig. 4, table 1).[15] These and other manufacturers' codes are frequently encountered in the period literature and photographers' correspondence.[16]

The image hues of prints were advertised as "engraving black," "etching sepia," "mellow brown," or "soft gray," terms that echoed the "etching revival" of the mid-nineteenth century (fig. 5)[17] and helped to justify the aesthetic movement of the Pictorialists. Both the Brotherhood of the Linked Ring and the Photo-Secessionists asserted that photography was an art form equal to painting or etching.

These artistic trends drove manufacturers to expand the range of paper tints, textures, and thicknesses available in all photographic papers. Paper base tints were described initially as "brilliant white" and "natural" (unbleached) and later as "cream" in the 1890s and "buff" by circa 1905.[18] These base paper tones influenced the overall appearance of the print, providing an undertone, color contrast, or chromatic complement to the image hue. An off-white paper, such as buff or cream, could impart a warmer appearance to a neutral black image or complement a sepia image (fig. 6). In 1906 the Platinotype Company noted that the yellow highlights of some of its papers were due to the use of unbleached "natural

Table 1 | Product Code Designations Used for Platinum Papers Manufactured and Sold by the Platinotype Company and Distributed in the United States by Willis & Clements

Paper Quality	Black For Cold Development		Sepia For Hot Development	
	Platinotype Company	Willis & Clements	Platinotype Company	Willis & Clements
Heavy, smooth	KK	KK Black	KS	KK Sepia
Heavy, medium rough	TT	TT Black	TS	TT Sepia
Extra heavy, smooth	YY	YY Black	YS	YY Sepia
Extra heavy, rough	ZZ	ZZ Black	ZS	ZZ Sepia

Sources: Willis & Clements 1908, 14–15; Platinotype Company 1908b.

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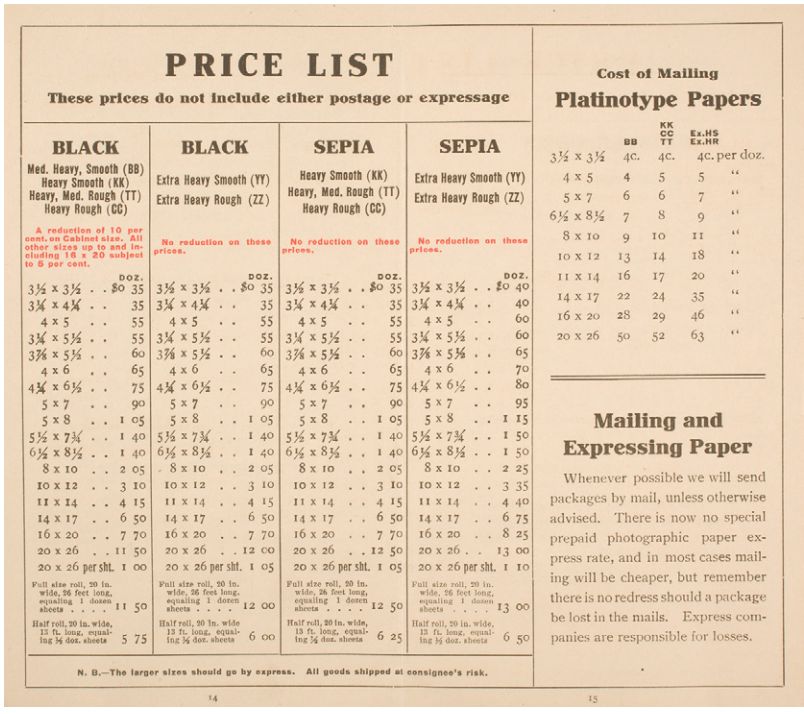

PRICE LIST

These prices do not include either postage or expressage

BLACK

Med. Heavy, Smooth (BB)
Heavy Smooth (KK)
Heavy, Med. Rough (TT)
Heavy Rough (CC)

A reduction of 10 per cent. on Cabinet size. All other sizes up to and including 16 x 20 subject to 5 per cent.

	DOZ.
3½ x 3½	$0 35
3¼ x 4¼	35
4 x 5	55
3¼ x 5½	55
3⅜ x 5½	60
4 x 6	65
4¼ x 6½	75
5 x 7	90
5 x 8	1 05
5½ x 7¾	1 40
6½ x 8½	1 40
8 x 10	2 05
10 x 12	3 10
11 x 14	4 15
14 x 17	6 50
16 x 20	7 70
20 x 26	11 50
20 x 26 per sht.	1 00

Full size roll, 20 in. wide, 26 feet long, equaling 1 dozen sheets 11 50

Half roll, 20 in. wide, 13 ft. long, equaling ½ doz. sheets 5 75

BLACK

Extra Heavy Smooth (YY)
Extra Heavy Rough (ZZ)

No reduction on these prices.

	DOZ.
3½ x 3½	$0 35
3¼ x 4¼	35
4 x 5	55
3¼ x 5½	55
3⅜ x 5½	60
4 x 6	65
4¼ x 6½	75
5 x 7	90
5 x 8	1 05
5½ x 7¾	1 40
6½ x 8½	1 40
8 x 10	2 05
10 x 12	3 10
11 x 14	4 15
14 x 17	6 50
16 x 20	7 70
20 x 26	12 00
20 x 26 per sht.	1 05

Full size roll, 20 in. wide, 26 feet long, equaling 1 dozen sheets 12 00

Half roll, 20 in. wide, 13 ft. long, equaling ½ doz. sheets 6 00

SEPIA

Heavy Smooth (KK)
Heavy, Med. Rough (TT)
Heavy Rough (CC)

No reduction on these prices.

	DOZ.
3½ x 3½	$0 35
3¼ x 4¼	35
4 x 5	55
3¼ x 5½	55
3⅜ x 5½	60
4 x 6	65
4¼ x 6½	75
5 x 7	90
5 x 8	1 05
5½ x 7¾	1 40
6½ x 8½	1 40
8 x 10	2 05
10 x 12	3 10
11 x 14	4 15
14 x 17	6 50
16 x 20	7 70
20 x 26	12 50
20 x 26 per sht.	1 05

Full size roll, 20 in. wide, 26 feet long, equaling 1 dozen sheets 12 50

Half roll, 20 in. wide, 13 ft. long, equaling ½ doz. sheets 6 25

SEPIA

Extra Heavy Smooth (YY)
Extra Heavy Rough (ZZ)

No reduction on these prices.

	DOZ.
3½ x 3½	$0 40
3¼ x 4¼	40
4 x 5	60
3¼ x 5½	60
3⅜ x 5⅜	65
4 x 6	70
4¼ x 6½	80
5 x 7	95
5 x 8	1 15
5½ x 7¾	1 50
6½ x 8½	1 50
8 x 10	2 25
10 x 12	3 35
11 x 14	4 40
14 x 17	6 75
16 x 20	8 25
20 x 26	13 00
20 x 26 per sht.	1 10

Full size roll, 20 in. wide, 26 feet long, equaling 1 dozen sheets 13 00

Half roll, 20 in. wide, 13 ft. long, equaling ½ doz. sheets 6 50

N. B.—The larger sizes should go by express. All goods shipped at consignee's risk.

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Cost of Mailing Platinotype Papers

	BB	KK CC TT	Ex.HS Ex.HR	
3½ x 3½	4c.	4c.	4c.	per doz.
4 x 5	4	5	5	"
5 x 7	6	6	7	"
6½ x 8½	7	8	9	"
8 x 10	9	10	11	"
10 x 12	13	14	18	"
11 x 14	16	17	20	"
14 x 17	22	24	35	"
16 x 20	28	29	46	"
20 x 26	50	52	63	"

Mailing and Expressing Paper

Whenever possible we will send packages by mail, unless otherwise advised. There is now no special prepaid photographic paper express rate, and in most cases mailing will be cheaper, but remember there is no redress should a package be lost in the mails. Express companies are responsible for losses.

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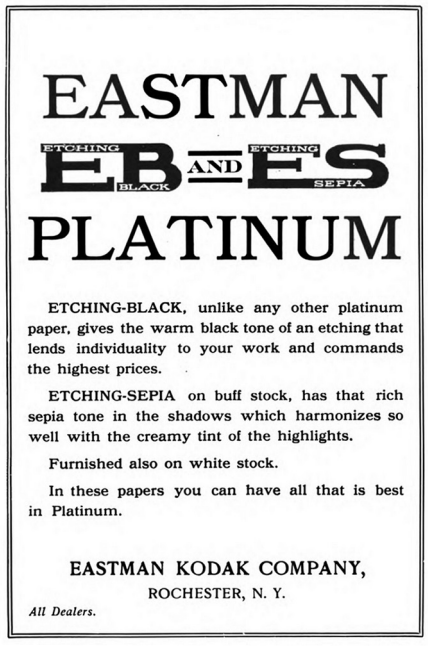
Figure 4. Willis & Clements price list, 1908. From Willis & Clements, *The Platinotype: Simplest Photographic Process* (Philadelphia: Willis & Clements, 1908), 14–15. National Gallery of Art, Photograph Conservation Department Study Collection. This price list shows the designations the firm used to describe the Platinotype Company papers it sold in the United States. Willis & Clements slightly modified the Platinotype Company's strictly alphabetical codes that described the same products, examples of which are shown in table 1. The same paper bases in various tones, thicknesses, and surface textures were sensitized for black tones using cold development or for sepia tones using hot development. Both companies advised against storing, handling, or processing black and sepia papers together, as sepia papers could contaminate the black papers, causing staining and spotting.



EASTMAN

ETCHING BLACK EB AND ES ETCHING SEPIA

PLATINUM

ETCHING-BLACK, unlike any other platinum paper, gives the warm black tone of an etching that lends individuality to your work and commands the highest prices.

ETCHING-SEPIA on buff stock, has that rich sepia tone in the shadows which harmonizes so well with the creamy tint of the highlights.

Furnished also on white stock.

In these papers you can have all that is best in Platinum.

EASTMAN KODAK COMPANY,
ROCHESTER, N. Y.

All Dealers.

Figure 5. Eastman Kodak Company advertisement for "Eastman EB [Etching Black] and ES [Etching Sepia] Platinum" paper available in white or buff paper stock. From *Abel's Photographic Weekly* 7, no. 174 (April 29, 1911): 331. Image tones for platinum and *faux platinum*, whether sepia or black, were frequently associated with etching, engravings, and artistry, as shown in this 1911 advertisement.

Figure 6. Eastman EB Etching Black platinum sample prints, c. 1909–16. Courtesy of Lee Ann Daffner.

6a. Print on buff paper with a smooth surface warm black image, sheet 15.9 × 10.8 cm, image 15.1 × 10.1 cm.

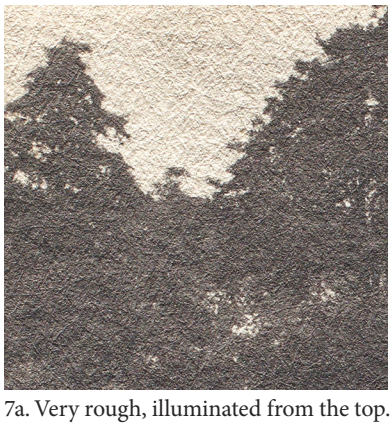
6b. Print on buff paper with a rough surface sepia image, sheet 15.9 × 10.8 cm, image 15.1 × 10.1 cm.

 Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

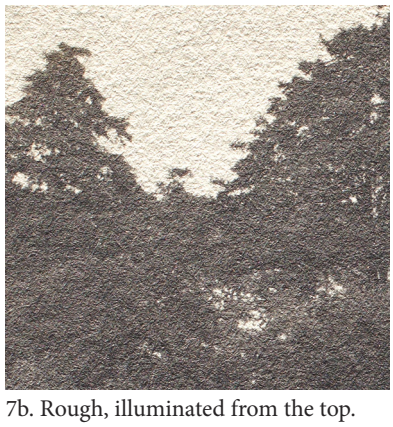
colour" papers to provide "a more harmonious base" for sepia platinum, while white or "blue" paper was employed for the black platinum.[19] Therefore, a slight yellow tone observed today in a platinum print might be an original paper tint rather than an indication of darkening that occurred over time.

The textures of platinum and *faux platinum* products were initially described as "smooth" or "rough" in the 1880s, amplified in the 1890s as "extra rough" and as "tiger tongue" after 1900 (figs. 7, 8).[20] Surface sheen was extolled as "matte" starting in the 1880s and expanded to include "velvet," "satin," "eggshell," "lustra," and "carbon" after 1900.[21] Specialty papers, such as "vellum" and "parchment," appeared in the 1890s and were more common after 1900, as was Japine, a partially parchmentized paper introduced in 1906 by the Platinotype Company.[22]

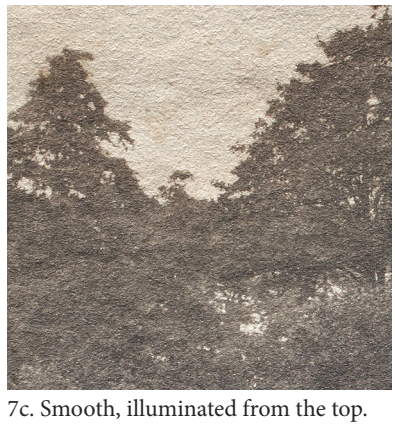
Figure 7. Continental Platin Papier Company Platinpapier platinum sample print in rough surface, 1906, 8.6 × 11.7 cm. Courtesy Birmingham Library, Birmingham, UK, Brian Coe Archives, Photographic Collections. Details of the upper left corner of three paper surfaces—very rough, rough, and smooth—are illuminated in raking light. The upper row was illuminated from the top, and the lower row was illuminated from the left. These prints show different surface textures and appearances depending on the lighting angle.



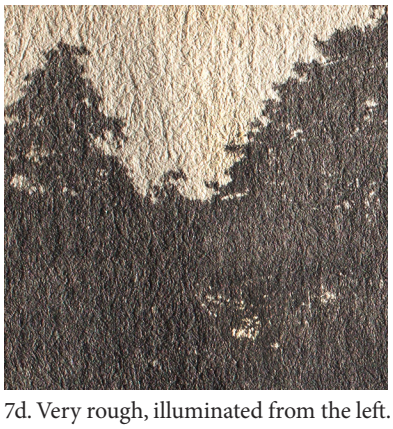
7a. Very rough, illuminated from the top.



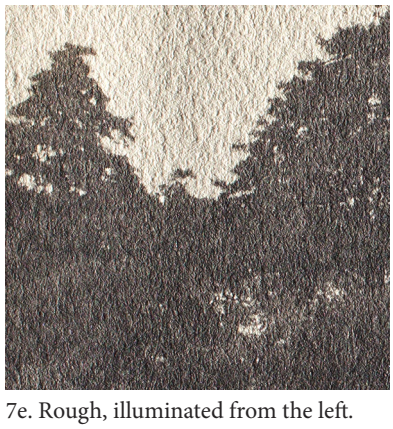
7b. Rough, illuminated from the top.



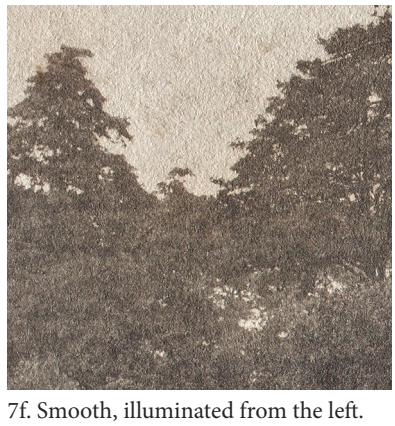
7c. Smooth, illuminated from the top.



7d. Very rough, illuminated from the left.



7e. Rough, illuminated from the left.



7f. Smooth, illuminated from the left.

Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

Figure 8. Camera Chemical Company Artisti platinum sample print in rough surface, 1901, sheet approximately 11 × 8 cm, image 10 × 7.5 cm. Courtesy Birmingham Library, Birmingham, UK, Brian Coe Archives, Photographic Collections. This print, illuminated in raking light, shows a slight texture on a very thin paper compared with the more pronounced texture possible on heavier papers shown in figure 7.

Japanese papers were also adopted for photographic use as their popularity increased in traditional graphic art printmaking.[23] A thick or "heavy paper" was indicative of a beautiful, expensive paper for watercolors.[24]

The different colors, textures, and surface qualities provided an extraordinarily wide range of options for photographers to explore.

Paper Purity

Because the platinum image is embedded within the paper fiber network, the purity of the paper and its working properties are crucial to the platinum image formation chemistry and print permanence.[25] The paper's porosity, opacity or translucency, texture, sheen, and tints all contribute to the reflective background that creates the luminosity of platinum photographs. In 1890 Willis noted:

> It is probable that the brilliancy, and certainly all atmospheric effects, depend mainly on the amount of reflected light transmitted through the image from the white underneath. . . . It is a want of perception of this fact which is answerable for a great many of the feeble and muddy prints which are produced. A certain amount of penetration (of image into the paper) is essential to vigour, but beyond this any increase leads to flatness.[26]

Photographic paper manufacturers advertised their papers using terms such as "best picked paper," "perfect purity," "perfect paper," "none but the best," and "brilliant whites" to emphasize paper's important role in their products (see fig. 2).[27] Two papermaking companies were repeatedly named in advertisements and articles as the producers of the best papers for photographic processes: Blanchet Frère & Kléber, also referred to as BFK Rives or simply Rives, and Steinbach & Company, also referred to as Saxe paper.[28] By the late nineteenth century, these two companies supplied 90 percent of the paper raw stock used by photographic paper manufacturers.[29]

Willis's initial frustrations with the available papers led him to work with the Steinbach paper mill to develop a paper appropriate for the unique chemistry of platinum's iron-based process.[30] BFK Rives's company records also show sales starting in 1887 of raw stocks for platinum paper bases, which were used by the Platinotype Company and other paper manufacturers.[31]

Rives may have become the preferred paper base by the 1890s because of its bright white quality.[32] Although compatible with the platinum process, Steinbach papers in the late 1880s were noted for a slight yellowish tint that tended to "yellow the highlights."[33] Of course, "natural color" paper also could be marketed as a desirable "cream" or "buff" paper base, as occurred in the mid-1890s and early 1900s, respectively. A slightly yellow paper tint may also have conveniently camouflaged the yellowing commonly experienced by platinum printers. As late as 1925, Edward Weston (1886–1958) recognized concerns regarding thorough processing and switched from buff-tinted papers to white, noting in his *Daybooks*:

> Why I have not used the white stock palladio before can only be answered by admitting myself addicted to buff from years of professional usage. And to use a tinted stock is a form of affectation near to "artiness." The white stock is clean, direct, unpretentious: it presents unveiled all the negative has to give. It reveals the best of a good negative and exposes the worst of a bad. There is no hiding behind a smudge of chemical color.[34]

Paper Sizing

Sizing compounds also directly influence the platinum image by interacting with the platinum salts as the image

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Figure 9. Dr. Richard Jacoby Sepia Platinum Paper sample print, 1906, sheet approximately 8.1 × 10 cm, image 7.3 × 9.6 cm Courtesy Birmingham Library, Birmingham, UK, Brian Coe Archives, Photographic Collections. Some platinum prints, as seen here, were susceptible to fading due to volatilization of the mercury added to the sensitizer and/or developer to render sepia image tones.

forms, affecting the grain, tone, and contrast of the image. In general, a surface-applied starch or gelatin size reduces image grain and provides a smoother image quality. Starch tends to warm the image, while gelatin creates a cooler tone, and a predominance of rosin lends a more neutral tone.[35] Rosin- or rosin-starch-sized papers, produced by both Steinbach and Rives, provided wet strength and had a long history of use as a substrate for albumen papers.[36] Willis noted that colloids such as gums, sugars, and starches render a browner image when applied to the paper's surface or dissolved in the developer.[37] In addition to various chemical additives and the temperature of the development bath, it is likely that manufacturers of presensitized platinum paper also manipulated the sizing and use of colloids to adjust image hue of their papers.[38]

The Sources of Yellowing

When compared with silver photographs, the photographic processing of platinum prints placed additional demands on the paper base. In fact, some paper supports displayed greater tendencies to yellow during or soon after processing, which Willis and others originally attributed to interaction with gelatin sizing common to English papers.[39] Platinum was known to coagulate gelatin and cause yellow stains in the highlights after exposure to air polluted by sulfurous compounds.[40]

Even the traditional gelatin size used for nonphotographic papermaking could be a source of metallic impurities. Cyntia Karnes suggests that the hot process itself may have aided the retention of the yellow platinum salt, due to swelling of the hygroscopic gelatin size at these elevated temperatures.[41] In 1892, Willis commented that his new cold-development process allowed him to succeed for the first time in using a rough-surfaced Whatman watercolor paper, which was sized with gelatin.[42] Perhaps the more hydrophobic resin-based sizes reduced adsorption and retention of iron and platinum salts within the paper interior during both hot- and cold-development baths, improving subsequent clearing and mitigating future yellowing. Numerous other sources could contribute to yellowing, including poor-quality papermaker's alum, incomplete clearing, use of impure hydrochloric acid, and acid-interaction with ultramarine colorants used in the paper base as a whitening or bluing agent.[43]

Silver processes were also prone to problems of yellowing and fading, as well as curling and easily damaged emulsions.[44] Even carbon prints' reputation for permanence was called into question, as light-sensitive red colorants used for warm sepia and albumen-like "chocolate" tints were said to cause fading, while yellowing was attributed to the overuse of bleach during papermaking and discoloration of paper additives.[45]

Concerns about the permanence of platinum prints lingered into the early twentieth century because of yellowing and also fading, which was related to the use of mercury salts as an additive to the process (fig. 9).[46] Various chemical treatment recipes for reducing the yellowness of platinum prints were widely published.[47]

Other Drawbacks to Platinum

Several other problems hindered the adoption of commercial platinum paper, including its short shelf and the problem of bronzing.

Short Shelf Life

The short shelf life of sensitized papers required that they be kept in a sealed metal container with a desiccant to prevent chemical fog (see fig. 1).[48] By 1891 Willis claimed that some papers had a shelf life of eighteen months,[49] but three to six months was considered the norm for unopened tins. Improperly stored presensitized platinum paper

Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

became an expensive waste that plagued photographers, prompting suggestions of how to use spoiled paper.[50] The tubes of platinum and palladium paper sometimes arrived damaged. Georgia O'Keeffe (1887–1986) recalled, "The palladium prints were on a beautiful parchment paper that was often dented in the shipping and had to be thrown away—while Stieglitz complained bitterly about it."[51]

Bronzing

Platinum and palladium papers could also unexpectedly "solarize" or "bronze"—that is, develop a reverse tone from black to a lighter gray or brown in dark image areas—especially if the paper's moisture content and the ambient relative humidity were low during exposure. This phenomenon was advertised as a flaw by manufacturers of silver and some platinum papers with the claim that their papers did not bronze and were "trouble-free" (fig. 10).[52] The tendency to solarize was particularly recognized as a characteristic of Palladiotype paper and was exploited for artistic purposes by Alfred Stieglitz (1864–1946).[53]

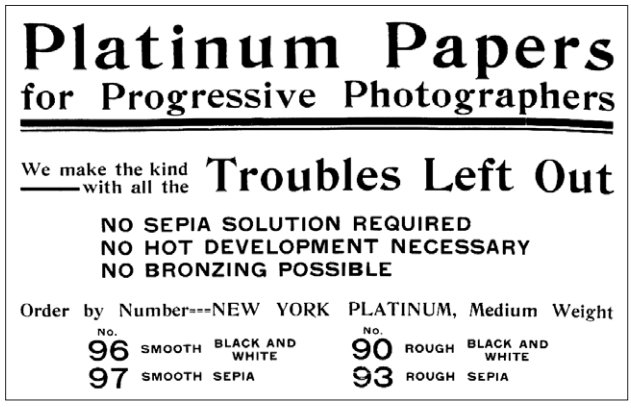


Figure 10. Mirmont Photo Paper Company advertisement for "New York Platinum." From *Bulletin of Photography* 1, no. 1 (August 14, 1907): 20. The Mirmont Photo Paper Company advertised its New York Platinum paper as trouble-free: "no bronzing possible" and "no hot development necessary" for sepia tones. "Bronzing" of the platinum image usually occurred when printing in low relative humidity.

Manufacturing Trends, 1880s–1920s

The forty years from 1880 to 1920 represent the most active period for the manufacture of platinum papers. These presensitized papers were advertised in the 1880s by just a few companies, followed by the advent of many new manufacturers in the 1890s to the early 1900s as the popularity of the process increased. By the 1920s the production of platinum papers had declined, continued by only a handful of firms as the era of platinum photography waned (see appendix for timelines).

The 1880s

Production of manufactured platinum paper began in earnest in the early 1880s with the first commercial firm devoted to the new process, Willis's Platinotype Company of London. By the end of the decade, new manufacturers located in Berlin and Vienna entered the market, producing a new type of platinum paper based on a formula published in 1887 by Giuseppe Pizzighelli (1849–1912).

The Platinotype Company's Hot-Development Process

The Platinotype Company introduced the first manufactured platinum paper in 1879, the year after the company's founding. With this new Platinotype paper and the necessary chemicals sold to practitioners willing to pay the required licensing fees, the company enjoyed a virtual monopoly in the early 1880s. This Platinotype paper was initially criticized for its cold-black, matte appearance and was disparagingly compared with albumen's warmer image and carbon's variety of colors and surfaces.[54] For enlarging studios and art reproductions, however, advertisements promoted the black image as sympathetic to those media and ideal for hand-coloring.[55] By the late 1880s, "engraving black" was noted as "always preferred by art critics . . . and taking its right place in public estimation."[56] Sepia platinum and gelatin prints, introduced in the mid-1880s, were marketed for artistic etching effects.[57]

Giuseppe Pizzighelli's Direct-Printing Water-Development Process

In 1882, Giuseppe Pizzighelli and Baron Arthur von Hübl (1853–1932) published a hot-development platinum recipe (with formula variations) that provided a license-free alternative to the Platinotype Company's control of the market.[58] That same year the Vienna firm of Dr. E. A. Just sold papers based on the Pizzighelli recipe.[59] A subsequent formula developed by Pizzighelli in 1887 for printing-out or "water-developed" platinum paper did not require hot-development baths, only water or steam to complete image formation.[60] In 1887 in the United States, Dr. E. A. Just advertised a smooth and rough Platinotype paper that was possibly still based on the 1882 formula.[61] In 1888 the Berlin firm of Drs. Adolf Hesekiel & Jacoby advertised "direct printing" paper based on Pizzighelli's new formula.[62] These two firms provided the first commercial alternatives to the Platinotype Company's products.

The Platinotype Company's Cold-Bath Processes

The competition from new manufacturers spurred the Platinotype Company to eliminate its licensing fees in 1888 and offer several innovations so photographers could

Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

avoid hot developers. The first cold-bath "platinum-in-the-developer" process was introduced in 1887, in which the paper was sensitized with iron salts only and the developer contained the platinum salts.[63] This "cold-bath" formula underwent subsequent variations, culminating in 1892 with the perfected cold-development process, in which the paper was sensitized with both iron and platinum salts.[64]

The 1890s

In addition to Willis's cold-development process, the 1890s brought other advances in platinum photography, with new types of paper supports, improvement in sepia papers, various formula additives, and an increasing number of manufacturers as the popularity of the platinum process gained momentum. After the adoption of the 1892 cold-development process, advertisements and brochures simply referred to these products as "cold-bath" papers to distinguish them from those that used the traditional hot-bath development papers and the print-out water-developed papers.

The Platinotype Company's Cold-Development Process

At an 1892 meeting of the London Camera Club, Willis demonstrated his new cold-development process on standard smooth and rough papers in thin and heavyweight thicknesses, and on Whatman's drawing paper, stating that he "could never succeed in doing [so] with the old form of sensitizing mixture." In fact, Willis showed papers of all qualities, from "coarse, almost brown, to fine writing paper" and "an interesting proof on parchment paper."[65] At a similar demonstration in 1893, he showed several papers again, including English watercolor paper and a Japanese paper he found to be "very beautiful; there is great transparency in the shadows, and it is of a lovely tone throughout."[66]

It is possible that an unpublished change in the sensitizer formula for Willis's cold-development process worked on a greater variety of papers than before without the chemical interactions that had affected image formation. The "gentler" print-out (water-development) and the new cold-bath platinum processes could also be used on papers that would have been damaged by harsh development in scalding acid, such as softer-surfaced papers, easily abraded textured papers, and Japanese tissues.

Japanese Tissues and Other Artists' Papers

The artistic use of rough-surface Whatman papers and a variety of Japanese tissues for hand-sensitized plain silver papers had also been suggested in journals and manuals starting in the late 1880s.[67] Dr. Adolf Hesekiel & Company offered a Whatman paper in addition to Pizzighelli Platinpapier in 1890,[68] while the large photographic firm of Ed. (Edward) Liesegang in Düsseldorf, Germany, had experimented with coating a silver emulsion on Japanese "vellum" paper in 1893.[69] These artistic trends and competing commercial endeavors may have motivated Willis to demonstrate the successful use of the new cold-development process on these types of papers. Although the Platinotype Company did offer an even rougher-textured paper in the 1890s, it never offered a sensitized Japanese paper support.[70] Both the Helios Photographic Paper Company and Dr. Richard Jacoby, however, did advertise platinum-sensitized Japanese tissues in the United States circa 1902.[71]

For obvious reasons, processes that did not require hot development were more attractive to practitioners. The print-out and cold-bath platinum processes, like the silver papers, offered greater ease of use along with the ability to incorporate different types of papers. The early platinum printing-out papers were described as losing favor by 1891 due to shortcomings such as their very short shelf life and sensitivity to dampness, but they continued to be manufactured by many firms through the 1890s into the early 1900s.[72] In 1891 Stieglitz noted that the image tone of direct printing paper could be modulated by controlling the moisture content of the paper both prior and during exposure, allowing for artistic manipulation of image hue.[73]

Parchmentized Papers

Willis demonstrated a parchmentized paper at both the 1892 and 1893 meetings of the Camera Club. This was a paper commonly treated with sulfuric acid to make it nonporous, hard, strong, and translucent.[74] He found that "its manipulation is exceedingly difficult, as when wet it stretches into all shapes, and after development is so transparent that it is difficult to say which is the right side; however, when mounted and finished it gives an image of great softness, and one that may find favor with the new school of photography."[75]

Willis had lamented, "To make a good sepia paper is a heartbreaking problem. . . . The difficulties are these:—1st. To secure homogeneity in the colour. 2nd. To obtain transparency or detail in deep shadow, and 3rd. To produce, with certainty, a colour of any definite warmth."[76] But with parchment paper he found that "the imitation of sepia is wonderfully accurate."[77] Willis was intrigued by parchment paper's ability to render sepia beautifully; at the same time, its very smooth surface heightened the resolution of image detail.

Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

Some manufacturers were already offering parchmentized silver paper for portraits in the early 1890s, although the products were probably used more for copying plans and for paper negatives.[78] Despite the competition in the 1890s, the Platinotype Company did not manufacture a parchmentized platinum paper until the introduction of Japine in 1906.[79]

"Faux Platinum" and Matte-Surfaced Silver Papers

During the 1890s, there was an increase in the variety of rough-surface textures offered by both platinum and silver photographic paper manufacturers.[80] The matte surface aesthetic of platinum was also becoming popular.[81] Many *faux platinum* silver products were rushed to market with names evocative of platinum, including Aristo-Platino, Platino Bromide, Platino Matte Surface (or PMS), Platinoid, Platino Matt, Platitone, Platina, etc. (fig. 11; see also fig. 3 and appendix).[82] Various metal salts used in the silver emulsions or as processing toning agents created the black and sepia hues typical of platinum prints.[83] Articles in the 1890s noted that many of the new *faux platinum* products were difficult to distinguish from platinum,[84] and these papers continue to present challenges to conservators and photograph historians as they attempt to determine the process by which a print was made.

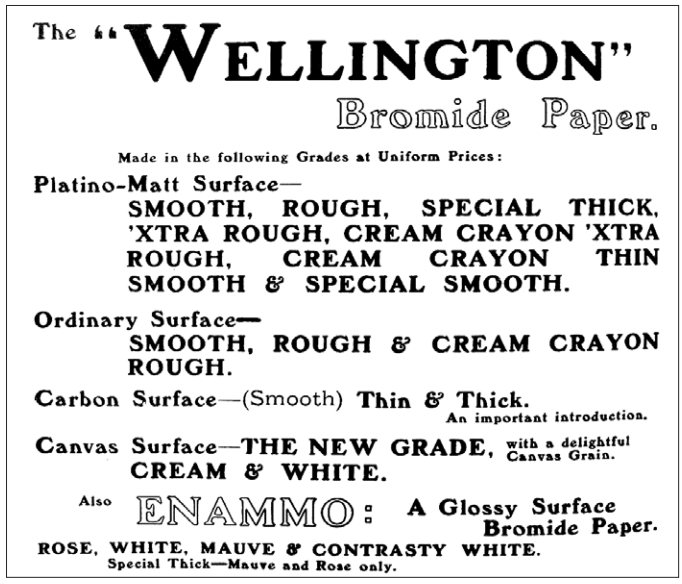


Figure 11. Wellington & Ward advertisement for "The 'Wellington' Bromide Paper." From *The British Journal Photographic Almanac and Photographer's Daily Companion, 1910* (London: Henry Greenwood, 1910), 254. In the early 1900s, *faux platinum* silver paper manufacturers expanded textures beyond the "extra rough" category to include a smooth "carbon" surface.

As a plain-paper process, platinum had an obvious advantage in the competition for matte-surfaced products. *Faux platinum* papers, with their traditional gelatin and collodion binders, required modification to achieve a similar surface. The matte surface was imparted by avoiding highly calendered paper supports, using a very thin or no baryta layer, adopting textured baryta layers, using a very thin binder, and/or adding matting agents to the binder such as starch, baryta, and silica (fig. 12).[85]

12a. Professional Plat Blue Black.

12b. Professional Plat Sepia.

Figure 12. Ansco Company Cyko sample prints from sample book, c. 1911. Matte gelatin silver developed-out photographs, each sheet 19 × 12.8 cm, image 15.3 × 10.6 cm. National Gallery of Art, Library Image Collection, Album PH7. Matte gelatin silver developed-out photographs often imitated platinum. Slight silver mirroring is evident at the edges of 12a. Sulfur toning has protected the image in 12b from oxidation.

Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

The popularity of the "platinum look" even compelled some manufacturers, such as Eastman Kodak, to suggest that its glossy silver chloride printing-out Solio papers (later available in matte surface) could be lightly abraded with pumice to achieve a platinum surface look.[86] Occasional tips in journals also recommended abrasion or squeegeeing against ground glass to achieve a matte surface on gelatin papers.[87]

The demand for the matte surface occasionally prompted a backlash among some critics, one of whom complained:

> There seems to be at times an uncertain and hazy conception of what constitutes art even in the minds of artists themselves. . . . An illustration of this . . . [is] the matt-surface papers now so much in vogue, and the arrogant assumption of their *artistic* superiority. . . . A perfectly matt or dead matt surface is inimical to depth, transparency, colour, and tone . . . while in photography it is destructive to some of its finest and most subtle characteristics. To apply it to everything, as some do, is a simple piece of stupidity.[88]

A Proliferation of Platinum Manufacturers

The American platinum paper manufacturing industry expanded in the late 1890s beyond the long-established Willis & Clements—the American branch of the Platinotype Company. E. & H. T. Anthony & Company advertised Climax platinum paper in 1891, a direct printing paper based on the Pizzighelli formula, claiming that its being "manufactured by us, and in this country, . . . enables us to guarantee quality . . . not possible with foreign goods."[89] Advertisements appear between 1897 and 1899 for National Photo-Paper & Chemical Company (Platni), John Bradley Manufacturing Chemist (Bradley Professional Papers), and J. C. Millen Manufacturing Company (Etching Matte).[90]

In England and on the Continent, the Platinotype Company, Hardcastle & Company, Britannia Works Company Ltd. (Ilford Platona), and Dr. Richard Jacoby in Berlin were the major producers at the end of the decade (see appendix).[91] Other manufacturers active during this decade include the German firms of Dr. Adolf Hesekiel & Company, Romain Talbot, Photochemische Fabrik HELIOS, and Unger & Hoffman; the Austrian companies of Dr. E. A. Just and Wilh. & M. L. Winter; and in England, the Autotype Company.[92]

In 1899 *Photo-Miniature* devoted an edition to platinum printing, explaining:

> There are three principal processes used in making platinum prints. *First* the *print-out* platinum method. . . . Millen's Etching Matte, *Platni*, Jacoby's and Hardcastle's print-out platinum papers belong to this class. *Second*, the *development* method. . . . Papers of this class, such as those of Willis & Clements, Bradley's platinum papers, and, in England, The Platinotype Co.'s papers, *Platona*, and Jacoby's platinum paper, are sometimes called "cold bath", "hot bath", and "sepia" papers. *Third*, the *platinum toning* method, in which print-out silver papers, such as *Aristo-Platino*, or plain salted papers, are used, the silver image being toned with platinum.[93]

Other noteworthy products in the 1890s include C. C. Vever's Argentic-Platinum paper and, in Germany, a silver-platinum paper manufactured by Dr. Adolf Hesekiel & Company; Dr. Richard Jacoby's Platinum Paper No. 1, containing palladium salts for brown image tones; and Dr. Krebs's Palladium-Papier.[94]

Industrial Consolidation: The "Paper Trust" and "Kodak Trust"

With the rapid growth in the photographic industry during the 1890s, mergers and consolidation among paper mills and manufacturers of photographic materials began as established companies lost market share. These changes greatly impacted both the industry as a whole and the many new platinum manufacturers in the early twentieth century.

The Rives and Steinbach paper companies formed the General Paper Company (GEPACO) "Paper Trust" in 1898 and doubled the price of its papers. Notably, Rives altered its watermark at this time from "BFK Rives Nº 74" to "BFK Rives Nº 75," the latter flanked on each side by a star, a possible dating clue if a watermark is extant.[95] The price increase added cost pressures to the photographic paper industry, but especially to the more expensive platinum papers.[96] Also in 1898, Kodak and American Aristotype secured sole North American distributorship of GEPACO papers, with substantial discount for themselves, effectively cornering the U.S. market for photographic paper raw stock.[97]

During the mid-1890s into the early 1900s, Kodak acquired other, smaller companies and colluded with other manufacturers to coordinate product distribution and

 Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

limit price undercutting in North America, Great Britain, and Europe.[98] Dealers were pressured to carry only products from this group, and journals were discouraged from advertising other companies' products. Few small companies could compete with Kodak's large advertising budget and full-page advertisements in numerous journals.[99] Kodak's corporate partners and some competitors weakened by the trust activities were either bought out or absorbed into Eastman Kodak as divisions in the United States and abroad, further increasing market pressure on the nascent platinum paper manufacturers well into the next decade.[100] American Aristotype and Eastman Kodak merged circa 1899, adding the very popular Aristo-Platino collodion papers and American Aristotype Platinum to Eastman Kodak's line of gelatin papers, films, plates, and photographic equipment.[101]

The 1900s

A flush of new platinum paper manufacturers entered the market in the first years of the new century, especially in the United States, quickly followed by a decrease in the number of firms that continued to advertise by 1910. Product innovations included new offerings of presensitized Japanese tissues and parchmentized paper supports, while the widespread use of mercury for sepia papers began to affect platinum's reputation for permanence.

Ansco and "Anti-Trust" Platinum Papers

In competition with the "Kodak Trust," the large photographic firms of E. & H. T. Anthony and the Scovill & Adams Company in the United States merged with several smaller companies in December 1901, creating the Anthony & Scovill Company (abbreviated to Ansco Company).[102] Ansco initially sold "Anti-Trust" papers including Water Tone Platinum made by the Columbian Photo Paper Company and Cyko Royal, a silver gelatin printing-out paper manufactured by the Western Photo Paper Company advertised as "superior to platinum."[103]Ansco advertised under its own label Ansco Platinum Paper in 1902, Watertone Platinum in 1903, and Ostia Platinum in 1905.[104] After 1907, Ansco advertisements do not mention platinum products except for Cyko Sepia Platinum, which, in later advertisements, was described as requiring redevelopment and toning, indicating it was a silver paper (see fig. 23a).

Several small firms in the United States also sold "Anti-Trust" platinum papers at various times during the decade. These include the established Bradley papers and new manufacturers: Alfa Paper Company (Alfa Platinum), Joseph di Nunzio (Angelo Platinum), Camera Chemical Company (Perfecter, Artisti), M. H. Kuhn (Buena Platinum), Platinum Manufacturing Company (Platinum Paper, Denver Platinum Paper, and Artisti), Curtis & Cameron (Harcourt Platinum), and Mirmont Photo Paper Company (New York Platinum).[105]

"Anti-Trust" companies and their products were advertised in "Anti-Trust" journals such as *Abel's Photographic Weekly*, the *Camera*, and others. Some manufacturers made a special point of marketing their papers as not belonging to the Trust. For example, Bradley Platinum Papers were proudly advertised as "Boycotted by the Trust. Dealers not allowed to sell it. Because it is so good" and "is sold by many dealers . . . not controlled by the Trust. . . . By making a superior article and selling it at a low price."[106] Bradley himself was proclaimed as "the man who defeated the Trust."[107]

During the early 1900s, the number of platinum paper manufacturers increased dramatically in the United States, with twelve new companies, while there were only one or two new companies in England and one in Germany.[108] Yet most of these companies did not survive the decade, due to a combination of market pressures from the Kodak and GEPACO trusts, the rising price of platinum, and business cycles of the time period (see appendix).

Eastman Kodak Platinum Papers

Before 1901 Eastman Kodak had not produced a successful platinum paper, and by 1906 the company had made unsuccessful overtures to purchase Willis & Clements.[109] American Aristotype manufactured American Platinum (Kodak Platinum abroad) as a Kodak division after the 1899 merger.[110] Other Kodak platinum products began to appear after 1901, including Eastman Platinum (1901) and WD Platinum (Water-Developed, c. 1901) (fig. 13).[111] In 1906, Joseph di Nunzio was acquired as a Kodak division, bringing its successful Angelo Sepia Platinum Paper under Kodak's corporate umbrella.[112] Etching Black (EB) and Etching Sepia (ES) were introduced in 1909 and 1910 respectively (see figs. 6, 13).[113]

Kodak also purchased companies well known for their *faux platinum* lines, such as the Nepera Chemical Company, and began to market its successful silver product, Velox, in addition to Kodak's own Platino Bromide papers.[114]

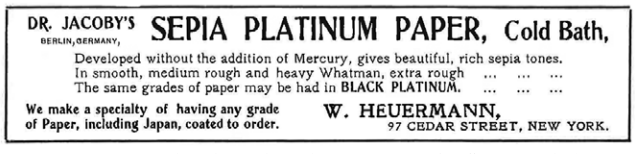
Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

Figure 13. Kodak sample platinum prints, after 1900. Courtesy George Eastman Museum Archives.

13a. American Platinum Black "heavy rough," sheet 15.9 × 10.8 cm, image 15.1 × 10.1 cm.

13b. Angelo Sepia Platinum, sheet 15.9 × 10.8 cm, image 15.1 × 10.1 cm.

13c. Eastman WD Platinum, sheet 15.9 × 10.8 cm, image 15.1 × 10.1 cm.


DR. JACOBY'S BERLIN, GERMANY, **SEPIA PLATINUM PAPER, Cold Bath,**

Developed without the addition of Mercury, gives beautiful, rich sepia tones.
In smooth, medium rough and heavy Whatman, extra rough ... ...
The same grades of paper may be had in BLACK PLATINUM. ... ...

We make a specialty of having any grade of Paper, including Japan, coated to order.

W. HEUERMANN, 97 CEDAR STREET, NEW YORK.

Figure 14. Dr. Richard Jacoby advertisement for "Dr. Jacoby's Sepia Platinum Paper." From *Camera Notes* 5, no. 4 (April 1902): n.p. Several manufacturers, including Dr. Jacoby, offered platinum papers on a variety of paper supports, including Japanese papers.

Increased Variety of "Faux Platinum" Papers

The variety of surface textures offered by both platinum and *faux platinum* silver photographic papers proliferated in the years before World War I as each manufacturer tried to outdo or keep pace with its competitors' latest products (see appendix). *Faux platinum* products were marketed as "just like platinum!" but offered many advantages: lower cost, longer shelf life, no unpredictable bronzing or image hue shift, and many textures and paper tints not available in platinum.

By 1905, Elliott & Sons listed its Barnet papers in Platino Matt and Lustra Matt in "white," "cream," "smooth," "rough," and "tiger tongue," which was described as "a specially rough paper of the Whatman grade for Exhibition Pictures."[115] In 1910, Wellington & Ward made eight varieties of Platino-Matt surface from smooth to "XTRA Rough" and "canvas" (see fig. 11). Even albumen paper manufacturers offered matte surfaces on various paper supports, including Japanese tissues.[116] Several companies, including Kodak, Ilford, Jacoby, and Gevaert (c. 1911) advertised traditional silver, *faux platinum,* and platinum paper lines.

During this decade, gelatin silver developing-out papers of all types were eclipsing the traditional printing-out

Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

Figure 15. Gertrude Käsebier, *Alfred Stieglitz*, 1902. Platinum print, illuminated in raking light, sheet 30.6 × 21 cm, image 29.8 × 19.7 cm. National Gallery of Art, R. K. Mellon Family Foundation, Diana and Mallory Walker Fund, and Horace W. Goldsmith Foundation through Robert and Joyce Menschel, 2005.123.1. Although artists hand-sensitized Japanese tissues for platinum printing, the availability of manufactured presensitized Japanese papers raises the possibility that these may have been in common use. This 1902 portrait may be a presensitized manufactured Japanese tissue. In fact, Käsebier endorsed Helios Photographic Paper Company, a provider of Japanese vellum and tissues presensitized with platinum (see fig. 16).

processes, despite the continued production of collodion and albumen printing-out papers. One 1909 article stated, "The leaders throughout the country are today dividing their business between developing-papers and platinotype, and many of them are using developing-papers exclusively, and not the cheaper grades, mind you, but the expensive papers such as Artura Iris, Professional Cyko, Acme Kruxo, heavy-weight Argo."[117] In fact, Artura papers constituted half of the U.S. professional market in 1909.[118]

Japanese Papers Sensitized with Platinum

The expanding range of artistic paper types included Japanese papers sensitized with platinum. These were advertised by Helios Photographic Paper Company of New York circa 1902 and by Dr. Richard Jacoby in Berlin (imported to the United States after 1902 by W. Heuermann) (fig. 14).[119] Given the number of products advertised, these commercial papers might have been more commonly used among Pictorialists than previously realized (figs. 15, 16).[120]

Low-Sheen Papers

In the early 1900s the desire for photographic papers with smooth, lustrous surfaces increased. Silver paper manufacturers had been offering low-sheen or lustrous surfaces (semimatte or semigloss), which were described as "carbon," "lustra," "velvet," and "vellum," in addition to the traditional glossy, enamel, and the now-ubiquitous matte *faux platinum* surface.[121] In 1901, E. & H. T. Anthony & Company introduced Oxy-Vellum Paper coated on a "substance similar to parchment or vellum with a matte surface, in black and sepia." Although described as permanent and the most expensive on the market, it was not explicitly identified as a platinum paper.[122] Because of the naturally matte surface of plain paper, platinum prints required waxing or other coatings to achieve a low- to medium-sheen surface.[123]

The Platinotype Company's Japine Paper

In August 1906 the Platinotype Company responded to customers' demands for prints with a lustrous surface by announcing a new paper with the catchy name of "Japine," perhaps to capitalize on the current

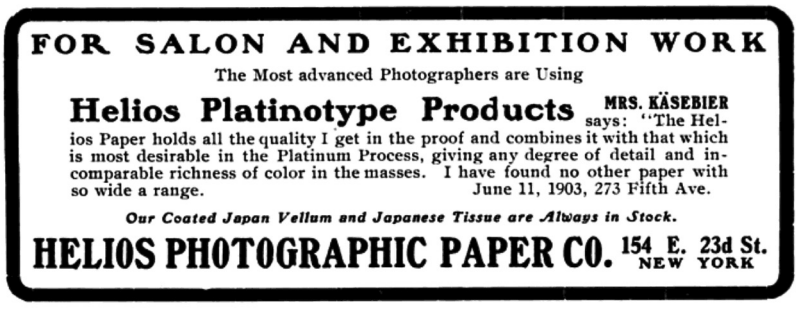
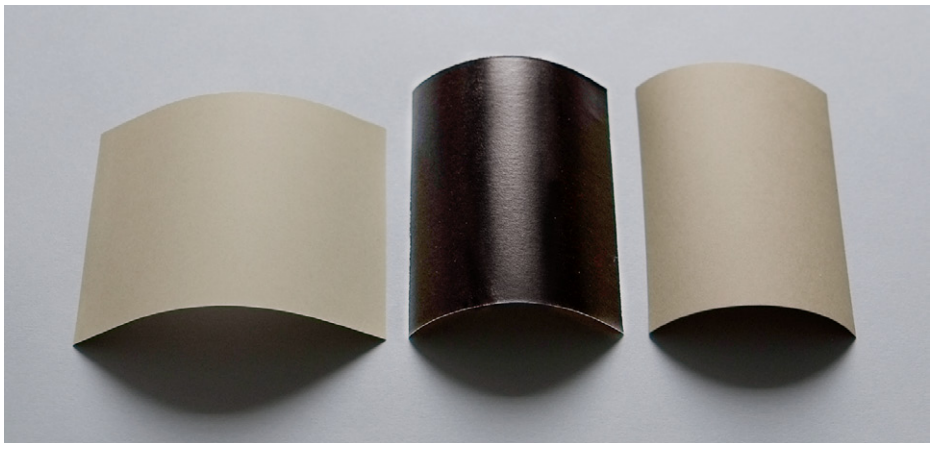


Figure 16. Helios Photographic Paper Company advertisement for "Helios Platinotype Products" endorsed by Mrs. Käsebier. From *Western Camera Notes* 1 (August 1903): vi.

Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.



a b c

Figure 17. Platinotype Company papers.

17a. Platinotype AA paper, c. 1908, a plain, smooth paper. National Gallery of Art, Photograph Conservation Department Study Collection, Gift of Mike Ware, C0077.

17b. Japine Platinotype for Sepia Tones, c. 1906, with an "eggshell" surface. National Gallery of Art, Photograph Conservation Department Study Collection, Gift of the Photograph Conservation Department Study Collection, Metropolitan Museum of Art, C0013.

17c. Black Japine Platinotype paper, c.1908, with a matte surface. National Gallery of Art, Photograph Conservation Department Study Collection, courtesy of the Study Collection of Rob McElroy, Buffalo, New York, C0448. These papers were removed from previously unopened sealed tins and show image fogging or print-out of the sensitized papers. The Japine base paper was partially parchmentized by an acid treatment to modify the cellulose at the surface.

popularity of *Japonisme*, a fascination with Japanese arts and aesthetics.[124] Japine—a partially parchmentized paper—was offered in surfaces ranging from matte to semigloss "eggshell" (fig. 17).[125] This partially parchmentized paper retained opacity yet provided a more lustrous surface than was achievable with the standard matte platinum papers. Advertisements in October journals declared its "instantaneous success" (fig. 18).

The semigloss surface of Japine overcame several characteristics that had put platinum papers at a competitive disadvantage when compared with traditional silver papers and the carbon process.[126] The dense and amorphous cellulose surface of the partially parchmentized paper enhanced the details and deep shadow tones of the image and gave prints the "wet look" with "juicy blacks" previously so hard to achieve in plain platinum paper.[127] Japine was abrasion resistant,[128] and, like gelatin silver gaslight and developing-out papers, it printed faster and had a longer shelf life.[129] It was reportedly less sensitive to heat and humidity than plain platinum papers, which had liabilities of unpredictable image tones and spoiled papers that provoked frequent complaints. Unlike plain Platinotype papers, the Japine surface was prone to cracking and slight curl, issues that the company later claimed to have resolved.[130] Less sensitizer was needed to coat this paper, lowering the production cost at a time when both platinum and the price of paper raw stock had increased substantially. Japine could compete with silver's new low- to medium-sheen surfaces.

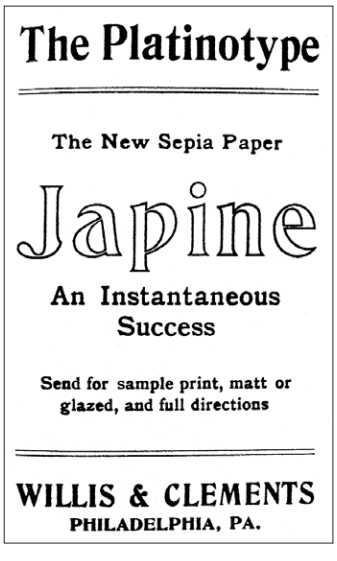


Figure 18. Willis & Clements advertisement for "The Platinotype: The New Sepia Paper Japine." From *Photo-Beacon* 18, no. 10 (October 1906): back cover. Although Japine was first advertised by the Platinotype Company in August 1906, Willis & Clements's announcement of its forthcoming introduction in the United States appeared in September 1906 followed by glowing advertisements in the October journals.

Fading of Sepia Platinum Papers

The fading of sepia papers continued to diminish platinum's distinction as a permanent process. A series of articles in *Abel's Photographic Weekly* from December 1907 through March 1909 criticized Kodak's Angelo Sepia Platinum line for fading, earning it the nickname "Will-o'-the-Wisp" and "fools' gold."[131] Editorials suggested that it and a few other papers were suspected not to be pure platinum but were heavily toned with mercury or were possibly mercury-toned silver prints.[132] Uranium-toned platinum papers had also been noted for their tendency to fade.[133]

Dr. Richard Jacoby advertised in 1902 that its cold-bath Sepia Platinum Paper did not require mercury or a sepia developer solution (see fig. 14). It is not known if this paper contained mercury in the sensitizer as other sepia papers did, a developer with other additives, or was

 Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

sensitized with a palladium-platinum mixture.[134] Jacoby's No. 1 Platinum Paper incorporated palladium in 1891, and a 1907 article mentioned that Jacoby had shown that zinc oxalate could provide a warm brown tone on black platinum paper, while a developer containing copper sulfate also produced a warm sepia tone.[135]

Decline of the Trusts

In 1909, Kodak's monopolistic manipulation of the market had instigated investigations by the U.S. government, resulting in a 1915 verdict for violations of the Sherman Anti-Trust Act. Kodak's numerous appeals of this decision were finally dismissed in 1921 with a decree of dissolution and injunction forcing it to divest itself of numerous divisions, which were bought by other companies.[136] Unfortunately, the legal actions of the 1910s came too late for most companies that had succumbed to the unfair competition or were subsumed under Kodak as divisions. By 1910 the number of independent platinum manufacturers had already decreased in the United States and abroad as a result of these various market pressures, the rising cost of platinum, and the increasing popularity of "bromide" papers (see the timelines in the appendix as evidence of these trends).

Gevaert
Platinum Papers.

Full Booklet, Particulars, and Price List on application.

No other printing process can approach Platinum for Artistic quality of results—simplicity of working—and permanency. Gevaert Platinum Papers are made in a great variety of grades and surfaces, some of which are of a quite unique nature, producing a tone and effect not previously obtainable by any process whatsoever.

For Black Prints.

I. White Smooth.
II. White Rough.

For Warm Black.

III. Cream Tinted Smooth.
IV. Cream Tinted Rough.

For Sepia.

V. Cream Tinted Smooth.
VI. Cream Tinted Rough.
VII. White Smooth.
VIII. White Rough.

Unique Speciality.

Japanese Hand-made Vellum prepared for Platinum.

This exclusive product is prepared for yielding Sepia and warm black prints. Supplied only in sheets 19¾ by 13¾ in.

Gevaert Lustra Platinum Papers.

Lustra Papers are the latest introduction, and are grades with a particularly hardened surface and the lustra-sheen or semi-gloss that is preferred by many workers. The surface of these grades is of a particularly resisting nature and is very suitable for re-touching or colouring. Prepared for Black and Sepia.

Figure 19. Gevaert Ltd. advertisement for "Gevaert Platinum Papers," "Japanese Hand-made Vellum," and "Lustra Platinum Papers." From *The British Journal Photographic Almanac and Photographer's Daily Companion, 1912* (London: Henry Greenwood, 1912), 390. In 1911, Gevaert introduced Japanese Vellum Paper along with a semigloss, Lustra Platinum. Described as having a hard, semigloss surface sheen, Lustra appears to be similar to Japine.

The GEPACO trust began to lose its competitive advantage in the early 1900s with the entrance of other paper raw stock manufacturers into the market offering high-quality papers at a lower price and the end of Kodak's arrangement with Rives and Steinbach in 1910.[137] Of course, the paper price reductions benefited all photographic manufacturers. The Platinotype Company and Dr. Richard Jacoby advertised price reductions in 1908, a crucial move at a time when platinum prices were soaring due to the demand for its use for military applications.[138]

The 1910s

In 1911 *Photo-Miniature* issued another edition devoted to platinum printing. Sepia and black papers were described as the two primary classes of manufactured products, with fifteen varieties from the Platinotype Company, eleven from Eastman Kodak, and eleven from Gevaert, including Japanese papers. Buff and white paper bases in rough and smooth surfaces were offered, and Ilford papers were available in several thicknesses.[139] In addition to these four major companies, Dr. Richard Jacoby and Wallace Chemical Company also continued to manufacture platinum papers in the years leading up to World War I.[140]

Gevaert's Platinum Papers

In 1911 Gevaert advertised black and sepia platinum papers on Japanese vellum and the new Lustra, a paper with a hard, semigloss surface, a description remarkably similar to the Platinotype Company's Japine surface (fig. 19). Gevaert's standard Platinum Paper was available on white and cream paper bases with smooth and rough textures for black, warm black, and sepia image tones.[141]

Gevaert also advertised in March 1913 the new Etral paper as having the "properties of platinum and silver and offered at a price substantially below platinum." It had "the same" iron-based sensitizer, oxalate developer, acid clear, and "the new part"—toning in potassium

 Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

Figure 20. Platinotype Company advertisement for "Japine Silver." From *The British Journal Photographic Almanac and Photographer's Daily Companion, 1916* (London: Henry Greenwood, 1916), 17. Japine Silver was introduced in late 1915, and advertised as producing "Any colour from light brown to warm black."

chloroplatinate.[142] Based on this description, Etral appears to be a platinum-toned silver process, yet the advertisement does not mention the usual fixation required for silver processes.[143] Etral does share some characteristics with the Platinotype Company's silver-platinum Satista process, patented in September 1913 and advertised for sale by early 1914, also at a lower cost than platinum papers.[144]

Gevaert papers were considered to be more popular in England than either Kodak or Ilford, but they became unavailable after the German invasion of Belgium in autumn 1914.[145]

The Impact of World War I

World War I (1914–1918) created difficulties for all photographic manufacturers, but it affected platinum manufacturers most. The photographic industry struggled through the war years with the loss of German paper and chemical sources, supply chain disruptions, and Britain's institution in January 1916 of the platinum embargo and government restrictions on use for nonmilitary purposes.[146] The military was a major customer for photographic products and boosted profits for many.[147] However, there was little use for elegant platinum prints when utilitarian silver products met the need. The quality of paper declined as cheaper wood fibers replaced rag content and skilled workmen were conscripted from the paper mills, many never to return, further impacting postwar papermaking capabilities.[148]

The Platinotype Company and Willis & Clements held on by offering extensive printing services and manufacturing *faux platinum* products of their own, reducing or eliminating the need for platinum in the sensitizer. Their platinum-silver paper Satista became widely available in January 1914, seven months before the war began, and was soon followed by Japine Silver in late 1915 (fig. 20).[149] Satista's sepia companion, Satistoid (later called Satoid) was introduced in 1916.[150] In 1917, the company marketed Palladiotype on a Japine base as another alternative to platinum.[151]

In October 1916 platinum papers were withdrawn from the U.S. market "on account of war conditions."[152] Kodak and Ilford had stopped production of their platinum papers by the end of 1916, and, judging by the dearth of advertisements, most, if not all, of the few remaining smaller manufacturers did the same.[153]

The Platinotype Company was able to produce some platinum and Satista papers in 1916 due to a license for a small allowance despite the governmental prohibitions.[154] Although the Platinotype Company was listed in 1917, no platinum products were advertised that year in *The British Journal Photographic Almanac and Photographer's Daily Companion.* With the platinum restrictions in effect for more than a year and exorbitant metal costs, the almanac's listing probably referred to other products sold by the firm such as Japine Silver and the new Palladiotype.[155] In August 1918, three months before the end of the war, the Platinotype Company advertised platinum again, along with Satista, Palladiotype, and Japine Silver.[156] Willis & Clements advertised Japine Sepia Platinotype in January 1916, Japine Silver in March, Satista in December 1916 and March 1917, and both Platinotype and Satista in May and November 1917.[157] It is possible that Willis & Clements sold the last Satista and Platinotype papers that the Platinotype Company was able to manufacture at the end of 1916 and ship to the United States.

In 1918 and 1919 only the Platinotype Company was listed as a supplier of platinum paper in *The British Journal Photographic Almanac and Photographer's Daily Companion*.[158] Dr. Richard Jacoby advertised "Palladium Papiere" in 1918.[159] Gevaert issued a notice in 1919 indicating that the company intended to resume platinum paper manufacture in the future.[160] Silver manufacturers with *faux platinum* lines continued advertising these popular and less-expensive products.[161]

160 Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

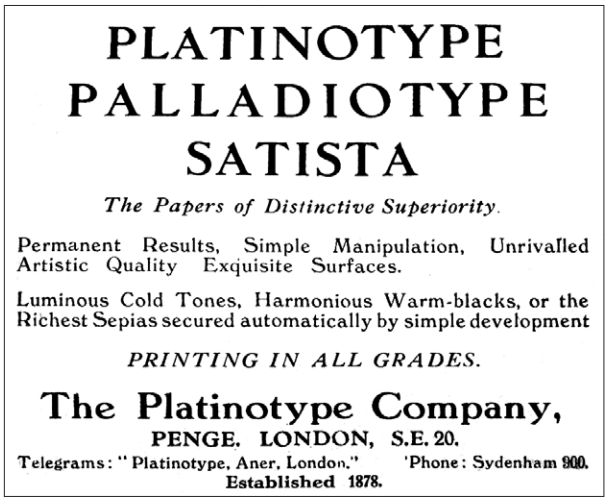


Figure 21. Platinotype Company advertisement for "Platinotype, Palladiotype, Satista." From *The British Journal Photographic Almanac and Photographer's Daily Companion, 1924* (London: Henry Greenwood, 1924), 101. This advertisement highlights permanence, artistic results, simplicity, exquisite surface quality, and image hues ranging from cold tones to warm black and the richest sepias, depending on the print type.

In 1918, Alfred Stieglitz voiced the frustrations experienced by platinum photographers: "A kingdom for some decent platinum paper. Just a few sheets. I see I have run out of paper."[162]

The 1920s

Platinum manufacturers faced strong headwinds in the 1920s. After their loss of market share during the wartime constriction, they now confronted the high cost of platinum and photographers' changing tastes in papers. Besides the Platinotype Company, only a handful of firms that restarted production in the 1920s offered platinum papers, and these discontinued platinum manufacture by the end of the decade.

Declining Interest in Platinum Papers

In 1925, Paul L. Anderson noted that platinum papers had "fallen into disrepute . . . partly by reason of cost, and on account of the relative slowness . . . compared to gaslight papers." Yet he went on to describe platinum's many virtues, much as he had done in 1913.[163] After the war, Alfred Stieglitz complained of periodic quality issues and inconsistency in both the Platinotype Company papers and some silver papers as Kodak divested itself of former divisions, such as Artura.[164] The high cost of platinum continued to be a major impediment, despite announcements of price reductions for platinum and palladium papers in 1920 by Willis & Clements and in 1922 by the Platinotype Company.[165]

Brief Reemergence of Platinum Manufacture

By 1920 Gevaert was again listed as a supplier of platinum papers in *The British Journal Photographic Almanac and Photographer's Daily Companion*, continuing through 1924.[166] German advertisements for Dr. Richard Jacoby's Platinpapier and a palladium paper were found in 1921 and continued at least until 1927.[167] The final platinum paper production dates for these two companies were not determined, but they are likely around 1930.

The Platinotype Company continued to advertise Platinotype and Palladiotype on plain and Japine papers, along with Japine Silver and Satista, throughout the 1920s (fig. 21).[168] Despite the decline of advertisements in the 1920s, Willis & Clements sold Platinotype Company products in the United States until 1931, when its role as sole agent was discontinued by the Platinotype Company.[169] Also in the United States, the Wallace Chemical Company advertised Mezzotint Black Platinum until at least 1925 (fig. 22).[170]

The End of Platinum Production

After 1931, the Platinotype Company is thought to have been the sole source of manufactured platinum papers in the United States and Great Britain, if not the world. The company dissolved in 1937, informing customers that it "shall make no more photographic papers of any description. . . . So far as we know we are the only manufacturers of Platinotype in the world, yet the demand in insufficient to justify our continuing."[171]

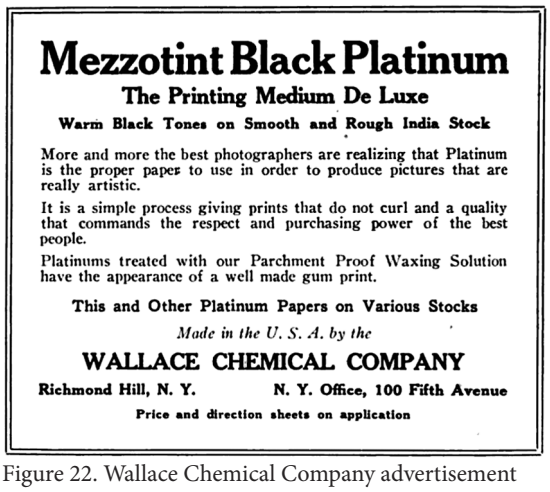


Figure 22. Wallace Chemical Company advertisement for "Mezzotint Black Platinum." From *The American Annual of Photography,* vol. 39, *1925* (New York: Federal Printing Company, 1925), xxxiv. After World War I, the Wallace Chemical Company was, in 1925, the last American manufacturer found to have advertised a platinum paper product, Mezzotint Black Platinum.

Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

Figure 23. Competing advertising campaigns between platinum and *faux platinum* papers, c. 1908–9.

23a. Ansco Company advertisement, "Real Sepia Platinum Prints Are Made Only on Cyko Paper." From *Abel's Photographic Weekly* 3, no. 60 (January 23, 1909): front cover. The fine print mentions a single redevelopment bath, indicating that Cyko Paper was actually a toned silver paper.

23b. Willis & Clements advertisement, "This Is the Truth about Sepia Platinum Papers." From *Abel's Photographic Weekly* 3, no. 71 (April 10, 1909): front cover. Willis & Clements countered advertisements such as the one in 23a with advertisements reminding photographers of the "Truth" that its sepia platinum papers were the genuine product, permanent and nonfading.

Conclusions

The 1880s to the 1920s, when numerous companies manufactured platinum paper, was a fascinating period in the history of photographic technology, with intense competition, major innovations, and feverish product development. Concurrent with the increasing popularity of platinum photography in the early 1890s, new sources of platinum metal were located, temporarily easing escalating price pressures and helping platinum paper manufacturers remain competitive with silver papers.[172] The number of companies manufacturing platinum papers increased in the 1890s into the early 1900s throughout Europe and the United States as artistic and commercial photographers increasingly favored the platinum aesthetic with the rise of Pictorialism.

From 1890 to 1910 there was a tremendous increase in *faux platinum* papers and a rapid change from silver printing-out processes to developing-out gelatin papers. Because many *faux platinum* products were difficult to distinguish from platinum, the Platinotype Company even offered to prosecute "the mean and contemptible imposture" of those who had fraudulently sold customers bromide prints in lieu of platinum photographs.[173] *Faux platinum* manufacturers used ambiguous wording to imply that their products *really were* platinum, but a close reading of the fine print, such as mentions of redevelopment and toning baths, may indicate that the image was composed of silver. The Platinotype Company and Willis & Clements sparred with competitors in revealing the "Truth about Sepia Platinum Papers" and warned photographers to avoid the "cheap developing silver papers" (fig. 23).[174]

An emphasis on quality, permanence, and artistry dominated this era, with photographers using an increasing variety of paper surface textures and tints, rich image tones ranging from sepia to cool black, and new Japanese tissues and parchmentized paper supports. Despite the prominent role played by manufactured platinum photographic papers in leading these trends, gelatin silver

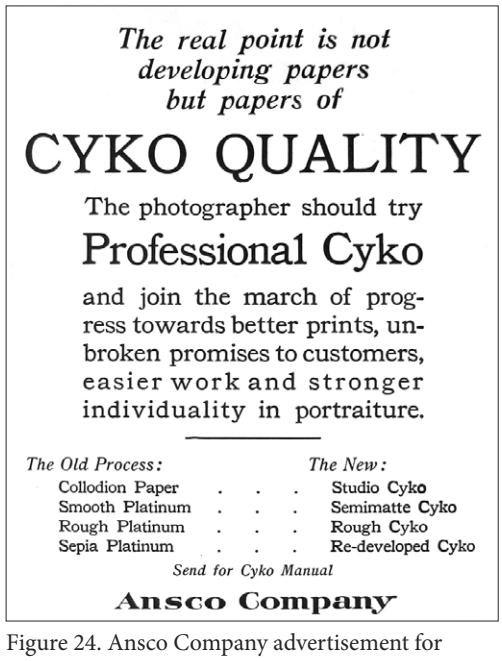


Figure 24. Ansco Company advertisement for "Cyko Quality," "Professional Cyko." From *Bulletin of Photography* 1, no. 11 (October 23, 1907): 316. This advertisement for Professional Cyko proclaims "Cyko Quality" for developing papers representing the "march of progress," replacing the old collodion, platinum, and sepia platinum papers.

 Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

developing-out papers eventually dominated the market, with features such as graded contrast, lower cost, ease of use and enlarging, a variety of surfaces and textures, and an ability to mimic platinum itself.[175] Throughout the 1930s, many silver paper manufacturers advertised *faux platinum* and matte surface products using "Platino-Matt," or similar descriptors, indicating continuing demand for the special qualities of these papers.[176]

Even as platinum and the older silver printing-out processes were at the peak of their perfection, new processes began to replace them (fig. 24). Postwar changes in technology with the advent of the 35 mm camera in 1925 and the new art trends of straight photography and circles such as Group *f*.64 led to a decline of interest in Pictorialism and in platinum as the medium of choice. Finally in 1937, with the closure of William Willis Jr.'s Platinotype Company, the production of platinum paper ceased.

Acknowledgments

Thank you to the entire National Gallery of Art team—Constance McCabe, Alisha Chipman, Matthew L. Clarke, Christopher A. Maines, Caroline Minchew, and Ronel Namde— for support, suggestions, and patience. Constance McCabe, as project leader, was instrumental to the success of my research. Caroline Minchew entered hundreds of advertisements into a database to generate the initial timelines. Christophe Jirav and Heather Brown also assisted with compiling pdf files from scanned articles and advertisements during their summer internships in 2013. Mike Ware provided invaluable expertise throughout the entire platinum research project and donated several important platinum samples to our study collection. Michael Pritchard and Pete James are due a debt of thanks for drawing attention to the print samples in the Brian Coe Archives, Photographic Collections, at the Birmingham Library, Birmingham, UK. These print samples greatly enhanced the content of this essay. Many useful discussions with Cyntia Karnes were very important as this research progressed. Andreas Gruber was indispensable in sharing many sources for German and Austrian platinum papers manufacturers. Library of Congress Photograph Conservators Adrienne Lundgren, Dana Hemmenway, and Andrew Robb provided access to numerous journals (and free bench space). Finally, I am grateful to The Andrew W. Mellon Foundation and it generous support of the National Gallery of Art's photograph program during this multiyear project.

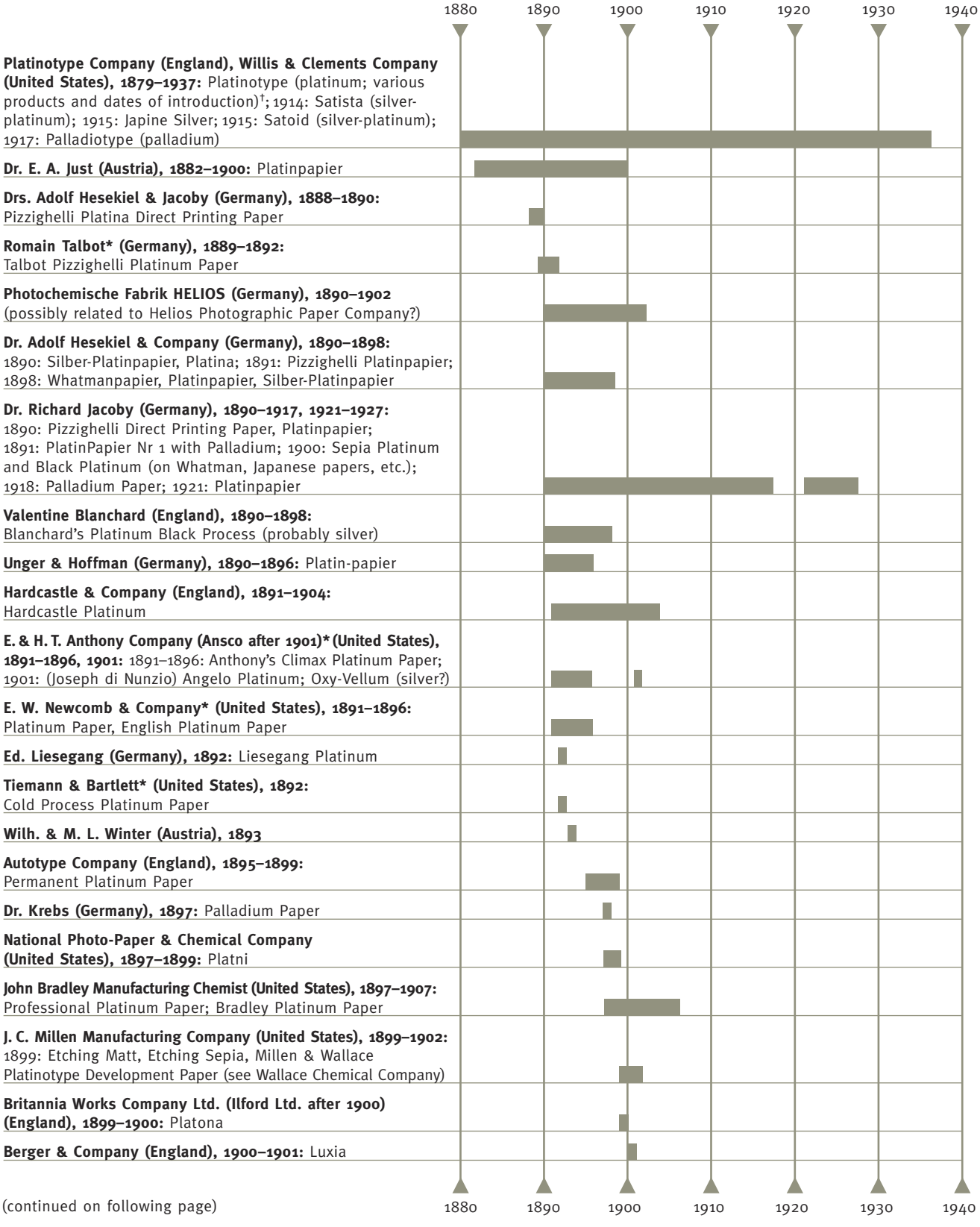
Appendix

Timelines of Platinum and Faux Platinum *Paper Manufacturers*

The timelines that follow form a general overview of the industry as it relates to the production and availability of platinum and *faux platinum* manufactured papers. Product dates were generated from a review of product literature, articles, and advertisements listed in the References section. These dates represent the first and last advertisement or notice found during the present study and may not reflect the actual production dates or represent every manufacturer. Some companies may have resold other manufacturers' papers as their own brand. Whether a company was only a supplier or also a manufacturer was sometimes difficult to discern, as some firms performed both functions. The entries for *faux platinum* manufacturers is skewed toward major British and American companies and represents a fraction of the numerous photographic paper manufacturers that produced matte silver papers. Most German and Austrian platinum paper manufacturers also produced a variety of silver papers; these are not listed in the second timeline, showing *faux platinum* paper manufacturers. The German and Austrian manufacturers of platinum papers are discussed in more detail in Andreas Gruber, "The Platinum Print Technology of the Austrian Pictorialist Heinrich Kühn," in this volume.

Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

Timeline 1: Platinum Paper Manufacturers, Based on First and Last Notices Found



(continued on following page)

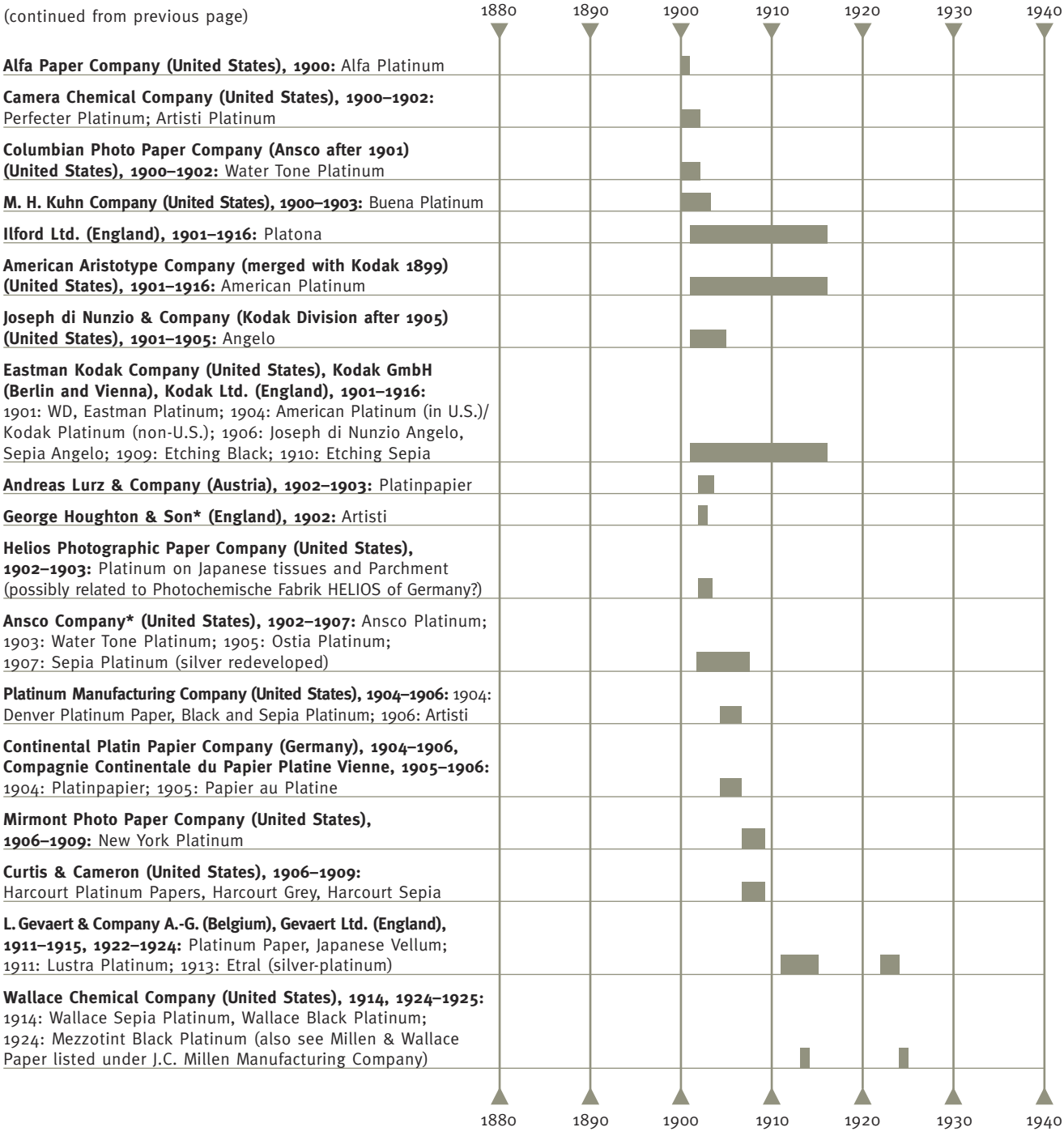
*Manufacturer and/or distributor, may be selling other manufacturers' brands.

†See Mike Ware, "The Technical History and Chemistry of Platinum and Palladium Printing," in this volume.

 Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

Timeline 1, cont.: Platinum Paper Manufacturers, Based on First and Last Notices Found

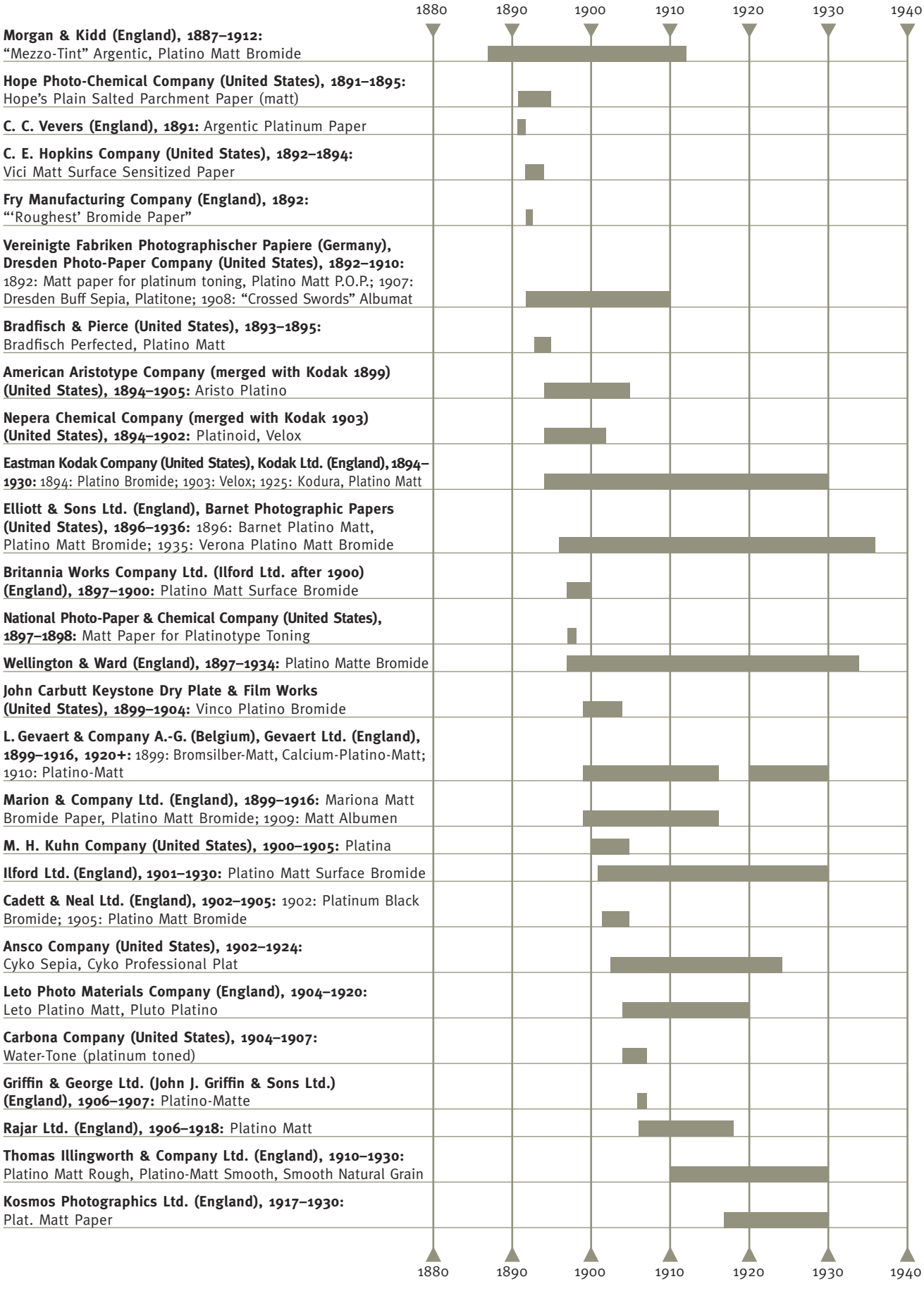
(continued from previous page)



* Manufacturer and/or distributor, may be selling other manufacturers' brands.

 Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

Timeline 2: *Faux Platinum* Paper Manufacturers, Based on First and Last Notices Found



166 Sarah S. Wagner, "Manufactured Platinum and *Faux Platinum* Papers, 1880s–1920s," in *Platinum and Palladium Photographs: Technical History, Connoisseurship, and Preservation*, ed. Constance McCabe (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2017), 144–183.

Notes

1. Willis 1878. See also Mike Ware, "The Technical History and Chemistry of Platinum and Palladium Printing," in this volume.

2. [Tennant] 1899b, 474; "Home-Made" 1904, 17; Pizzighelli 1883, 48. See also Cyntia Karnes, "The Art and Science of Papermaking for Platinum Photographs," in this volume.

3. Eastman Kodak 1905, 139; Eastman Kodak Company advertisement April 1899, xviii.

4. [Taylor] 1895, 571: "Bromide papers giving a 'matt' platinum-like effect have been placed on the market, and are finding great favour."

5. "News and Notes" 1906, 274.

6. [Tennant] 1899b, 474; Aquinas 1897, 152.

7. Important recent scholarship on material characteristics of photographs from this era include Clarke et al. 2015; Daffner 2014; Danzing 1991; Hoffmann and Schatzl 2003; Lewis and Koseki 2015; McCabe et al. 2013; McCabe 2014; Messier 2014; Vo and Stulik 2011. In this volume, please refer to Alisha Chipman and Matthew L. Clarke, "A Technical Study of Paul Strand's Platinum Prints"; Sarah Greenough, "A Great Day for Palladio: Alfred Stieglitz's Palladium Prints"; Andreas Gruber, "The Platinum Print Technology of the Austrian Pictorialist Heinrich Kühn"; Constance McCabe et al., "Alfred Stieglitz's Palladium Prints: Treated by Steichen"; and Verna Posever Curtis and Adrienne Lundgren, "Discovering F. Holland Day's Platinum Prints: A Collaboration between Conservator and Curator."

8. Willis & Clements advertisement July 1900, 2.

9. Anderson 1913, 386.

10. [Taylor] 1895, 571; [Tennant] 1899c, 351; Pénichon 1999, 124; Lavédrine 1991, 205–8 (includes an extensive list of products and manufacturers active before 1925); Hoffmann and Schatzl 2003, 97.

11. Quoted in [Wilson] 1879, 308. See also Willis & Clements advertisement 1888, xxxi: "The only permanent chemical photographic process that passes all acid and alkali tests."

12. Willis & Clements advertisement December 1907, front cover; [Taylor] 1894, 794.

13. Stith 1903, 185–90, points out that the overall cost of printing with platinum papers could be less than printing with silver papers because the processing chemicals were less expensive compared with silver's gold toner and sodium thiosulfate solutions. In addition, platinum's labor costs were far less due to its faster exposure and shorter processing time. The actual cost of platinum papers did increase substantially soon after Stith's book was published in 1903, probably offsetting any savings on chemicals and exposure time, especially compared with silver development papers.

14. See Alice Carver-Kubik et al., "Additives Used in the Platinum Process"; Erin L. Murphy, "A Summary of Early Chemical and Physical Treatments of Platinum Prints"; Adrienne Lundgren, "The History and Use of Glycerine in Platinum Printing"; Greta Glaser, "Platinum Enlargements," all in this volume.

15. Platinotype Company 1908b; Willis & Clements 1908. For example, the Platinotype Company used KK to designate its black cold-bath paper on a heavy, smooth stock, while Willis & Clements described the same paper as KK Black. When the same heavy smooth paper was coated with a sepia sensitizer for hot development, the product was designated KS by the Platinotype Company and KK Sepia by Willis & Clements.

16. Stith 1903, 190. For a complete listing of Platinotype Company paper grade designations, also see Ware, "The Technical History and Chemistry of Platinum and Palladium Printing," in this volume.

17. Advertisements promoted the ability of products to achieve the "beauty" of etchings, as, e.g., Eastman Kodak Company advertisement May 1898, 20: "Enlargements on this paper made through bolting cloth and given the sepia tone have the softness and beauty of rare old etchings. They are 'pictures' not 'photographs,' say the critics." See also Morgan & Kidd advertisement 1887, 89; J. C. Millen Manufacturing Company advertisement October 1899, n.p.; Eastman Kodak Company advertisement March 1914, 28.

18. Morgan & Kidd advertisement 1899, 650; Defender Photo Supply Company advertisement November 1905, n.p. The term "buff," used by silver manufacturers and the Platinotype Company, may have denoted a less than pure white natural color paper similar to cream. Willis & Clements advertisement 1911, 14. This 1911 advertisement mentions the appearance of Platinotype buff retroactively to 1906, perhaps a marketing ploy in response to increasing competition from other manufacturers promoting buff papers. The Platinotype Company and Willis & Clements did not use the term "buff" in advertisements and brochures until 1911. Willis mentioned the use of natural tone, unbleached papers for sepia Japine in 1906 (see below).

19. "Japine Platinotype Papers" 1906, 808. See also Karnes, "Art and Science of Papermaking," in this volume.

20. Dr. E. A. Just advertisement 1887, lviii; Fry Manufacturing Company advertisement 1892, 904; Willis & Clements advertisement July 1897, 2; Wellington & Ward advertisement 1910, 254; Willis & Clements advertisement 1897, 2.

21. Marion & Company Ltd. advertisement 1903, 6; Elliott & Sons Ltd. advertisement June 1904, front cover; Eastman Kodak Company advertisements June 1904, n.p., August 1904, n.p., and August 1905, x; Platinotype Company advertisement 1906, xiv; Brigham 1906, 9–10 (describes the new Ilford carbon surface silver paper).

22. E. & H. T. Anthony & Company advertisement October 1901b (Oxy-Vellum Paper) n.p; [Stieglitz] 1902c, 124–25 (comments on Helios parchment papers and Japanese tissues); "Japine Platinotype Papers" 1906, 808; Clarke et al. 2015; McCabe et al. 2013.

23. Dr. Richard Jacoby advertisement April 1902, n.p.; Gevaert Ltd. advertisement 1912, 390.

24. Dr. Adolf Hesekiel & Company advertisement 1890, n.p.; Dr. Richard Jacoby advertisement April 1902, n.p.; Elliott & Sons Ltd. advertisement 1905, 574.

25. See Ware, "The Technical History and Chemistry of Platinum and Palladium Printing"; Matthew L. Clarke, "Characterization, Degradation, and Analysis of Platinum and Palladium Prints"; and Karnes, "Art and Science of Papermaking," in this volume.

26. Willis 1890, 121–22.

27. See, e.g., Wellington & Ward advertisement 1901, 396.

28. See Karnes, "Art and Science of Papermaking," in this volume; Eastman Kodak Company advertisement April 1899, xviii (states that Kodak uses "nothing but the best imported stock. . . . For years the names of 'Rives' and 'Steinbach' have stood for perfection in photographic paper").

29. Darnault 2000, 129.

30. [Woodbury] 1895, 218.

31. Darnault 2000, 128.

32. Darnault 2000, 122, 130.

33. Mitchell 1889, 158.

34. Weston 1973, 143.

35. Harrison 1887, 101–2.

36. Stulik and Kaplan 2013a, 6.

37. Willis 1892a, 120.

38. See Carver-Kubik et al., "Additives Used in the Platinum Process," in this volume.

39. Harrison 1887, 102.

40. O'Farrell 1886–87, 41–42; [Wilson] 1901, 453 (says Dr. Richard Jacoby noted that papers treated with an iron-free chloroplatinite solution yellowed, while those coated with the standard lead-iron cold-bath sensitizer without any platinum cleared and left no yellow tint).

41. See Karnes, "Art and Science of Papermaking," in this volume.

42. Willis 1892a, 120.

43. Harrison 1887, 102; Pizzighelli 1883, 48.

44. Elsden 1891, 75.

45. Nicol 1878, 291.

46. Jones 1901, 443–45; Bartlett 1907a, 5; Bartlett 1907b, 5. See Clarke, "Characterization, Degradation, and Analysis of Platinum and Palladium Prints," in this volume.

47. See Murphy, "Summary of Early Chemical and Physical Treatments"; Carver-Kubik et al., "Additives Used in the Platinum Process," in this volume.

48. See Caroline Minchew, "Platinum Paper Tins," in this volume.

49. Willis 1891, 121. The date suggests that Willis's claim may have applied to the platinum-in-the-bath cold-process paper that was sensitized only with iron salts, and not to the usual platinum paper sensitized with both iron and platinum salts.

50. Clements 1896, 473; [Tennant] 1902, 158 (mentions that old paper could produce a "pleasant," warmer tone, while damp paper could be printed darker than usual, followed by use of a hot developer to provide a warmer black in the shadows); [Stieglitz] 1902d, 191–92 (suggests spoiled paper could be glycerine-developed to a desired tone and used as a mount paper for finished prints).

51. O'Keeffe 1978, n.p.

52. Anthony & Scovill Company (Ansco) advertisement March 1902, xl; Eastman Kodak 1905, 124 (cites American Platinum); Eastman Kodak Company advertisement January 1907, n.p. See also Ware, "The Technical History and Chemistry of Platinum and Palladium Printing," in this volume.

53. Greenough, "Great Day for Palladio," in this volume.

54. [Todd] 1889, 3; Willis 1892b, 55.

55. Platinotype Company advertisement 1883, 153.

56. Platinotype Company advertisement 1884, xvi; Morgan & Kidd advertisement 1887, 89.

57. Eastman Kodak Company advertisement May 1898, 20; J. C. Millen Manufacturing Company advertisement October 1899, n.p.

58. Pizzighelli 1883, 48–53.

59. Dr. E. A. Just advertisement in Hübl and Pizzighelli 1882, 88. Thanks to Andreas Gruber for this reference.

60. [Wilson] 1888, 142–43; Pizzighelli 1888, 410–21.

61. Dr. E. A. Just advertisement 1887, lviii. Dr. E. A. Just also manufactured albumen, collodion, and gelatin bromide and chloride papers.

62. Drs. Adolf Hesekiel & Jacoby advertisements 1888, xi, and 1889, 67. Hesekiel and Jacoby separated after 1890, and their individual firms continued production of "Pizzighelli" direct printing platinum paper. Dr. Adolf Hesekiel & Company advertisement 1890, n.p.; Dr. Richard Jacoby advertisement October 1890, n.p. Jacoby later produced both cold-development and direct printing papers, as seen in Dr. Richard Jacoby advertisement 1896, vi.

63. [Todd] 1889, 3; Willis 1887. See also Ware, "The Technical History and Chemistry of Platinum and Palladium Printing," in this volume.

64. Willis 1892a, 119–21. Willis describes in detail experiments with glycerine development, the effect of colloids on image tone, and the ability to sensitize on various paper supports.

65. Willis 1892a, 120.

66. Willis 1893, 171.

67. Leaming 1889, 117.

68. Dr. Adolf Hesekiel & Company advertisement 1890, n.p.

69. [Wilson] 1898, 141: "[Liesegang] . . . gave up . . . because . . . he found that the paper was not pure enough for durability."

70. Willis & Clements advertisement July 1897, 2.

71. [Stieglitz] 1902a, 220 (mentions the recent importation of Dr. Jacoby platinum papers); [Stieglitz] 1902c, 124–25 (comments on Helios Japanese tissues and a parchment paper described as 3-ply Bristol thickness); Dr. Richard Jacoby advertisement April 1902, n.p.

72. Elsden 1891, 75 (states that due to these factors "Pizzighelli platinotype almost completely lost favour"). Direct printing papers were advertised into the early 1900s: M. H. Kuhn Company advertisement January 1903, ii; J. C. Millen Manufacturing Company advertisement March 1902, xxxiv; Eastman Kodak Company advertisement September 1907, n.p. (WD Platinum); Hiscox 1907, 529 (mentions Water Tone Platinum Paper); [Tennant] 1899a, 322 (mentions J. C. Millen's Etching Matte, Platni, Jacoby's, Hardcastle's); J. C. Millen Manufacturing Company advertisement February 1900, n.p. In addition to "Etching Matte for Cold Water Development," this company also manufactured "Millen & Wallace Platinotype Paper for Chemical Development."

73. Stieglitz 1891, 249. One criticism of the direct printing paper was the variable and seemingly capricious image tones that, now elucidated by Stieglitz, could be controlled more consistently by the photographer. See also Clarke, "Characterization, Degradation, and Analysis of Platinum and Palladium Prints," and Gruber, "Platinum Print Technology of Kühn," in this volume.

74. Jenkins 1992, 66.

75. Willis 1892a, 121.

76. Willis 1893, 170. At this time, Willis stated, the problem of homogeneity from "one end of the scale to the other" had been "fairly overcome."

77. Willis 1893, 171.

78. Hope Photo-Chemical Company advertisement 1893, 38.

79. Platinotype Company advertisement 1906, xiv; Willis & Clements advertisement September 1906, back cover.

80. [Todd] 1891b, 116.

81. [Gilson] 1894, 51.

82. [Taylor] 1895, 571; [Todd] 1891b, 116. Other *faux platinum* products found but not listed in the appendix include Platora, Platono, Platinous P.O.P., Platinette, and Platinograph. In addition, numerous plain silver salted paper recipes were printed in journals and also manufactured (without *faux platinum* names), capitalizing on the matte surface aesthetic and providing a less-expensive alternative to platinum papers, resulting in a brief revival of this historic process. See John Clemons advertisements 1897, 81, and 1902, n.p.

83. Pénichon 1999, 135–36; Lavédrine 1991, 205–8. See also Ronel Namde and Joan M. Walker, "Platinum Toning of Silver Prints," in this volume.

84. [Snelling] 1893, 147 (states that with Eastman Kodak's new Platino-Bromide Paper, "It is difficult for experts to tell the difference"). Note that silver image oxidation, such as silvering-out and obvious fading, usually provides evidence that a process is silver-based. Yet these clues can be misleading, as excess mercury, especially used during the development of platinum prints, contributes to fading as it volatizes and it may also deposit on the surface in high-density image areas, creating a reflective sheen similar in appearance to silver mirroring. See Erin L. Murphy et al., "Reflective Sheen in Mercury-Processed Platinum Prints," in this volume.

85. Stiefel 1894, 94; Wentzel 1960, 72; Eastman Dry Plate and Film Company advertisement 1888, 734 (Eastman's Permanent Bromide uses "the least possible quantity of gelatine to avoid curling and to preserve the tooth of the paper for working in crayons").

86. [Gilson] 1895, 85.

87. Stiefel 1894, 94.

88. Rawstorne 1896, 741–42.

89. E. & H. T. Anthony & Company advertisement January 1891, 94; See also Tiemann & Bartlett advertisement December 1892, iv. This company may have been reselling the Platinotype Company's new cold-process paper.

90. National Photo-Paper & Chemical Company advertisement December 1897, 9; John Bradley Manufacturing Chemist advertisement December 1897 xviii; [Tennant] 1899a, 363; J. C. Millen Manufacturing Company advertisement October 1899, n.p. J. C. Millen had manufactured blue print paper, another iron-based process, previous to introducing a platinum paper. See J. C. Millen M.D. Manufacturing Chemist advertisement 1898, xiv. Millen's platinum paper production seems to have ended about 1903, when the company started advertising blue print paper again. J. C. Millen M.D. Photographic Chemical Company advertisement May 1903, xvi.

91. Hardcastle & Company advertisements 1891, 293, and 1896, 367; Britannia Works Company, Ltd. advertisement January 1899, 7; Dr. Richard Jacoby advertisement December 1898, v.

92. See Gruber, "Platinum Print Technology of Kühn," in this volume, for references to German and Austrian manufacturers such as Photochemische Fabrik HELIOS, Dr. E. A. Just, and Wilh. & M. L. Winter, which are also listed in the appendix. See also Dr. Adolf Hesekiel & Company advertisement 1898, n.p.; Romain Talbot advertisement 1892, 1115; Unger & Hoffman advertisements 1890, cxxxvi, and 1896, lxiv; Autotype Company advertisement 1898, 15.

93. [Tennant] 1899c, 322. (American Aristotype Company manufactured Aristo-Platino. Approximately half the paper purchased in the United States at this time was Aristo-Platino.) See Namde and Walker, "Platinum Toning of Silver Prints," in this volume.

94. C. C. Vevers advertisement 1891, 1022. See Gruber, "Platinum Print Technology of Kühn," in this volume, for a discussion of these papers, including Hesekiel's Silber-Platinpapier, first advertised in 1890. Also see Dr. Richard Jacoby advertisement 1891b, 708; Dr. Krebs advertisement April–July 1897, 204. Thanks to Andreas Gruber for these three German references.

95. Darnault 2000, 129. Additional information on Rives is provided by Karnes, "Art and Science of Papermaking," in this volume.

96. Jenkins 1975**,** 196; [Wilson] 1899, 54–56.

97. Jenkins 1975, 197; Darnault 2000, 126. Prior to Kodak, E. & H. T. Anthony & Company held the U.S. distributorship for Rives paper, 1884–98, and also sold Steinbach papers.

98. Jenkins 1975, 201 ("Eastman acquired during the summer of 1899 options on American Aristotype, Nepera Chemical Company, New Jersey Aristo, Kirkland Lithium, and the Paper Division of Kodak; in August he founded the new holding company, General Aristo"); [Abel] 1909b, 2 ("Eastman and 13 other concerns . . . constitute a trust and . . . they have driven many other firms out of business . . . and raised the price of films and kodaks [*sic*] 20 per cent"). In 1902, various articles in the *Photographic Dealer* described the way Kodak forced dealers to sign contracts and merged with or attempted to buy out other English and European companies. Jenkins 1975, 240–42, describes Kodak's rebuffed attempts to purchase Ilford and Lumiére as well as its acquisition of the British firm Cadett & Neall and the "Western European marketing network" of Vereinigte Fabriken Photo Papiere.

99. [Tennant] 1911a, 440–41. In 1911, a business slowdown was under way for photographic goods with "sales . . . confined to a few well-known lines" that were well-advertised. Tennant noted that two hundred firms supplied photographic goods in the United States, but only about sixty of them advertised. The absence of advertisements therefore may not indicate cessation of production or business termination.

100. Jenkins 1975, 204; Eastman Kodak 1906, n.p. (mentions Solio, Dekko, Cadett & Neall Dry Plate as British divisions with factories in Harrow and Ashtead).

101. Jenkins 1975, 201.

102. [Stieglitz] 1902b, 274 ("The Anthony& Scovill Company . . . was incorporated December 23rd, 1901. It includes the firms . . . E. & H. T Anthony & Co., the Scovill & Adams Co., and other smaller ones including Western Photo Paper Co. [Cyko and Royal brands] and Columbian Photo Paper Co. [Actino Collodion and Water Tone Platinum]"); Jenkins 1975, 318 ("Anthony and Scovill instigated at the state level the first serious antitrust charges brought against Eastman Kodak"). Ansco filed a petition in February 1904, and the case was decided in favor of Eastman Kodak. Jenkins 1975, 319.

103. Anthony & Scovill Company (Ansco) advertisement 1902, xxxiii (lists Cyko, Royal, Actino, and Water Tone Platinum as "children of Anti-Trust and the Columbian Paper Co." of Chicago); Western Photo Paper Company advertisement May 1900, n.p.; Columbian Photo Paper Company advertisement December 1901, n.p. (lists Chicago, Westfield, New York, San Francisco, and Denver as locations). A tin of Water Tone Platinum Paper made by the Columbian Photo Paper Company of Chicago is shown on the front of the book jacket for this volume. Jenkins 1975, 251, mentions Ansco's acquisition of collodion paper produced by the Monarch Paper Company based in Cortland and Binghamton, New York, and silver developed-out papers made by the Columbian Photographic Paper Company located in Westfield, Massachusetts. It appears that the Columbian Paper Company, Columbian Photo Paper Company, and Columbian Photographic Paper Company are all the same firm.

104. Anthony & Scovill Company (Ansco) advertisements December 1902, x; 1903, xx; 1905, liii–liv; Hiscox 1907, 529 (mentions Ansco Platinum, Water Tone, Bradley Platinum, and the Willis and Clements/Platinotype Company platinum products). It is interesting that another manufacturer, Carbona Company, advertised a Water Tone product during 1904–7 that appears to be a platinum-toned silver paper: Carbona Company advertisements December 1904, n.p., and February 1907, n.p.

105. Alfa Paper Company advertisement August 1900, 35; [Adams and Hard] 1906, 323 (mentions Bradley platinum papers, as does Hiscox 1907, 524); Camera Chemical Company advertisement April 1900, n.p.; Maurice H. Kuhn Company advertisement December 1900, n.p.; [Stieglitz] 1901, 159 (mentions the introduction of Angelo by Joseph di Nunzio); Platinum Manufacturing Company advertisements September 1904a, xix (Platinum Papers) and September 1904b, n.p. (Denver Platinum Paper); Curtis & Cameron advertisement December 1906, (9); Mirmont Photo Paper Company advertisement August 1907, 20. Mirmont relocated to Brooklyn in late 1906 after starting production in San Francisco just before the 1906 earthquake destroyed its factory. [Adams and Plump] 1906, 95 mentions that the Platinum Manufacturing Company has begun marketing Artisti Platinum, although its advertisements do not list this product name. Thus it is possible that this company was a successor to the Camera Chemical Company, which manufactured Perfecter and Artisti platinum papers from 1900 to 1902. Perfecter and Artisti were advertised for the last time in a joint listing of Camera Chemical Company with Anthony & Scovill Company just after the formation of Ansco in March 1902, before Ansco began promoting its own platinum papers in late 1902. See Camera Chemical Company and Anthony & Scovill Company (Ansco) advertisement March 1902. It is interesting that three platinum companies were based in Denver: J. C. Millen Manufacturing Company (1899–1902), Camera Chemical Company (1900–1902), and the Platinum Manufacturing Company (1904–6). The Camera Chemical Company mentioned in its 1900 advertisements that it used the "Kirkland-Wallace process" and that the dry atmosphere in Denver was ideal for platinum manufacture. Kirkland's Lithium Paper Company, a silver paper manufacturer, was also located in Denver. It seems likely that the same Wallace collaborated with J. C. Millen (Millen-Wallace Platinotype Paper), the Camera Chemical Company, and Kirkland's Lithium Paper Company (which later merged with Kodak) before founding his own platinum manufacturing firm in Richmond Hill, New York. See Wallace Chemical Company advertisements 1914, n.p., and 1924, xxxiv.

106. John Bradley advertisements April 1902, 49, and June 1902, 182.

107. John Bradley advertisement June 1902, 182.

108. In the United States: Alfa Paper Company, American Aristotype, Ansco Company, Camera Chemical Company, Columbian Photo Paper Company, Curtis & Cameron Company, Eastman Kodak Company, Helios Photographic Paper Company, M. H. Kuhn Company, Mirmont Photo Paper Company, Joseph di Nunzio, Platinum Manufacturing Company; in England, George Houghton & Son (possibly reselling the Camera Chemical Company's Artisti), and Berger & Company;[Brookes] 1900, 83 (mentions the new Berger & Company paper Luxia); [Tennant] 1900, 40 (mentions the recent introduction of Luxia); in Germany and Austria, the Continental Platin Papier Company and Compagnie Continentale du Papier Platine Vienne (probably the same company). Advertisements are listed in the references section.

109. Jenkins 1975, 204.

110. Jenkins 1975, 204; Lloyd 1901, 250 (shows price lists for American Aristotype Platinum); Eastman Kodak 1906 (lists Kodak properties and mentions that in addition to collodion papers produced at the American Aristotype Works, Jamestown, N.Y., "Platinum paper of the first quality is also made in these factories"); Eastman Kodak 1905, 124 (cites American Platinum); Kodak Ltd., London, advertisement 1904, 226; Kodak GmbH, Berlin, advertisement July 1906, cover.

111. Jenkins 1975, 204; Lloyd 1901, 248, 251 (shows price lists for Eastman Kodak Company's Eastman's Platinum Paper and WD Water Development Platinum Paper); Eastman Kodak Company advertisement May 1901, n.p.

112. [Stieglitz] 1901, 159; E. & H. T. Anthony & Company advertisement October 1901b, n.p. (does not mention that Joseph di Nunzio manufactured Angelo); Eastman Kodak 1905, 126 (mentions Angelo Sepia Platinum Paper but not Joseph di Nunzio); Jenkins 1975, 204 (mentions that Joseph di Nunzio had worked for American Aristotype before starting his own platinum manufacturing company in Boston circa 1901). See also Eastman Kodak Company advertisement November 1906, xiv.

113. Eastman Kodak Company advertisements November 1909a, n.p., and December 1910, 20. It is possible that some early Kodak platinum papers, such as Eastman Platinum and WD Platinum, were rebranded products manufactured by other companies and resold by Kodak.

114. Jenkins 1975, 201 ("Eastman had acquired options on Nepera Chemical Company during the summer of 1899"); Jenkins 1975, 208 ("Early in 1909 Eastman Kodak purchased Artura. . . . Once again, having failed to keep pace with important product innovations in the photographic paper sector, Eastman Kodak found it necessary, in order to retain its position of supremacy in this sector . . . to purchase an entire technology").

115. Elliott & Sons advertisement 1905, 574.

116. Hoffmann and Schatzl 2003, 86–97; Vereinigte Fabriken Photographischer Papiere, Dresden, advertisement 1910, 1033. Marion & Company advertisement 1909, 169. Reilly 1980, 51–53, discusses matte albumen papers as introduced by Hübl in 1895, manufactured by Dr. E. A. Just in 1898 and by Trapp & Munch, which produced eighteen varieties, including Japanese papers, until 1929.

117. [Abel] 1909a, 60–61.

118. Jenkins 1975, 206. The popularity of Artura decreased Kodak's dominance in the paper market, until Kodak purchased the firm in 1909.

119. Helios Photographic Paper Company advertisement December 1902, n.p.; [Stieglitz] 1902a, 220. Gruber, "Platinum Print Technology of Kühn," in this volume, has identified a German Photochemische Fabrik HELIOS company associated with Dr. Krebs, but the relationship, if any, with the U.S. Helios Photographic Paper Company is unknown. Gevaert Ltd. offered Japanese tissues at a later date. Gevaert Ltd. advertisement 1912, 390.

120. Information on Heinrich Kühn's use of Japanese papers is provided by Gruber, "Platinum Print Technology of Kühn," in this volume.

121. Brigham 1906, 9; Wellington & Ward advertisement 1910, 254 (see fig. 11). See also the advertisements listed in note 21 above.

122. E. & H. T. Anthony & Company advertisement October 1901a, n.p.

123. Ogilvie 1906, 473. See also Chipman and Clarke, "Technical Study of Paul Strand's Platinum Prints," in this volume.

124. Platinotype Company advertisement August 1906, xiv; Willis & Clements advertisement September 1906, back cover (announces the forthcoming introduction of Japine to the United States).

125. [Wilson] 1907b, 431; Clarke et al. 2015, 216–21. Technical analysis and reverse engineering shows the nature of the partially parchmentized paper.

126. Webster 1888, 292–93; Ogilvie 1906, 473.

127. "Japine Platinotype Papers" 1906, 808; "News and Notes" 1906, 274.

128. [Brown] 1916a, 395 (mentions that abrasion between prints in a bath was less likely); Platinotype Company 1913, 334 (mentions the paper's ability to withstand surface cleaning: "Scrub with nailbrush and soap and water"). [NB: This is not recommended.]

129. "Japine Platinotype Papers" 1906, 808; "News and Notes" 1906, 274.

130. Ogilvie 1906, 473; In an October 14, 1921, letter to Herbert Seligmann, Stieglitz complained that the palladium "paper is full of cracks." Alfred Stieglitz/Georgia O'Keeffe Archive, Yale Collection of American Literature, Beinecke Rare Book and Manuscript Library, New Haven, Conn. I thank Julia Thompson for this reference. A copy of her paper, "Processes and Techniques Used by Stieglitz, 1886–1940," presented at the Stieglitz Colloquy, National Gallery of Art, Washington, D.C., 1993, is in the Photograph Conservation Department files, National Gallery of Art. C. Robinson of the Platinoptype Company, to photographer Ned Scott, April 1, 1937, claimed that the "preliminary treatment and sensitization methods were modified to eliminate cracking problems." Ned Scott Archives, online at http://www.thenedscottarchive.com/. Thanks to Norm Scott for sharing this letter. Chipman and Clarke, "Technical Study of Paul Strand's Platinum Prints," in this volume, discusses Paul Strand's frustration with cracking.

131. [Abel] 1909c, 161; [Abel] 1908, 404.

132. Bartlett 1907b, 5: "A platinum print, which being subjected to a bath of ferri-cyanide of potassium and hypo through unaltered, would be evidence that an unalterable platinum deposit formed the image." See also Bachrach 1908a, 135–36; Bachrach 1908b, 135.

133. [Wilson] 1900, 469: "The tendency of uranium-toned platinotypes to fading is a sore subject."

134. See [Nicol and Beach] 1901, 570, in which Alfred Stieglitz conjectures that the imported "Jacobi" [*sic*] paper produced "beautiful Van Dyke brown prints . . . by a mixture of the palladium with the platinum." This may be a misspelling of the Dr. Richard Jacoby sepia paper recently imported to New York based on the spelling of a Mr. Jacobi, a chemist at Nepera Chemical Company in New Jersey. [Gilson] 1895, 278, mentions a Mr. Jacobi, the "head chemist" working under "Dr. Baekland, the founder of Nepera."

135. Dr. Richard Jacoby advertisement 1891b, 708 (thanks to Andreas Gruber for this reference); [Wilson] 1907b, 431.

136. [Tennant] 1921, 41. Jenkins 1975, 318–22, describes in detail *United States v. Eastman Kodak Company*, in which Kodak was held guilty of monopolistic activities in August 1915. The case was finally settled in January 1921 when Kodak withdrew its appeals just before the case was to be presented to the Supreme Court. Kodak agreed to the terms of the "consent decree for dissolution."

137. Jenkins 1975, 208; Darnault 2000, 132.

138. Platinotype Company advertisement July 1908, xvi; Willis & Clements advertisement October 1908, 439; [Wilson] 1908, 478 (announces Jacoby price reduction); [Tennant] 1910, 539 (says platinum paper costs three times silver papers); [Wilson] 1907a, 383 (announces "Platinum $34 an Ounce," with substantial price increases from 1905 to 1907). Ware, "The Technical History and Chemistry of Platinum and Palladium Printing," in this volume, discusses the pre–World War I military uses of platinum and cost escalation. The Russo-Japanese War (1904–5) reduced the availability of Russian platinum.

139. [Tennant] 1911b, 309: "There are perhaps half a dozen platinum papers of one sort or another in the American and British markets, but probably eighty percent of the platinum paper used here and in Great Britain is manufactured by Willis & Clements (The Platinotype Co.), the Eastman Kodak Company, and Ilford Ltd." The article notes that Ilford and Gevaert products were not imported to the United States at this time.

140. Dr. Richard Jacoby advertisement 1913, n.p.; Wallace Chemical Company advertisement 1914, n.p.; Eastman Kodak Company advertisement March 1914, 28. Stieglitz purchased and used American Platinum and Etching Black up to 1916. Thompson 2002, 2: 946–47.

141. Gevaert Ltd. advertisement 1912, 390.

142. Gevaert Ltd. advertisement March 1913, 29–31 (supplement)

143. Hopkins 1953, 711, describes a similar process using an ammonia solution for fixation rather than hypo: "Oxalate silver printing papers resembling platinum paper . . . in which [the] paper is sensitized with a solution of ferric oxalate, oxalic acid and silver nitrate. The paper is printed like platinum papers, cleared in a solution of borax and sodium tartrate with a few drops of potassium bichromate, washed, toned with a solution of potassium chloroplatinite and citric acid, then fixed with a 2% solution of ammonia for 10 minutes followed by a final wash."

144. Willis 1913; "Satista Paper" 1914, 221.

145. [Brown] 1916c, 560. Wentzel 1960, 86, mentions that the Gevaert complex in Antwerp, Belgium, "the largest manufacturing plant of photographic papers in Europe," was occupied by a German military unit that included Fritz Wentzel. Most of Gevaert's wartime production was directed to German military uses.

146. "With the Trade" 1916, 208 (Japine silver); "Commercial Legal Notices" 1916, 43–44. See Ware, "The Technical History and Chemistry of Platinum and Palladium Printing," in this volume.

147. Despite supply shortages and price increases for chemicals and papers, many photographic companies manufacturing cameras, films, plates, and silver papers experienced increased profits due to demand of military operations. Jenkins 1975, 332. Ansco experienced "the most financially successful years" from 1914 to 1917. Jenkins 1975, 321. Kodak was able to maintain its pricing due to substantial prewar stockpiling of German papers and chemicals. [Brown] 1918a, 262, says Kodak experienced profits that were "the largest in the history of the company."

148. Darnault 2000, 134.

149. "Satista Paper" 1914, 221; "With the Trade" 1916, 208; Platinotype Company advertisement 1915, 17; [Brown] 1916b, 385–86; Platinotype Company advertisement November 1915, 381. See also McCabe et al., "Satista Prints and Fading," in this volume.

150. Our Roving Commissioner 1916, 100; Platinotype Company advertisement March 1916, 117.

151. [Mortimer] 1917, 160; Platinotype Company advertisement June 1917, iii.

152. Watkins 1916, 468.

153. [Brown] 1917, 503. Also see similar notices: [Brown] 1915; [Brown] 1916c; [Brown] 1918b; [Brown] 1919. Presumably both Gevaert and Jacoby had ceased platinum production soon after the start of the war. No advertisements for Wallace Chemical Company were found after 1914 until 1924.

154. "Professional and Trade Exhibits" 1916, 481 ("The company was able to maintain a fair output of Platinotype papers, although the quantity of metal allowed . . . by their license does not suffice to meet demand"); Platinotype Company advertisements March 1916, 117; August 1916, iii; December 1916, 14.

155. Platinotype Company advertisements March 1916, 17, and February 1917, iii.

156. Platinotype Company advertisement August 1918, 248.

157. Willis & Clements advertisements January 1916, 63; March 1916, 305; December 1916a, 613; March 1917, 210; May 1917, 498; November 1917, 14.

158. [Brown] 1918b, 421; [Brown] 1919, 381; Platinotype Company advertisements August 1918, 248, and January 1919, iii.

159. Dr. Richard Jacoby advertisement 1918, n.p.

160. Gevaert Ltd. advertisement, 1920, 762.

161. [Brown] 1915, 591 [Brown] 1916c, 560; [Brown] 1917, 503; [Brown] 1918b, 421; [Brown] 1919, 381.

162. Alfred Stieglitz to Paul Strand, August 22, 1918, Alfred Stieglitz/Georgia O'Keeffe Archive. I thank Julia Thompson for this reference.

163. Anderson 1925, 57.

164. Jenkins 1975, 339. Artura was sold to Defender Photo Supply Company in the mid-1920s as part of Kodak's divestment. Ansco declined after World War I and was bought by Agfa in 1928. Jenkins 1975, 337. See also Stieglitz to Paul Strand, July 27, 1920: "I've ordered some paper from W&C. I don't expect any great results"; Stieglitz to Herbert Seligmann, September 16, 1921: "Trying to make some prints on the rottenest platinum paper I ever experienced—and that is saying quite something"; Stieglitz to Strand, July 17, 1924: "I have been trying to print with Artura & with my usual luck. . . . Eastman's have changed the quality of their raw stock . . . and it is rotten now. A gritty surface"; Stieglitz to Eastman [Kodak] Company August 21, 1924, complains of mealy and gritty prints, and of changes in Artura: "So if you have changed . . . the quality of Artura . . . why for decency's sake, don't you let the photographer know?" Alfred Stieglitz/Georgia O'Keeffe Archive. I thank Julia Thompson for these references.

165. Willis & Clements advertisement July 1920, 29; Platinotype Company advertisement August 1922, 382.

166. [Brown] 1920, 515; [Brown] 1924, 462; [Brown] 1925, 446 (Gevaert Ltd. is no longer listed for platinum paper). See also Dr. Richard Jacoby advertisement 1921, n.p.

167. Gruber, "Platinum Print Technology of Kühn," in this volume, mentions a Heinrich Kühn letter to Alfred Stieglitz, December 9, 1927, stating that Jacoby platinum paper was again available. I thank Andreas Gruber for this reference. See also Dr. Richard Jacoby advertisement March 1927, xi.

168. Willis & Clements advertisement June 1922, 622; Platinotype Company advertisement 1925, 85; Willis & Clements advertisement 1927, 30.

169. Charles Robinson, Platinotype Company, to Frick Art Reference Library, January 30, 1931, mentions that products can be ordered directly from England and that new agents would not be appointed due to recent increase in tariffs and U.S. custom duties. Frick Art Reference Library, New York, N.Y. See also Chipman and Clarke, "Technical Study of Paul Strand's Platinum Prints," in this volume.

170. Wallace Chemical Company advertisement 1924, xxxiv. Although a 1925 advertisement was found (see fig. 22), the last date of manufacture is unknown.

171. Charles Robinson, Platinotype Company, to Ned Scott, June 15, 1937, Ned Scott Archives. Thanks to Norm Scott for sharing this letter.

172. [Todd] 1891a, 77: "Platinum is already falling in price . . . as a new source of supply has been discovered in Australia."

173. Platinotype Company 1908a, 594: "We shall . . . employ counsel and pay all the costs of the prosecution, provided . . . evidence that a fraud has been attempted . . . to protect our customers against such unfair and dishonest competition."

174. Willis & Clements advertisement March 1908, front cover; Willis & Clements advertisement March 1909, front cover; Ansco Company advertisement January 1909, front cover.

175. Daffner 2014 discusses paper manufactured in Germany and the Soviet Union in the interwar period; Messier 2014 also examines gelatin silver papers from 1910 to 1940.

176. Wheeler 1930, 93–95, lists several British firms still selling matte papers with tones ranging from sepia to black and *faux platinum* Platino-Matt papers including Elliott & Sons Ltd., Ilford Ltd., Thomas Illingworth & Co. Ltd., Kodak Ltd., Kosmos Photographics Ltd., and Wellington & Ward Ltd. See also Elliott & Sons Ltd. advertisement 1935, adv. 33; Dassonville Company Ltd. advertisement 1935, adv. 22 (lists Grades A–G papers including Laid and Opaline Parchment). Stulik and Kaplan 2013b, 57, state that one of the more unusual papers introduced c. 1930 by the Gevaert Company was Gevaluxe, a dead matte silver bromide paper favored by several platinum photographers, including Laura Gilpin and Frederick Evans. Wentzel 1960, 75, describes the Gevaluxe base paper as being coated with "an adhesive only slightly soluble in water" that is then spread with a "fibrous dust such as fine animal hairs."

References

The sources listed here have been divided into two sections. Section 1 lists books, articles, and product notes cited in endnotes and/or used as sources in the timelines for platinum and *faux platinum* paper manufacturers. Section 2 contains manufacturer advertisements cited in endnotes and/or used as sources for the timelines.

1. Books, Articles, and Product Notices

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[Abel] 1909a [Abel, Juan C.]. "All about Developing Papers and Printing Machines." *Abel's Photographic Weekly* 3, no. 58 (January 9, 1909): 60–61.

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[Adams and Hard] 1906 [Adams, W. I. Lincoln, and Spencer Hard]. "Printing Processes: Bradley Platinum Paper." *The American Annual of Photography and Photographic Times Almanac,* vol. 20, *1906*, 323. New York: Styles & Cash, 1906.

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Anderson 1913 Anderson, Paul L. "The Choice of a Printing Paper, with Especial Reference to Platinum." *American Photography* 7, no. 7 (July 1913): 384–92.

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Bachrach 1908a Bachrach, D. "On the Fading of Cold Developed Platinum Prints." *Abel's Photographic Weekly* 1, no. 24 (May 16, 1908): 236.

Bachrach 1908b Bachrach, D. "The Permanency of Sepia Platinum." *Abel's Photographic Weekly* 1, no. 14 (March 7, 1908): 135.

Bartlett 1907a Bartlett, John. "Concerning the Permanency of Platinum Prints." *Abel's Photographic Weekly* 1, no. 1 (December 7, 1907): 5–6.

Bartlett 1907b Bartlett, John. "Why Does Angelo Fade? Two Letters and an Article by John Bartlett Now Editor of the *Bulletin of Photography* of Philadelphia, in Which the Alleged Lack of Permanency in Angelo Sepia Platinum Paper Forms Material for an Extremely Interesting Discussion." *Abel's Photographic Weekly* 1, no. 1 (December 7, 1907): 5.

Brigham 1906 Brigham, E. Foster. "Ilford Carbon Surface Gaslight Paper." *Photographic Scraps* 5, no. 198 (February 1906): 9–10.

[Brookes] 1900 [Brookes, Arthur C.]. "Trade Jottings: Messrs. Berger & Co. Will Shortly Introduce . . . Luxia Platinum Paper." *Photographic Dealer* 8, no. 47 (April 1900): 83.

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