



Overview of Historical Practices for Postprocessing Toning and Intensifying Platinum Prints

Erin L. Murphy

Various aesthetic qualities of the platinum print can be altered after initial processing to modify contrast, tone, and color. Many recipes for postprocessing toning and intensification treatments are found in the early literature (1887–1912), suggesting that practitioners of the platinotype process experimented using chemical means to adjust the appearance of their prints. This essay, although not inclusive of all such techniques, presents a brief discussion of postprocessing modifications of platinum prints using catechu, uranium, gold, platinum, and silver, with mention of a few other toning and intensification methods. Recipes and quotations are taken from the published accounts of well-known photographers, chemists, and scholars who were active members of photographic societies and camera clubs in Britain, America, and Germany as well as from less-well-known contributors to photographic journals of the time.

To test the effects of the recipes in the period literature, platinum print step-tablets or simulacra were made by the Photograph Conservation Department and the Scientific Research Department at the National Gallery of Art. The results of the tests are presented in the appendix.

Why Tone or Intensify?

Why would a photographer purposely alter a platinum print when he or she specifically chose the particular aesthetics of the platinum process at the outset? Commercial platinum papers and recipes for sensitizers produced prints with image hues that ranged from black to sepia. The paper's color (white or cream), surface finish (smooth or textured), and sheen (matte to semigloss) further influenced the appearance of the print. When combined with the deliberate use of any number of processing techniques (cold vs warm developer and additives such as mercury), the photographer could create a wide array of final tonalities. However, if the appearance of the print did not meet with the photographer's approval, its initial colors could be manipulated by toning or intensification (fig. 1).

Many practitioners considered the much-lauded elegance of the platinum print as best left unaltered. Concerning the postprocessing alteration of the platinum print's tone, Roger Child Bayley, author of *The Complete Photographer*, wrote:

There are a whole string of processes for altering the colour of platinum prints . . . in most cases the colours obtained are too positive—violent greens, crude blues, and assertive reds are seldom effective as the single tint of a monochrome. . . . A platinum print, it may safely be said without fear of an accusation of unreasonable dogmatism, should be black or brown-black.¹

Other practitioners, however, saw a technical and artistic challenge in creating a variety of tones and embraced the experimental practices of toning and intensification. In his article, "Modifications of Platinotype Printing," the author W. J. Warren explained:

And with the increased use of platinotype paper has come the consequent elaborations and emendations of the process—which should certainly be at the call of all workers. Even more than that, it would seem to me necessary that anyone who has adopted a process should not rest until he has acquainted himself with all its powers and variations—its whimsicalities and peculiarities—so that he may obtain

Figure 1. Carle Edwin Semon, *Portrait of a Japanese Woman*, first half of the 20th century. Uranium-toned platinum print, 17.80 × 12.70 cm. The Cleveland Museum of Art, John L. Severance Fund, 2005.7.

a desired result within its compass, with certainty. There is no doubt that the virgin gray of a simple platinotype print is specially suited to certain effects, but whilst I would not advocate any attempt at reproducing the colors of Nature herself, still I imagine for other subjects a warmer tone may be more appropriate, and that is why I make the following suggestions—begged, borrowed, or stolen, or the result of one's mistakes, experiments, and misfortunes, commonly called experience.²

In short, toning experiments were fun.

To begin this discussion, some clarification of terminology is necessary. Early practitioners' definitions of "toning," "intensifying," and "staining" differ from the modern use of those terms, and the period literature used the terms "toning" and "intensification" interchangeably, as many toners had an intensifying effect and many intensifying solutions resulted in a slight change of tone. In addition, the term "toning" during this time was used to describe developing in order to create a tone. The many references to mercury-toned prints might be more accurately described as mercury-processed prints, as mercury could be added to the sensitizing solution, to the developer bath, or to both.

In the context of the discussion in this essay, a toning process is one whose primary purpose was intended to change the color of an already finished print (with intensification of contrast a secondary effect). Likewise, intensifiers are categorized as those whose primary function was to change the contrast rather than the color of the finished print. In addition, there is a minor subcategory of "mellowing," "tinting," or "staining," in which various organic materials, such as tea or coffee, were used to give an overall tone or stain to the paper.³ Not all the procedures fit neatly into the above categories, and more research must be done to determine the mechanisms behind the interaction between these materials and the photographs. However, the procedures discussed in this essay, whether toning, intensifying, or staining, are all considered postprocessing treatments or after-treatments, meaning that they were intended to alter the aesthetics of a finished print *after* development and clearing of the platinum print.⁴ Various methods of manipulating tone and contrast in the paper, sensitizer, and developer are discussed elsewhere in this volume.⁵

It is also worth noting that toning of platinum prints was not used to increase chemical permanence, as it has been for other photographic processes, for example,

gold-toning of salted paper or albumen prints. The platinum image itself is quite stable, and any addition to or modification of the image particle could in fact be a destabilizing factor. To increase the life of photographs, early practitioners recommended coating prints to protect them from damage by the environment.⁶

Toners

As mentioned above, toning is the act of deliberately changing the color of a finished print via chemical interaction with the image-forming material. This change can be achieved by altering portions of the image metal through addition of another material; some of these alterations are found in the toning formulas below. However, platinum, being a noble metal, is less likely to interact with other materials and form chemical bonds. This characteristic may account for reported difficulties with toning in practice as well as the apparent rarity of finished toned platinum prints. Platinum's resistance to forming new bonds may also provide insight into the discussion of the permanence of toned prints.

Toning with Catechu or Packham's Formula

In February 1895, James Packham presented an account of his patented method of toning platinum prints to a sepia, brown, or olive-brown color using the organic dye catechu or "cutch."⁷ Catechu, derived from the acacia tree, has been used for centuries in manufacturing and the arts as a source of tannin and as a dye to obtain various shades of brown.⁸ Packham's patented "tinctorial powder" combined several varieties of catechu, from pale to black, to produce an appropriate toner for photographic applications.

Catechus are rich in tannins, in particular catechuic acid (catechin), which Packham initially believed would "combine with platinum under certain conditions."⁹ In fact, the catechin reacts with minute amounts of iron compounds in the print rather than the platinum. In this sense, the iron acts as a mordant for the catechu dye molecule, and the reaction and subsequent color change take place only where iron is present.¹⁰ By July 1895, Packham seems to have developed a greater understanding of the influence of iron in his toning process as he reported that "he could not get the colour without the iron, and when the iron was present he invariably got the colour. . . . The more iron left in the print the greater was the change of colour produced by toning, but it was obvious that if too much iron remained there must be a fogging effect in the high lights."¹¹

Packham's toning bath was prepared by boiling ¼ ounce of Packham's tinctorial powder, a "mixture of catechus and other kindred extracts," in 5 ounces of water for 3–4 minutes. Once the mixture was cool, 1 ounce of alcohol was added to create the concentrated form of the toning bath, which could be kept for several days. To create the working solution, 30–40 drops of the concentrated solution were added to 1 pint of water. If a print was immersed in a 130–150°F toning bath, the desired tone could be reached within a few minutes, while a room-temperature bath could require up to several hours to achieve the same effect. After toning, the prints would be rinsed, dried, and further finished by rubbing the image side with a soft, dry cloth or with a thin coating of "oleate" or fat. A later modification to Packham's process was suggested by author and fellow practitioner A. Horsley Hinton. In his 1897 volume, *Platinotype Printing*, Hinton suggested that the catechu-toned print be soaked in a bath of Castile soap, sodium bicarbonate, and water in order to further intensify the image and clear the highlights.¹²

Simulacra of a catechu-toned platinum print, including an example of Hinton's Castile soap after-intensification process, are illustrated in appendix figure 2.

The choice of paper, printing technique, and developer all had an influence on the quality and depth of the catechu toner. Slightly acidic developer baths resulted in colder yellow tones, alkaline baths gave warmer tones, and glycerine-developed prints were not suitable for toning with catechu. Packham recommended allowing prints to "age" before toning and even suggested using "stale" prints, ones that had been exposed and allowed to sit in a cupboard for a few days before processing and subsequent toning. Likewise, he provided instructions on which kinds of development would assist the toning effects. Old baths of potassium oxalate and the addition of organic substances such as glucose, sugar, and honey in the developer also appeared to increase the strength of the toning.¹³ The brown tints of a catechu-toned photograph could also be further altered through treatment with potassium bichromate, chrome alum, or other dilute iron solutions.¹⁴

Stability of Catechu-Toned Prints

When asked about the stability of prints toned using his method, specifically fading of the color, Packham replied:

The brown colours are very persistent, and resist the action of bath acids and alkalis. The most active agent in apparently removing the colour is brilliant and intense sunlight, and this is only effective after pro-

longed exposure and then, when the colour has almost completely disappeared, it may be restored to almost its original tint by weak alkaline treatment or by passing the print through a soap bath. . . . By prolonged immersion in the tinctorial bath, a fictitious colour, a kind of pink staining of the whites is produced. This may be removed by treatment with a weak acid bath, or by bleaching by sunlight.¹⁵

Toning with Uranium

Uranium salts had long been used in photography prior to the advent of the platinum process. When F. Fitz Payne first discussed adaptation of uranium for use in toning platinum prints in 1892,¹⁶ the practice of toning with uranium had as many detractors as adherents. The photographer E. T. Holding described it as "rather dirty and disagreeable. The color is somewhat fugitive and frequently unpleasant,"¹⁷ while Alfred Stieglitz maintained that "very beautiful tones can be obtained" with uranium.¹⁸

There are multiple recipes for and references to uranium toning of platinum prints in the early literature, most of which involved uranium nitrate. Payne saw it as an alternative to commercially produced sepia-toned papers and recommended it as a way to improve the appearance of underexposed prints, thereby cutting down on waste of the expensive platinum paper.¹⁹ Alfred Stieglitz published his recipe, "Uranium Toning of Platinotypes," in 1893, adding this final advice to practitioners: "As with other things, a small addition of brains is of the greatest value in obtaining the best results."²⁰ The Royal Photographic Society member E. Cecil Hertslet spoke about his uranium-toned platinum prints at society meetings and exhibited his uranium-toned prints in the Seventh Annual Exhibition of the Society of Amateur Photographers of New York.²¹ A great proponent of uranium toning and one who appeared to have mastered the process was James McCorkle, a commercial photographer who ran a studio in Portland, Maine, with his partner R. H. Knight. They were the "sole agents of the Knight-McCorkle uranium-toned prints."²² Although his recipe seems basic, McCorkle had very precise instructions for trays, baths, and the working method,²³ which may account for his apparently greater commercial success with the process than other photographers.

One of the most interesting aspects of uranium-toning is that in addition to the warm reddish-brown hue described in articles by Stieglitz and Payne, a range of tones, including blues, greens, browns, and reds, could be obtained from the same bath depending on

any number of chemical bath combinations available to the photographer. As McCorkle described:

It was only a short time ago when black and sepia were the only colors of platinum pictures to be seen, and many of the so-called sepias were in reality a sickly sort of yellow brown. When such a print is compared with the rich seal browns of to-day, the great difference is at once appreciated. By careful manipulation, a picture on platinotype paper can be developed, cleared slightly in the acid bath, then toned in the uranium bath to a very beautiful blue; again clearing it in acid, and reimmersing it in the uranium bath, the shadows will begin to turn a deep olive color. The print can be stopped at this point by clearing in the acid bath and washing thoroughly, or allowed to turn a still darker brown, even to a deep chocolate color. Yet in such a case the effect will hardly be pleasing, the slight bluish tinge in the high lights being too harsh. Taking up this same print, now a deep chocolate color, we place it in the original oxalate developer, and again we have a black and white print, the oxalate removing every trace of color. From now on we cannot get the blue tones again; but by clearing very thoroughly in the acid bath and retoning in uranium, we can get the various shades of red and brown. The reds come from toning a light print in a freshly made uranium bath, while the chocolate tones come from a bath practically used up, or which has commenced to precipitate. The range of colors obtained by this process is remarkable, giving the blue tones from Prussian blue up to a delicate sky blue, including the rich tones of a carbon print. The red tones go from a brilliant red down through brick color to a deep, soft brown, and in many cases colors are obtained that it is impossible to produce again.²⁴

Stability of Uranium-Toned Prints

“As a chain is no stronger than its weakest link, their stability is no greater than that of their most changeable constituent.”²⁵ As Henry Chapman Jones thus observed, a toned platinum print could only be as stable as its most unstable component. In this case, uranium was often criticized for its perceived chemical instability and its difficulty in practice.²⁶ Like Packham, McCorkle defended the permanency of his favored toning technique saying, “Another claim is that the colors will fade. My experience

has been otherwise; I can safely say that I consider the colors practically permanent.”²⁷ In his article entitled, “Prints Treated with Uranium and Their Permanency,” A. J. Jarman insisted that his prints toned with uranium had aged eleven years without fading, and he advised photographers to keep their prints in a dry atmosphere as damp could cause fading and other unwanted changes.²⁸

In addition to considering the nature of the environment for storage and display of uranium-toned platinotypes, it should also be remembered that practitioners were advised against washing the toned prints in ordinary water, because neutral or alkaline water would remove the toning. Referring to uranium toning in *Popular Photographic Printing Processes*, Hector Maclean states, “If it is found needful to clear the high lights, or generally reduce the tone, plain water will act more energetically than acidulated water; indeed, the whole of the toning may often be washed out by plain water alone, hence after the weak acid bath the print should be only quickly rinsed in plain water and then at once blotted off. An alkaline solution entirely removes the above toning deposit.”²⁹

Intensification Processes

In his well-known *Dictionary of Photography for the Amateur and Professional Photographer*, E. J. Wall suggested several remedies for failed prints:

As with most other processes, success is not always attained at first, and it may happen that our finished prints are too dark or too light. In the former case there is not much to be done, as platinum is one of those intractable metals not easily amenable to reagents; strong chlorine water will reduce the image slightly. Platinotype prints can be far more easily intensified, and several processes have been suggested for this purpose, by means of which also various modifications of tone are possible.³⁰

Weak, flat, or underdeveloped platinotypes could be intensified through application of solutions of gold, platinum, silver, iron, and several other metal salts. As mentioned previously, intensification processes were intended to boost the contrast of a weak print, but a slight alteration of tone would often accompany the process. If practitioners were using an intensification process expressly to create a color shift, they were advised to underexpose their print to compensate for the eventual increase in contrast.

Intensification with Dollond's Gold Formula

Alfred W. Dollond's gold-intensification process appeared often in the period literature from 1894 onward.³¹ In addition to increasing the contrast of the print, intensification with gold could change a print with a "rusty" tone to black or give a blue-black tonality to the print. Paul Strand was among the more prominent photographers who claimed to use gold to modify the tone of his prints.³²

Dollond's process involved wetting the print and placing it face up on a glass sheet. Glycerine was spread evenly on the image side of the print, and a gold chloride solution (15 grains of gold chloride in 7½ drams of water) was then applied to the image using a brush or cotton wool. When the desired strength of color was achieved, the glycerine and gold solution was rinsed away with water. A weak developing solution (such as was used for silver halide processes) was then applied, followed by a water wash.³³ The developing solution was necessary to reduce any unreacted gold compound to its metallic state, which, if not removed, could cause an overall pinkish discoloration of the print. Dollond advised that freshly printed platinumotypes worked best for gold intensification, but that old prints (not more than three or four weeks) could also be treated in this way.³⁴

Simulacra of a gold-intensified print are illustrated in appendix figure 3.

Stability of Gold-Intensified Prints

The stability of gold-intensified prints is not often discussed in the period literature, perhaps indicating that treatment with gold was perceived not to adversely affect print permanence. As the photographer and Royal Photographic Society member, J. McIntosh, put it, "In intensifying platinum prints with gold or with platinum there is at least the consolation for the trouble expended that the permanency of the image has not been tampered with."³⁵ However, workers were warned that improper application or clearing of the glycerine-gold mixture, misapplication of the final developer solution, and temperature outside of the 65–70°F recommended range might lead to staining in the print.³⁶

Intensification with Platinum

In 1887, the German professor E. Vogel Jr. published a formula using platinum as an intensifying agent for platinum prints, and variations of his recipe were subsequently translated and published in a variety of British and American publications.³⁷ Vogel's recipe involved adding 3–5 drops of potassium chloroplatinite (diluted 1:6) to 50

cc (ml) of water and mixing this with 5 cc (ml) of oxalate developer. The solution was flowed over the finished print until the desired affect was attained. Vogel's method was one of the earliest intensification techniques, but it was occasionally criticized for uncertain and unsatisfactory toning results.³⁸

Variations on platinum intensifier recipes were also presented by Dr. Adolf Miethe, a German scientist, educator, and photochemist, and the Austrian scientist Baron Arthur von Hübl, co-inventor of Pizzighelli's platinum process with fellow Austrian Giuseppe Pizzighelli. Miethe modified Vogel's recipe by mixing a saturated solution of potassium oxalate (1 ounce) with a saturated solution of ferrous sulfate (90 drops) and a 10% solution of potassium bromide (80 drops). Immediately before immersing the print in the solution, a few drops of potassium chloroplatinite (1 grain to 1 dram) were added to the solution.³⁹ The radical difference between Vogel's and Miethe's recipe is that Miethe added the intensification step immediately *after development* but *before clearing*. As a result, this process was limited to prints that were already known to require intensification before being cleared and washed in the usual manner. Like Vogel's recipe, Miethe's intensification process proved difficult to apply in practical situations, with complaints of poor results and yellowish staining in the final print.⁴⁰

Hübl's recipe simplified the platinum intensification procedure,⁴¹ and that appeared to suit the needs of at least one practitioner: "The formula published later by A. Von Hübl is, however, thoroughly practical, and dispenses with the delicate balancing of chemicals that would be necessary in such a process, rendering further investigation in that direction needless."⁴² Hübl's procedure required only two solutions:

- Solution 1: Sodium formate (48 grains) with 1 ounce of distilled water.
- Solution 2: Platinic chloride (10 grains) with 1 ounce of distilled water.

To make the working solution, 15 drops of each solutions were added to 1 ounce of water and intensification occurred within 10–20 minutes.

Simulacra of a platinum-intensified print are illustrated in appendix figure 4.

Stability of Platinum-Intensified Prints

As with gold-intensified prints, there are few published articles discussing the long-term permanence of platinum-intensified prints. One caution to the practitioner was that, "It is probable that traces of the intensifier are left in the

paper, and, although no evil effects have been traced to this cause, it is well as a precautionary measure to treat the print with a developer as in the case of gold intensification.”⁴³

Intensification with Silver

According to William de Wiveleslie Abney and Lyonel Clark’s book *Platinotype: Its Preparation and Manipulation*, the earliest published reference to experimentation with silver as an intensifying agent for platinotypes was by Roland Briant. Briant’s process mixed 5–10 drops glacial acetic acid, 1 grain (0.065 g) pyro (pyrogallic acid or pyrogallol), and 2 drops of a 60 grain-to-the-ounce silver nitrate solution with 1 ounce of water to make an intensifying solution. An excess of acetic acid would slow the process while an excess of silver and pyro increased the reaction. Briant’s process yielded a rich red-brown, and the silver-intensified prints could then be toned again with gold, platinum, uranium, mercury, or any other material ordinarily used to tone silver prints.⁴⁴

Variants of Briant’s silver-pyrogallol process were subsequently introduced by other practitioners, including intensification with silver-gallic acid, silver-ferrous sulfate, and silver-hydroquinone.⁴⁵

Simulacra of silver-intensified prints are illustrated in appendix figures 5 and 6.

Stability of Silver-Intensified Prints

As with gold and platinum postprocessing treatments, the literature says very little about the long-term stability of silver-intensified prints. The absence of commentary appears to bode well for the long-term preservation of these photographs, and current research into platinum-silver and platinum-toned silver prints may provide more information in this regard.⁴⁶ J. McIntosh notes, however, that “A print which has been intensified with silver cannot be regarded as being as permanent as one developed to the correct strength in the ordinary way, nor even so stable as one that has been intensified with gold or platinum.”⁴⁷

Intensification with Iron

“It is questionable whether blue-tinted prints are suitable for photographs, and it is only in very few cases that they will help the representation.”⁴⁸ This observation, by W. J. Warren, referenced the postprocessing treatment of intensifying a weak print with potassium ferrocyanide. Because the treatment had the side effect of an overall intense blue tone, it may be assumed that iron-cyanide intensification was reserved for a limited number of situations in which the blue of the resulting ferric ferrocya-

nide (Prussian blue) helped to create an overall aesthetic mood, such as a seascape or moonlight scene. Warren published one such recipe, in which he substituted potassium ferrocyanide for potassium ferricyanide as published by Hübl:

- Solution A: ammonium iron alum (10 grams); hydrochloric acid (10 cc); water (100 cc).
- Solution B: potassium ferrocyanide (10 grams); water (100 cc).
- Solution C: ammonium sulphocyanide (50 grams); water (100 cc).

To make a working solution, 5 cc of Solution A was added to 1000 cc water followed by the addition of 2 cc of Solution B and 5 cc of Solution C. The practitioner was again warned to wash the print in faintly acidic water as alkaline water would remove the toning.⁴⁹

It should also be noted that blue tones could be achieved in platinum prints through uranium toning as seen in McCorkle’s description⁵⁰ or through adding potassium ferricyanide to the developer bath.⁵¹

Simulacra of an iron-intensified print are illustrated in appendix figure 7.

Stability of Iron-Intensified Prints

Very little is published on the success or stability of prints intensified or toned with iron, and no existing prints have been verified through elemental analysis. Until further scholarship discovers otherwise, we may assume that its use was not widespread, and perhaps only used as a last-ditch effort to save a failed print. To paraphrase W. J. Warren, it may be that many of these solutions were useful in “making what would otherwise be only fit for the dust-bin into presentable pictures.”⁵²

Mellowing or Tinting Prints

The final postprocessing modification involves staining the print with a substance that gives an overall tone to the paper without interacting specifically with the final image material. These practices are not mentioned in depth in publications of the time, and as a consequence little is published about their success or longevity. In the “Miscellaneous Hints” section of the *Practical Photographer* the journal’s editors F. Lambert and T. H. Cummings suggest that “Platinotype prints may often be improved by slightly tinting the paper to a colour approaching that of a mellow old engraving.” Strong tea or coffee could be used to achieve this tone, or the print could be immersed in a 1% solution of potassium dichromate, subsequently rinsed, dried, and exposed to light to create a pale yellow-brown

color.⁵³ A similar tinting recipe in an 1899 issue of *Photogram* recommended a 5% solution of potassium dichromate, which darkened the print on exposure to daylight.⁵⁴

Simulacra of a tinted platinum print are illustrated in appendix figures 8.

Conclusions

“We have received repeated inquiries for reliable methods of toning platinum papers . . . although we do not think that the permanency of any platinum print is likely to be improved by a toning process.”⁵⁵ In many ways, the consideration of postprocessing toning and intensification methods would incline one to agree with this statement by T. A. Aldridge. The stability of traditionally processed platinum prints does not appear to have been improved by postprocessing modifications. In fact, the literature seems to indicate that in many cases the opposite was true. At this point in our scholarship, however, we have gathered only a small sampling of the historic postprocessing treatments of platinum prints, and in fact, very few toned, intensified, or tinted platinum prints have been positively identified to date. What can be said with certainty, however, is that early practitioners of the platinum process were extremely knowledgeable about their materials and used toning and intensifying processes to manipulate the strengths and weaknesses of the platinum process, to experiment with its parameters, and to push forward the elevation of photography to the status of art.

Several topics bear closer scrutiny. The effects of aging, environment, and conservation treatment on intensified or toned platinotypes are not well understood and therefore difficult to predict. In particular, how do moisture, pH, and light exposure affect these photographs? Early practitioners indicate that many toned prints were sensitive to some if not all of these environmental factors. It is also important to note that while the recipes listed here may be considered canonical to some extent, early practitioners were keen to experiment, improve, and modify existing recipes to suit their own work. (Note the multiple published variations of Vogel’s platinum intensification recipe as well as subsequent iterations of the recipe by Hübl and Mieth.) These experiments lead to a more fundamental question: how can toned and intensified prints be identified? It has been clearly demonstrated that image tone alone cannot be the determining factor in identifying the platinum process; the wide range of colors seen in platinum prints could result from a variety of initial and/or postprocessing modifications. Although x-ray fluorescence spectroscopy can identify many inorganic elements

in photographs, detecting trace metals remains challenging, and identifying organic compounds, such as catechu, requires still other methods. The National Gallery of Art’s study of toning and intensification methods using historic re-creations (see appendix) is a start, but much more work remains to be done on this subject.

As scholarship and technical analysis advance, it is hoped that our knowledge of the subtleties of the platinum process will become more thoroughly understood and absorbed into our appreciation of the larger story of photography. As we continue to learn about variations within the platinum process, we will be able to create more sophisticated preservation guidelines and add a more useful set of identification criteria. In turn, we might better describe the photographers’ practices as they relate to their aesthetic goals and to the history of photography as a whole.

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Notes

1. Child Bayley 1906, 203.
2. Warren 1897, 472.
3. [Ward] 1899, 278, 279.
4. One exception to this definition is Dr. Adolf Miethé's platinum intensification procedure, which was carried out on the print between the development and clearing steps. See McIntosh 1905, 484.
5. See, especially Alice Carver-Kubik et al., "Additives Used in the Platinum Process," in this volume.
6. For a fuller discussion of coatings on platinum prints, see Waldthausen 2005.
7. Packham 1895b, 157.
8. B. Jones 1912, 95; Wood and Roberts 2005, 311.
9. Packham 1895b, 157.
10. H. C. Jones 1904, 47. Other tannin-rich organics, such as sumac and chestnut bark, have been cited as postprocessing toning materials producing a "soft greyish green colour." Mitchell 1907.
11. Packham 1895a, 358.
12. Hinton 1897, 89. Castile soap is traditionally made with olive oil and sodium hydroxide or potassium hydroxide.
13. Packham 1895b, 158.
14. Hinton 1897, 89; Packham 1895a, 357. Chrome alum would produce a greenish-brown tint, while potassium bichromate would create a warmer tone.
15. Packham, 1895a, 357. For additional commentary on the stability of catechu-toned platinum prints, see Bedding 1900; Maclean 1895, 136.
16. Payne 1892.
17. Holding 1904, 138. Also note Holding's reference to the intensifying properties of uranium.
18. Stieglitz 1893, 210.
19. Payne 1892, 656.
20. Stieglitz 1893, 210.
21. Society of Amateur Photographers 1894, 13. Note that more than 250 platinotypes were exhibited at this event, many identified as cold- or warm-bath processes or by paper type or other variation.
22. R. H. Knight advertisement, *Board of Trade Journal* 17, no. 7 (November 1904): 386.
23. [Tennant] 1902, 170.
24. McCorkle 1906, 41.
25. H. C. Jones 1904, 48.
26. Abney and Clark 1895, 95.
27. McCorkle 1906, 41.
28. Jarman 1909, 88. For additional commentary on the permanence of uranium-toned prints, see Bedding 1900, 788.
29. Maclean 1898, 82.
30. Wall 1902, 511.
31. Dollond 1894; Dollond 1895; Maclean 1898, 83–84.
32. See Alisha Chipman and Matthew L. Clarke, "A Technical Study of Paul Strand's Platinum Prints," in this volume.
33. [Tennant] 1899, 349. The developer solution suggested by Tennant consists of equal parts of Solution A (1 oz. sodium sulphite; 50 grains metol; 10 oz. water) and Solution B (1 oz. potassium carbonate in 10 oz. water).
34. Abney and Clark 1895, 96; Dollond 1895, 135.
35. McIntosh 1905, 482.
36. McIntosh 1905, 483.
37. Vogel 1887, 233. Vogel's exact recipe uses "50 ccm Wasser, 3–5 Tropfen Kaliumplatinchlorür 1:6 und 5 ccm Oxalatenwickler." Inexact volume conversions and the translations from German to English may account for the amount of variation in Anglicized versions of Vogel's recipe. See Abney and Clark 1895, 93, which interprets Vogel's recipe as "a solution of chloro-platinite of potassium with an ordinary dry plate developer."
38. McIntosh 1905, 484.
39. McIntosh 1905, 484.
40. McIntosh 1905, 484; Wall 1896, 323.
41. McIntosh 1905, 484.
42. McIntosh 1905, 484.
43. McIntosh 1905, 484.
44. Abney and Clark 1895, 93–94; McIntosh 1905, 480.
45. McIntosh 1905, 481; [Ward] 1899, 278; Lambert and Cummings 1904, 49.
46. See Ronel Namde and Joan M. Walker, "Platinum Toning of Silver Prints," and Constance McCabe et al., "Satista Prints and Fading" in this volume.
47. McIntosh 1905, 480.
48. Warren 1897, 473.
49. Hübl 1894, 57.
50. McCorkle 1906, 41; Aldridge 1906. Note that Aldridge discusses color variations of "mercury-toned" platinotypes by postprocessing techniques, a topic not specifically covered in this essay.
51. [Tennant] 1899, 344. See also Adrienne Lundgren, "The History and Use of Glycerine in Platinum Printing," in this volume.
52. Warren 1897, 473.
53. Lambert and Cummings 1904, 62.
54. [Ward] 1899, 278.
55. Aldridge 1906.

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Appendix

Preliminary Testing of Toning and Intensification Simulacra

To test the effects of the recipes in the period literature, platinum print step-tablets were made by the Photograph Conservation and Scientific Research Departments at the National Gallery of Art and subjected to several post-processing toning procedures, shown below. Archaic measurements in the recipes (grains, minims, drachms, etc.) were converted to standardized metric units, which are shown in each recipe that follows. Where necessary, modern equivalent ingredients were substituted for chemistry no longer available or too hazardous for use. Details of the creation of platinum print simulacra are provided in other essays in this book,¹ and toning and intensification recipes used for the preparation of simulacra are provided in the figure captions. Some deviation from the historic recipes was inherent in the re-creation process, and the details regarding the specific procedures used to tone the sample prints are shown in *italics*. Unless otherwise noted, deionized water was used to prepare the solutions.

After toning, the sample prints were cut in half. One half of each set was reserved as a control for comparison with the sample that was aged at the National Gallery of Art for 4 weeks at 70°C and 75% relative humidity (RH). Each sample was analyzed using x-ray fluorescence spectrometry (XRF), and the most salient findings are provided in the captions.

The simulacra illustrate that platinum prints may exist in a wide range of colors beyond a classic neutral black. XRF analysis showed that in cases where a toner or intensifier does not correlate with platinum image density, it could be considered a “stain” rather than a true toner or intensifier. More experimentation in this area will increase our knowledge in regard to identification of platinum prints and also assist in determining to what extent these toners and intensifiers influence their aging behavior and how environmental factors play a role in deterioration of these prints.

Note

1. See Matthew L. Clarke, “Characterization, Degradation, and Analysis of Platinum and Palladium Prints,” in this volume.

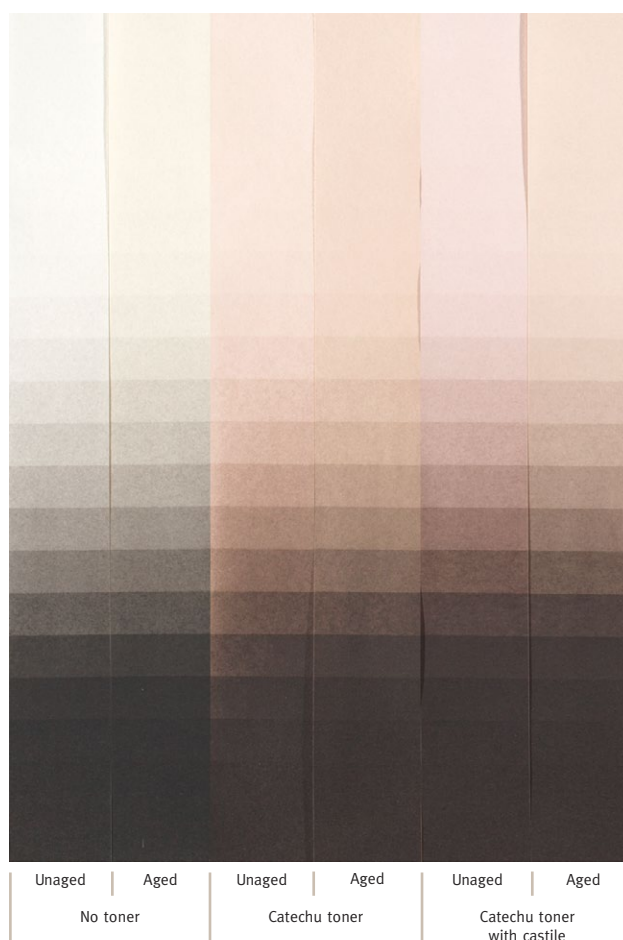


Figure 2. Platinum print step-tablets toned with catechu. Based on recipe in Packham 1895b.

Note: The catechu used was a mixture from Kremer Pigments, Inc. The Packham recipe used a specific blend of light and dark catechus.

To make a stock solution:

- Boil ¼ ounce (7.09 g) catechu in 5 ounces (147.87 ml) water for 3–4 minutes.
- Cool the mixture and add 1 ounce (29.57 ml) alcohol (*ethanol*) to the mixture.

To make a working solution:

- Add 30–40 drops (1.5–2.0 ml) stock solution to 1 pint (473.17 ml) water.
- Keep the bath at 130–50°F (54–66°C). Desired tone should be reached within a few minutes. *The dry print was placed in the bath for 15 minutes.*
- Rinse in two successive 3-minute 500 ml baths of well water and air-dry.

Optional clearing based on recipe in Hinton 1897, 84–89.

To further clear whites (if necessary), use a 180°F (82°C) bath of:

- 40 grains (2.59 g) Castile soap
- 80 grains (5.18 g) bicarbonate of soda
- 1 pint (473.17 ml) water

XRF observations: The control sample and the aged sample showed the same elemental composition. Catechu itself is not detectable by XRF, and no additional elements detectable by XRF were introduced by this recipe.

Figure 3. Platinum print step-tablets intensified with gold.
Based on Dollond's recipe as published in Maclean 1898, 83–84.

Note: According to Crawford 1979, 174, Kodak Dektol 1:9 in water may be substituted for the components of Solution A and Solution B omitted entirely.

Gold chloride solution:

- 15 grains (0.97 g) gold chloride
- 7½ drams (27.72 ml) water

Soak print in 100°F water for 5 minutes, and lay flat on sheet of glass. Blot off excess water. Spread an even coating of glycerine over image side. Brush a few drops of the gold chloride solution over the face of the print, and mix it with the glycerine *in light and leave for 5 minutes*, continuing to brush as the intensification proceeds. When the desired depth of tone is reached, rinse the print in *two successive 3 minute 500 ml baths of water* to remove all the glycerine, and immerse the print in equal parts of the following solutions:

Developer:

Based on [Tennant] 1899, 349.

Note: Modern substitute based on Crawford 1979, 174.

Solution A (15 minutes), 1:9 solution of Kodak Dektol:water:

- 1 ounce (28.35 g) sodium sulfite
- 50 grains (3.24 g) metol
- 10 ounces (295.7 ml) water

Solution B (omitted):

- 1 ounce (28.35 g) potassium carbonate
- 10 ounces (295.7 ml) water

Wash in running tap water for 15 (10) minutes or with four changes.

The alkaline developer above is intended to remove gold compounds that may have been formed with sizing in the paper. Hector Maclean (1898, 84) recommends toning in daylight, a step that seems to hasten the intensification.

XRF observations: Gold and platinum signals correlate with image density. The ratio of gold to platinum appears to be the same across image densities.

Figure 4. Platinum print step-tablets intensified with platinum.
Based on Hübl's recipe as published in Warren 1897, 473.

To make stock solutions:

Solution 1:

- 48 grains (3.11 g) sodium formate
in 1 ounce (29.57 ml) water

Solution 2:

- 10 grains (0.648 g) platinum perchloride
in 1 ounce (29.57) water

To make a working solution:

- 1 ounce (29.57 ml) water
- 15 drops (0.75 ml) Solution 1
- 15 drops (0.75 ml) Solution 2

Immerse for 15–20 minutes. Wash and dry.

XRF observations: The control sample and the aged sample show the same elemental composition. As there is no other element to compare against, platinum intensification is not detectable by XRF.

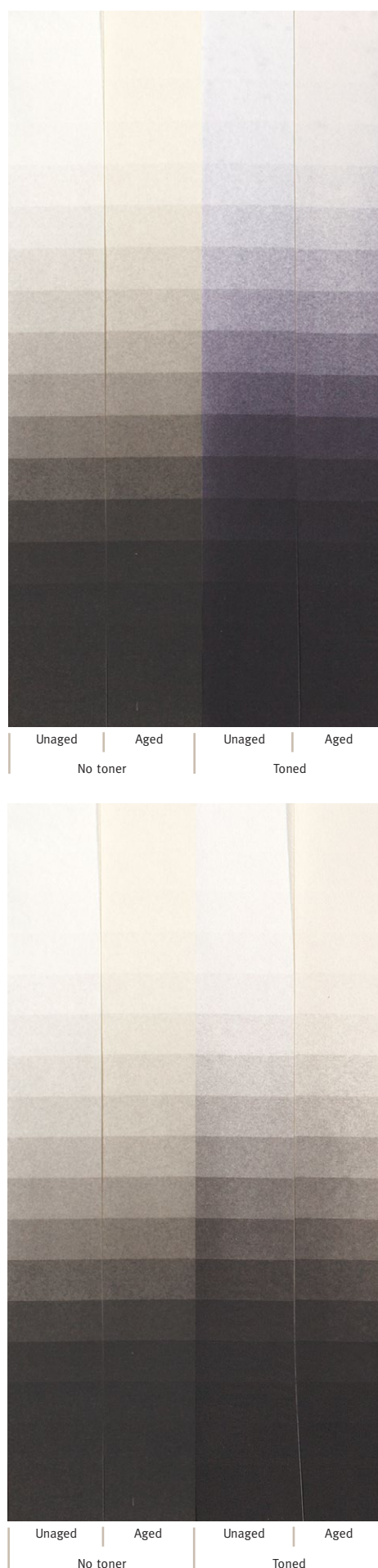


Figure 5. Platinum print step-tablets intensified with Briant's silver-pyro recipe.

Based on Briant's recipe as published in McIntosh 1905, 480.

- 1 ounce (29.57 ml) distilled water
- 5-10 drops (0.25-0.5 ml) glacial acetic acid
- 1 grain (0.065 g) pyro
- 2 drops (0.1 ml) of a silver nitrate solution (60 grains to the ounce/3.89 g per 29.57 ml water)

Immerse print in solution for 10 minutes, and rinse in two successive 3 minute 500 ml baths of well water.

XRF observations: The aged sample shows minimal or no silver present.

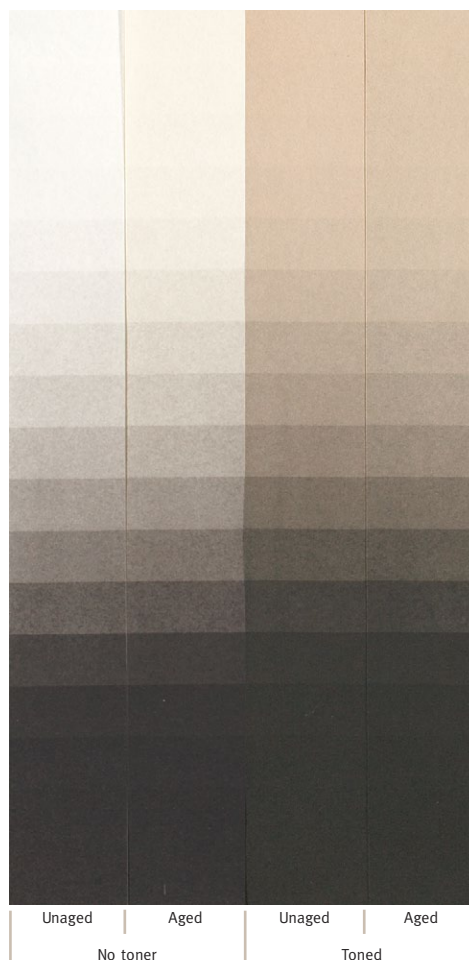


Figure 6. Platinum print step-tablets intensified with silver intensification recipe "# 9."

Based on recipe 9 published in [Ward] 1899, 278.

- 50 parts (100 ml) saturated solution of gallic acid in cold water
- 50 parts (100 ml) water
- 10 parts (20 ml) glacial acetic acid
- 2 parts (4 ml) 5% silver nitrate solution (0.2g silver nitrate in 4 ml water)

Soak the print in cold (63°F) water for 3 minutes. Apply bath by immersing for 10 minutes. After intensification, rinse for 2 minutes in dilute acetic acid (1%), followed by two successive 3 minute 500 ml baths of well water.

XRF observations: The silver correlates with image density. No silver is present in nonsensitized regions.

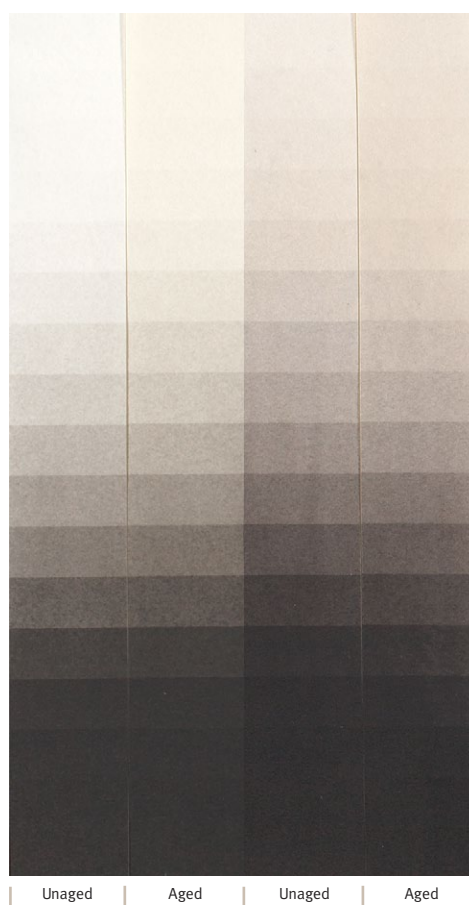


Figure 7. Platinum print step-tablets intensified with Warren's version of Hübl's iron-intensification recipe. Based on Hübl's recipe as published in Warren 1897, 473.

Solution A

- 10 parts (0.13 g) ammonium iron alum (ferric ammonium sulfate)
- 10 parts (0.13 ml) hydrochloric acid (37%)
- 100 parts (1.25 ml) water

Solution B

- 10 parts (0.05 g) potassium ferrocyanide
- 100 parts (0.5 ml) water

Solution C

- 50 parts (0.625 g) ammonium sulfocyanide
- 100 parts (1.25 ml) water

Immediately before use, add 5 parts (1.25 ml) Solution A, 2 parts (0.5 ml) Solution B, and 5 parts (1.25 ml) Solution C to 1000 parts (250 ml) water and immerse the prints for 10 minutes in the solution. Keep below the surface and moving in bath until desired tone is reached. Rinse in two successive 3 minute 500 ml baths of well water.

XRF observations: Iron is detectable throughout including nonsensitized areas. Iron does not correlate with image density. The Prussian blue is deposited overall.

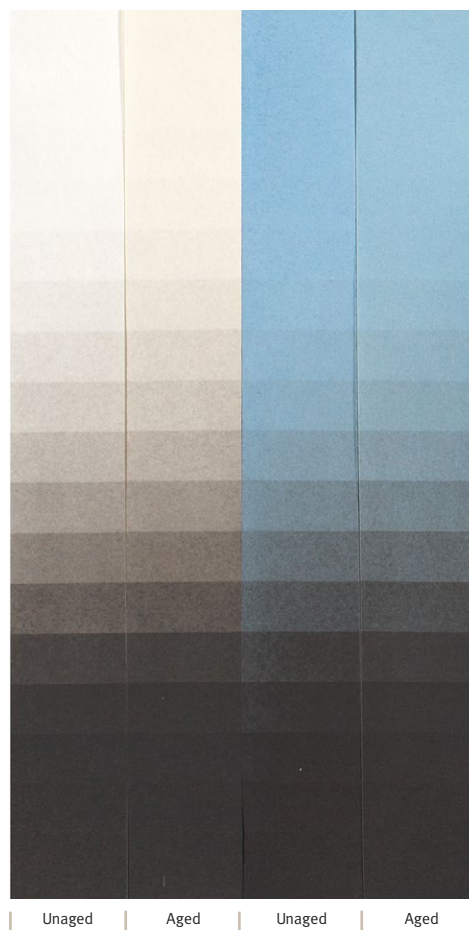


Figure 8. Platinum print step-tablets tinted with potassium dichromate.

Based on recipe published in Lambert and Cummings 1904, 62.

- Immerse in a 1% solution of potassium dichromate (1 g/100 ml water) for 15 seconds.
- Rinse lightly for 15 seconds, dry and expose to light to darken (little change observed after immediate and prolonged exposure to light).

XRF observations: Chromium is present throughout the paper, even in the nonsensitized areas. The amount of chromium increases with image density to a point (with middle tones and deepest blacks having similar amounts of chromium).

