

# At the Cutting Edge of Halftone Printing: William Augustus Leggo and George Edward Desbarats

Kate Addleman-Frankel

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Article abstract

In Canada, halftone photographic images began to feature regularly in the visual landscape of the news in late 1869, almost three decades earlier than anywhere else. In the technologically obsessed world of nineteenth-century photography, that is a huge amount of time by which to lead on a meaningful techno-cultural advance. Behind this early development were William Augustus Leggo (1830–1915) and George Edward Desbarats (1838–1893) and their initial media ventures: the **Canadian Illustrated News** and its French-language counterpart, **L'Opinion publique**. Their ground-breaking work to incorporate photographs into the news, and the scant acknowledgment it has received, is the focus of the present article.

# At the Cutting Edge of Halftone Printing: William Augustus Leggo and George Edward Desbarats

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**Abstract:** *In Canada, halftone photographic images began to feature regularly in the visual landscape of the news in late 1869, almost three decades earlier than anywhere else. In the technologically obsessed world of nineteenth-century photography, that is a huge amount of time by which to lead on a meaningful techno-cultural advance. Behind this early development were William Augustus Leggo (1830–1915) and George Edward Desbarats (1838–1893) and their initial media ventures: the **Canadian Illustrated News** and its French-language counterpart, **L'Opinion publique**. Their ground-breaking work to incorporate photographs into the news, and the scant acknowledgment it has received, is the focus of the present article.*

**Résumé :** *Au Canada, les images photographiques en demi-teinte (ou similigravures) ont commencé à figurer régulièrement dans le paysage visuel des nouvelles à la fin de 1869, soit près de trois décennies plus tôt que partout ailleurs. Dans le monde de la photographie du XIXe siècle obsédé par la technologie, c'est énormément de temps pour demeurer en tête d'une avancée technoculturelle si significative. Sont à l'origine de cette percée précoce William Augustus Leggo (1830-1915) et George Edward Desbarats (1838-1893) et leurs premières entreprises médiatiques, le **Canadian Illustrated News** et son équivalent francophone, **L'Opinion publique**. Le présent article porte sur leur travail révolutionnaire d'intégration de photos dans les journaux, et sur le peu de reconnaissance qu'a obtenue cette innovation.*

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**Keywords:** Canadian Illustrated News, George Edward Desbarats, Halftone, Printing, William Augustus Leggo

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The technological ability to reproduce continuous tone images alongside printed text was long an elusive goal of the photography, printing, and publishing worlds of the nineteenth century. The solution ultimately lay in a halftone process that, first, translated photographic images into dots and, second, recreated these images on a relief matrix. Because relief printing processes would enable the printing of text and image at once, they were, initially, the only ones theoretically suited to the mass scale of production of the burgeoning news media of the period.

The technical lineage of the halftone is long, complex, and well populated by inventors. Historians have long agreed that its origins can be traced to the British polymath William Henry Fox Talbot's patent of 1852, which described the use of a gauze screen to break the tones of a photograph into dots. This laid the conceptual basis for all the processes that came after. Halftone reproductions of continuous-tone photographic prints began to appear in the pages of illustrated weeklies in France, England, Germany, and the United States in the early 1880s. They followed on the heels of innovations centred chiefly on improvements to the screens at the centre of the halftone process, patented by Charles-Guillaume Petit and Stanislas Krakow in France, Georg Meisenbach in Germany, and Frederic Ives in the United States, between 1878 and 1884.<sup>1</sup> They remained sporadic and experimental inclusions in the visual news for almost



**Figure 1.** “A Snow Drift on the Pacific Railroad,” *Canadian Illustrated News* 1.20 (19 March 1870): 308.

two decades.<sup>2</sup> In the late 1890s, the halftone process was finally widely adopted by the Western illustrated press, and photography joined the panoply of illustrative techniques still in use to become a regular feature of mass media.

As a small handful of Canadian scholars have shown, the exception to this timeline was Canada, where halftone photographic images began to feature regularly in the visual landscape of the news in late 1869, almost three decades earlier than anywhere else.<sup>3</sup> In the technologically obsessed world of nineteenth-century photography, as in that of digital communications today, that is a long stretch of time, an almost unbelievable amount of time by which to lead on a meaningful techno-cultural advance. Behind this early development were William Augustus Leggo (1830–1915) and George Edward Desbarats (1838–1893) and their initial media ventures: the *Canadian Illustrated News* and its French-language counterpart, *L'Opinion publique*. Their ground-breaking work to incorporate photographs into the news, and the scant acknowledgment it has received, is the focus of the present article.

As with traditional printmaking, photomechanical methods—which combine chemical techniques of photography with ink-based printing—can be divided into planographic, intaglio, and relief methods. Planographic processes, such as photolithography, produce prints from a flat surface. These processes are based on the immiscibility of oil and water—greasy printer’s ink does not adhere to damp portions of the plate, which are created in correspondence with the light areas of the image. Intaglio processes such as photogravure consist of etching the image into the surface of the printing matrix.

Ink is applied such that it is held only in these etched reservoirs, and then transferred to paper under the pressure of the printing press. In relief or letterpress printing, the image is raised above the surface of the matrix and can, when integrated with moveable type, be readily printed with text. Successful photomechanical relief methods proved the most difficult to realize, but they were theorized as having the greatest potential impact on the visual landscape of the news. From the appearance in 1842 of the weekly journal, the *Illustrated London News*, until the 1890s, news pictures consisted nearly exclusively of wood engravings, a handmade relief process.

“Halftone” refers to the greys in a photographic image, or the range of shades from black to white. Black printing ink cannot print grey, but it can print dots of various sizes at such a small scale that, to the eye, they appear to constitute shades of grey. To translate the photographic image into dots, it was rephotographed through a gridded screen inserted in the camera, in front of the sensitized plate. Commonly, the resulting negative was then transferred to a sensitized metal printing plate that was etched according to a principle, first employed in photomechanical printing in the 1850s, that the photosensitive emulsion coating the plate hardens on exposure to light, becoming acid resistant. During the etching process, the image area was thus protected from the acid and retained in relief. The success of any halftone process—actually two processes, the translation of photographic tonalities into dots and then the creation of a print that appears to reproduce those tonalities—depended upon the correctness of the screen and its placement, the type of aperture in the camera, and the proper intensity of light.<sup>4</sup> Leggo and Desbarats’ version of the process employed two inventions devised by Leggo: the leggotype and the granulated photograph, both of which are explored here.

### **Invention and Diffusion**

Leggo and Desbarats were born in Quebec City to families in the printing industry.<sup>5</sup> After the death of his father in 1864, Desbarats initially took over the task of printing for the Canadian government, a family tradition since 1841.<sup>6</sup> But little more than six months after being appointed Canada’s official printer on 1 October 1869, Desbarats left his post to devote himself and his significant financial resources to his own enterprises in printing and publishing. Leggo’s father was a printer from England, and Leggo’s introduction to the trade was in copperplate engraving. He left Quebec City to gain further training in Montreal and Boston, returning in 1850 to start his own business in steel and copperplate engraving, a traditional branch of the graphic arts, which was then entering a highly transitional period.<sup>7</sup> Likely in response to the changes he understood to be afoot, Leggo expanded his realm of expertise and his business offerings to include lithography and electrotyping by 1863.<sup>8</sup> At some point around this time, he became interested in photography—which itself was gaining traction in the realm of book publishing, despite its limitations—and its possibilities for the printing trade.

The partnership between the two men arose from compatible interests and capabilities. Desbarats, intensely entrepreneurial and a great experimenter, was fascinated by printing techniques and innovations and their possibilities for his own business and his field more broadly.<sup>9</sup> Leggo was the inventor. In 1867, they joined forces to promote the first of Leggo’s photographic inventions: the leggotype. Patented two years earlier in



Canada, the United States, England, France, and Belgium,<sup>10</sup> the technique replicated line images “by light and electricity, and without the help of an engraver.”<sup>11</sup> The final prints created this way constituted direct facsimiles of the originals—drawings, varieties of prints, maps, manuscripts, etc.—rather than handmade interpretations of them. Leggo and Desbarats described the process as follows:

[T]he first operation...consists in producing a bichromated gelatin mold on the surface of the glass plate. After eliminating from this surface, by washing it with water, the gelatin that the shadows protected from the action of the light, the surface is covered with a fine, creamy plaster that absorbs the water and retraces in relief the shadows of the photograph. This plaster is then plunged into molten wax, which creates a positive mold. The copper negative, a facsimile of the plaster, is produced by galvanoplasty.<sup>12</sup>

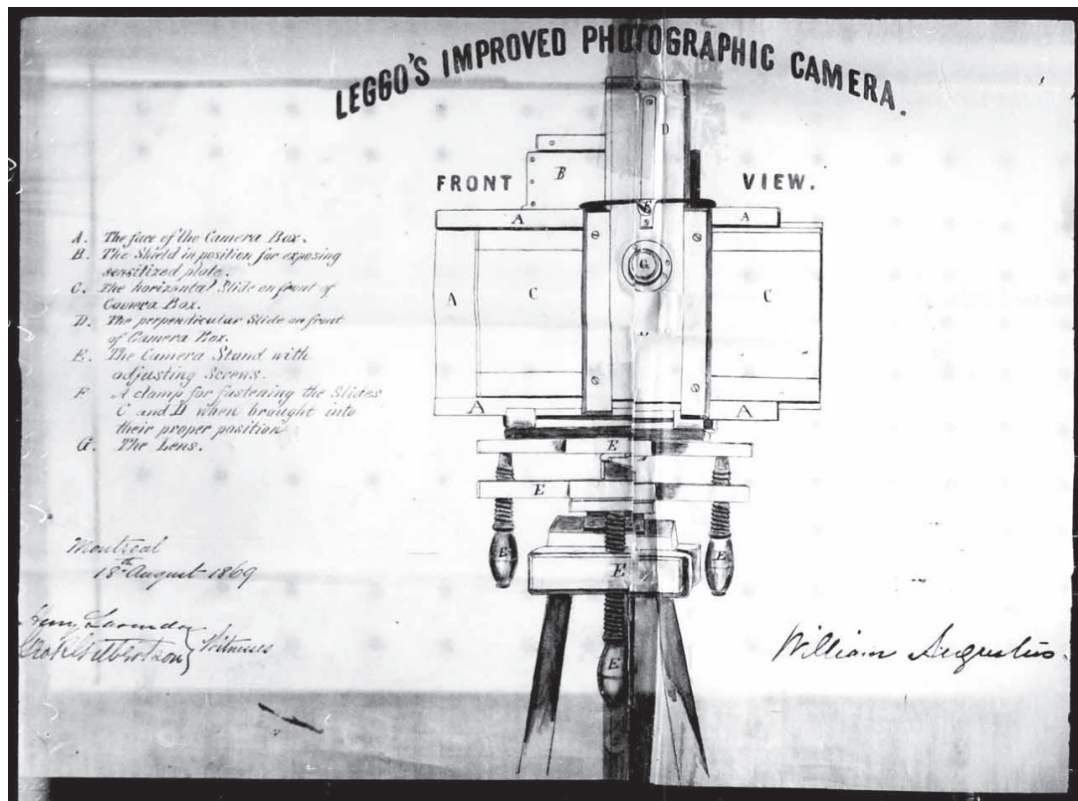
Leggotype was a variation on photo-electrotype methods capable of producing intaglio or relief plates that had been developed, attempted, and then abandoned in the 1850s. Most high-profile among these was the photogalvanography of Paul Pretsch, an Austrian resident in London, who published photogalvanograph facsimiles of artworks in his short-lived *Photographic Art Treasures, or Nature and Art Illustrated by Art and Nature* (1856–1857).<sup>13</sup> Leggo and Desbarats advertised the leggotype as different from those processes that had come before. They promised that it was of “the utmost simplicity; the materials we make use of, the most common; the speed of execution superior to all other means; and the perfection of the work all that can be desired.”<sup>14</sup> The truth of these claims is suggested by the leggotypes within the *Canadian Illustrated News*, which were occasionally identified by the name of the process inscribed into the image, as in **Fig. 1**. It would be ten years before other photorelief methods became, similarly, a critical part of other journals’ visual programs.<sup>15</sup>

It was not this process, however, that catapulted Leggo and Desbarats into the world of news media, but another, which was still in development when the leggotype was patented in 1865—still “less studied than [leggotype], but perfection awaits only a few experiments on the details.”<sup>16</sup> In 1869, having presumably reached what the two partners surmised to be the appropriate level of perfection, Leggo received a patent for his “granulated photograph.”<sup>17</sup> This was created through the use of a “granulated plate”—what we would now consider a halftone screen. The patent explains that the screen is produced

by spreading on a sheet of glass any opaque or dark substance, brown varnish for instance, and ruling it with a point or closely dotting it with a graver or other instrument, also by grinding irregularities into the surface of a sheet of glass, by friction or pressure with sharp sand, and then rubbing ink into the cavities so made.<sup>18</sup>

Concurrently with this, Leggo received a patent for his “Improved Photographic Camera” (**Fig. 2**), which helped correct distortions in architectural photographs by providing the lens with a greater range of motion.<sup>19</sup> The camera was understood to be important in creating photographs suitable for reproduction as leggotypes.<sup>20</sup> A scant two months after these patents were issued, Desbarats, as owner and publisher, launched the *Canadian Illustrated News* from its headquarters in Montreal.

The first issue appeared on 30 October 1869 as the country’s major illustrated weekly (soon to be joined, the following year, by *L’Opinion publique*). The prospectus for the *Canadian Illustrated News* promised



**Figure 2.** Diagram included with Leggo's patent application for his "improved photographic camera."

sixteen large folio pages, printed in the highest style of art, on heavy tinted paper specially manufactured for the purpose in Canada. At least seven pages will be handsomely illustrated by the beautiful and wondrous process of Leggotype, which being in result the transformation of a photograph into a relief engraving by purely chemical appliances, assures accuracy as well as beauty of effect.<sup>21</sup>

The cover image of that first issue was, of course, photographic: a leggotype reproduction of a granulated photograph. The image was a nearly full-page portrait of Prince Arthur (**Fig. 3**), made from a photograph by the famed Montreal studio photographer William Notman. With this cover, Leggo and Desbarats announced that theirs was a media venture committed to providing subscribers with a cutting-edge visual experience. Its use of photography set their journal utterly apart from any other in circulation. Before almost anything else, this was what readers were expected to understand.

Desbarats was confident that his new enterprise would succeed, relying as it did on an entirely new process for the reproduction of the scenes from Life, Nature, and Art, with which the pages of the News will be graced; and knowing that those entrusted with the working of this new process have thoroughly mastered it, in all its details, and are fully capable of performing all they promise...<sup>22</sup>

He had no doubt that the public would be appreciative, "and, already having seen and felt so much of the kindness and generosity with which the Canadian people patronize Canadian talent and enterprise, we cannot find room for the shadow of a fear or failure."<sup>23</sup> Only two years beyond Confederation, the *Canadian Illustrated News* would





**Figure 3.** *Canadian Illustrated News* 1.1 (30 October 1869): 1.

reflect the Dominion to its own citizens, acquainting them better with their country and promoting its riches—“in nature, enterprise and art” to its neighbours in the United States and all the cities of Europe.<sup>24</sup>

Perhaps Desbarats’ confidence was well placed; the journal was indeed a success. Along with *L’Opinion publique*, it ran for fourteen years and introduced multiple new processes of illustration that would later be taken up elsewhere. In addition to photographic line and halftone relief printing, the *Canadian Illustrated News* pioneered planographic printing in the press, to which leggotype was adaptable.<sup>25</sup> What is more, the journal forecasted a key role in the press for photographic imagery, whose aesthetics and narrative abilities, curtailed by technical realities, were so different from those of the often-romantic wood engravings to which its readership was accustomed— and would remain accustomed— for decades to come. Even in the years after the Canadian journal’s final issues, other major journals continued to demonstrate, as Thierry Gervais has written, “a resistance to and hesitation regarding the medium” that Leggo and Desbarats had so embraced.<sup>26</sup>

A thorough analysis of the halftone images that appeared in the *Canadian Illustrated News* and *L’Opinion publique* has yet to be published; a forthcoming study by Michelle Macleod, a PhD candidate in art history at Concordia University, promises to be the most comprehensive to date. At present, research using digital copies of the journals—all of which are accessible through the Bibliothèque et Archives nationales du Québec’s digital arm—suggests that they were largely portraits, reproduced from photographs made by Canadian studios. Notably, reproductions of popular photographs appeared as well, for example Notman’s 1870 painted composite *Carnival at the Skating Rink* (**Fig. 4**).<sup>27</sup> The number of halftones that ran in Desbarats’ journals is yet unknown.<sup>28</sup> According to Teresa McIntosh, they no longer appeared in the *Canadian Illustrated News* after 1873. McIntosh blames this on reasons of expense and issues with image quality, which could not withstand the speed at which issues were produced.<sup>29</sup> She also offers a critique of the image of Prince Arthur, having examined it in the original. While the image was, in her view, decidedly photographic in appearance (as can be seen even in digital reproduction), “it is evident that the process was not perfect and that tonal variation was coarse and details obscure.” One of the main problems was the rough, uncoated paper used for news print—fine for text, but not ideal for halftone prints.<sup>31</sup> Despite Desbarats’ “considerable expenditure on both the artistic and letterpress departments as well as on the material parts of the paper and typography,” he was unable to bring what he and Leggo had envisioned to fruition.<sup>32</sup>

If the journal did not fulfill the promise of its premier issue’s front page, it is nonetheless striking that halftone images were published regularly in the Canadian press in the early 1870s, and equally striking that this fact is so generally overlooked.

### An Obscure Legacy

Of all photomechanical processes, the halftone has received the most scholarly attention. Beaumont Newhall’s hugely influential *The History of Photography*, first published in 1937, exemplifies the tendency of modern surveys of the medium to consider earlier photomechanical processes as precursors to the halftone. The latter is presented as the





**Figure 4.** “Carnival at the Skating Rink,” *Canadian Illustrated News* 1.29 (21 May 1870): 460.

culmination of four decades of research into photomechanical techniques and the technique of greatest interest.<sup>33</sup> Like Newhall, historians of photography and the press have explored the halftone’s transformative effects on printed news in the decades around the turn of the last century: photography’s arrival as a fact of the illustrated press, the massive changes this wrought to the industry and adjacent industries (including, of course, photography), and the beginnings of modern graphic design. These accounts invariably name a host of men who helped to develop a process that cannot be credited to any one inventor, and a handful of illustrated publications that made early attempts to exploit it. Leggo, Desbarats, the *Canadian Illustrated News*, and *L’Opinion publique* are regularly left out of the story. Indeed, it is exceedingly rare to encounter these names outside of the few investigations of their work, specifically: Yves Chevrefils Desbiolles’ 1987 article “Reproduction photomécanique et photographie d’amateur au Canada,” which broke ground as the first sustained consideration of their work and its broader cultural implications;<sup>35</sup> McIntosh’s indispensable *History of Photography* article of almost ten years later, which drew heavily on Desbarats’ archive in what is now Library and Archives Canada;<sup>36</sup> and a 2017 MA thesis by Julien Boulianne, which relied almost exclusively on histories of the press and the graphic arts in Quebec for information on Leggo and Desbarats, indicating where such information is to be found. There is nothing on them in the major surveys of photo history, though all treat press photography at some length, nor in the leading histories of press photography.<sup>37</sup> The exception is Josef-Maria Eder’s *History of Photography*, first published in English translation in 1945, from the

fourth German edition of 1932, which makes note of the 1871 British patent for “Leggo’s granulated photograph.” However, Eder’s monumental tome is more a compendium of photographic inventions, which describes at least briefly seemingly every photographic printing process published from the eighteenth century on.<sup>39</sup>

Who typically receives credit for inventions that helped introduce photographic images to the illustrated press? Petit, Meisenbach, Ives, and Levy certainly—names mentioned above, and almost invariably in important accounts of the halftone.<sup>40</sup> And what pictures and stories are presented as initial forays in halftone publishing? “A Scene in Shantytown, New York,” published in the *Daily Graphic* in 1880; « L’Art de vivre cent ans. Trois entretiens avec Monsieur Chevreul », published in the French weekly *Le journal illustré* in 1886; « Les employés de chemins de fer—La garde barrière », published in another French weekly, *L’Illustration*, in 1891.<sup>41</sup>

Another name that appears particularly in classic texts is that of Stephen Horgan.<sup>42</sup> Robert Taft, in his *Photography and the American Scene of 1938*, describes what he understands as Horgan’s importance at some length. Horgan worked for the *Daily Graphic*, an early illustrated daily, beginning in 1874—first as a photographer, and then as manager of its photomechanical operations.<sup>43</sup> The paper had been launched the previous year by the New York City-based Graphic Company, a printing and publishing firm founded by none other than George Desbarats, “with the express purpose of exploiting photography to the limit of its capabilities.”<sup>44</sup>

Horgan himself mentions Leggo and Desbarats nowhere in his 1913 account of “processwork,” as he calls it, wherein he writes that he “began experimenting with half-tone in 1876” and “devised a practical half-tone process which was first shown in the *New York Daily Graphic*,” in the form of the famed Shantytown image.<sup>45</sup> He does not note the origins of the company he worked for, nor mention that the halftone screen he used to create his image was Leggo’s.<sup>46</sup>

McIntosh suggests that the lack of recognition that Leggo and Desbarats have received can be accounted for by the scant surviving documentation of their discoveries, their “secretive and mysterious working practices,” and actors such as Horgan who were eager to claim credit for themselves.<sup>47</sup> The long-established geographical frameworks of early photo history may be another factor. Bounded primarily by western Europe, Britain, and the United States, the field has often failed to incorporate findings from elsewhere into its dominant narratives.

In what would eventually become a field crowded with innovators, Leggo, Desbarats, and their accomplishments deserve more widespread recognition. The two men envisioned a starring role for photography in the news; they developed and pushed to their limits techniques that fit their aims, and launched the most technologically advanced news venture yet to appear anywhere. The work of these two Canadians to incorporate photographs into the pictorial press—a development that would come to define modern media—was and remains remarkable.

*Kate Addleman-Frankel is the Gary and Ellen Davis Curator of Photography at the Johnson Museum of Art, Cornell University. She holds a PhD in Art History from the University of Toronto, where her research focused on interactions between photography and printmaking in the nineteenth century.*

## Endnotes

- 1 All translations are by the author.
- 2 Gervais addresses the lag between the process's refinement and its widespread application in his "On Either Side of the 'Gatekeeper': Technical Experimentation with Photography at L'Illustration (1880–1900)," *Études photographiques* 23 (May 2009): 51–63.
- 3 The work of three of these scholars informs the present article: Julien Boulianne, "Canadian Illustrated News et L'Opinion publique, pionniers d'une nouvelle presse illustrée canadienne du XIXe siècle," MA thesis, Université du Québec à Montréal, 2017; Yves Chevretil Desbiolles, "Reproduction photomécanique et photographie d'amateur au Canada: quelques notes sur le rapport entre l'histoire d'une technique et le développement d'une pratique Culturelle," *Nouvelles de l'estampe* 91 (January 1987): 22–25; and especially Teresa McIntosh, "W.A. Leggo and G.E. Desbarats: Canadian Pioneers in Photomechanical Reproduction," *History of Photography* 20, no. 2 (1996): 146–149.
- 4 This overview is drawn primarily from Beegan, esp. 75–77; Thierry Gervais, "La similigravure: Le récit d'une invention (1878–1893)," *Nouvelles de l'estampe* 229 (2010): 6–25; and Art Kaplan and Dusan C. Stulik, *Halftone* (Los Angeles: The Getty Conservation Institute, 2013). In-depth explanations of the process can be found in the primary literature provided in Kaplan and Stulik's bibliography.
- 5 These biographical details are taken from McIntosh, 146.
- 6 Desbarat's father, George-Paschal Desbarats, was one of two men named Queen's Printer in 1841. See Canada Gazette Directorate, *160 Years of the Canada Gazette = 160 ans de la Gazette du Canada* (Government of Canada, 2001), 22.
- 7 On debates and transformations within the field of reproductive printmaking from the 1840s, see Trevor Fawcett, "Graphic Versus Photographic in the Nineteenth Century Reproduction," *Art History* 9, no. 2 (June 1986): 185–212.
- 8 McIntosh, "W.A. Leggo and G.E. Desbarats," 146.
- 9 Boulianne, "Canadian Illustrated News et L'Opinion publique," 39.
- 10 McIntosh, "W.A. Leggo and G.E. Desbarats," 149, f.n. 7
- 11 W.A. Leggo et Cie., *La leggo-typie: procédé photo-électrotypique breveté au Canada, aux Etats-Unis, en Angleterre, en France et en Belgique* (Ottawa: Imp. G.E. Desbarats, 1867), n.p. [https://archive.org/details/cihm\\_08655/page/n7/mode/2up](https://archive.org/details/cihm_08655/page/n7/mode/2up)
- 12 W.A. Leggo et Cie., *La leggo-typie*, n.p.
- 13 As Helena Wright notes, Pretsch's process was more successful at creating intaglio plates, which is what he used for *Photographic Art Treasures*. See Wright, "Photography in the Printing Press: The Photomechanical Revolution," in *Presenting Pictures*, ed. Bernard Finn (Washington, D.C.: National Museum of Science and Industry, 2004): 21–42.
- 14 W.A. Leggo et Cie., *La leggo-typie*, n.p.
- 15 The process used at this later point was commonly Charles Gillot's, who patented his method in 1877—a photographic version of his father's process from 1850. The younger Gillot's process was commonly called zincography or zinco, as it usually used zinc plates.
- 16 W.A. Leggo et Cie., *La leggo-typie*, n.p.
- 17 Canadian Intellectual Property Office, patent 67, "An Improvement in Photography," issued 18 September 1869.
- 18 Canadian Intellectual Property Office.
- 19 Canadian Intellectual Property Office, patent 61, "Leggo's Improved Photographic Camera," issued 15 September 1869.
- 20 McIntosh, "W.A. Leggo and G.E. Desbarats," 147.
- 21 "Prospectus," *Canadian Illustrated News* (20 October 1869): 16.



- 22 “The *Canadian Illustrated News*,” *Canadian Illustrated News* (20 October 1869): 7.
- 23 “The *Canadian Illustrated News*,” 7.
- 24 “Prospectus,” 16.
- 25 The London journal *The Lithographer* reported in November 1871 that the *Canadian Illustrated News* had become the first illustrated journal printed lithographically. McIntosh, 149, f.n. 25.
- 26 Gervais, “On Either Side of the ‘Gatekeeper,’” 51.
- 27 Celebrated on its exhibition in London, this impressive composite photograph was on display in Notman’s studio for sixty-five years. Christian Vachon, “Notman, Creator of the First Halftone,” in *Notman: A Visionary Photographer*, eds. Hélène Samson and Suzanne Sauvage, 152–157 (Paris and Montreal: Éditions Hazan & McCord Museum, 2016). [https://artsandculture.google.com/culturalinstitute/beta/exhibit/notman-creator-of-the-first-halftone/IQJiL\\_bHv9BWLQ](https://artsandculture.google.com/culturalinstitute/beta/exhibit/notman-creator-of-the-first-halftone/IQJiL_bHv9BWLQ)
- 28 Library and Archives Canada estimates the number that appeared in the *Canadian Illustrated News* at over 15,000, but this is surely incorrect. It may be that this is a typo and that the intended figure was 5,000, which would accord with the total number of leggotypes that Leggo and Desbarats planned to include in the journal, as per their Prospectus (see page 8), but not the number of halftones. See “*Canadian Illustrated News*, 1869–1883,” last updated 27 May 2020, <https://www.bac-lac.gc.ca/eng/discover/canadian-illustrated-news-1869-1883/Pages/canadian-illustrated-news.aspx>.
- 29 McIntosh, “W.A. Leggo and G.E. Desbarats,” 148.
- 30 McIntosh, “W.A. Leggo and G.E. Desbarats,” 147.
- 31 Estelle Jussim, *Visual Communication and the Graphic Arts: Photographic Technologies in the Nineteenth Century* (New York: Bowker, 1974), 69.
- 32 “Parting Words,” *Canadian Illustrated News* 28.26 (29 December 1883): 402.
- 33 See Beaumont Newhall, *The History of Photography from 1839 to the Present*, 5<sup>th</sup> ed. (New York: Museum of Modern Art, 1982), esp. 249–257. Newhall was instrumental in creating the fine-art photography canon.
- 34 Important examples from the past twenty years include Gerry Beegan, *The Mass Image: A Social History of Photomechanical Reproduction* (Basingstoke, UK and New York: Palgrave Macmillan, 2008); Geoffrey Belknap, *From a Photograph: Authenticity, Science and the Periodical Press, 1870–1890* (London: Bloomsbury, 2016); Gervais and Morel; Jason E. Hill and Vanessa Schwartz, eds., *Getting the Picture: The Visual Culture of the News* (London and New York: Bloomsbury Academic, 2015); Andrea Korda, *Printing and Painting the News in Victorian London: The Graphic and Social Realism, 1869–1891* (Farnham: Ashgate, 2015); Robert Lebeck and Bobo Von Dewitz, *Kiosk: A History of Photojournalism* (Gottingen: Steidl, 2001).
- 35 See fn. 3
- 36 Desbarats’ papers in LAC are divided by textual and graphic materials. See George Edward Desbarats fonds [textual record], MG29-A66, Vol. 1; George Edward Desbarats collection [graphic materials], 1993-163 DAP.
- 37 See fn. 31.
- 38 See Josef-Maria Eder, *History of Photography*, trans. Edward Epstean (New York: Dover Publications, 1978): 627.
- 39 Though not a history of photography, Jacob Kainen’s account of the history of the halftone is one important historical source that does recognize Leggo and Desbarats. See Kainen, “The Development of the Halftone Screen,” *Annual Report of the Smithsonian Institution 1951* (Washington, DC: Smithsonian, 1952): 409–25.
- 40 Ironically, Stanislas Krakow is not often cited, though it was through his process that the famous interview with Chevreul, listed below, was reproduced.
- 41 As noted by Gervais in his “On Either Side of the ‘Gatekeeper,’” 51.
- 42 See Eder, *History of Photography*, 29–630; Helmut and Alison Gernsheim, *The History of Photography from the Camera Obscura to Beginning of the Modern Era*, 2<sup>nd</sup> ed. (New York: McGraw Hill, 1969), 453; Newhall, *History of Photography*, 251; and Robert Taft, *Photography and the American Scene. A Social History, 1839–1889* (New York: Dover Publications, 1964), 437. A more recent survey history that mentions Horgan is Naomi Rosenblum’s *A World History of Photography*, 5th ed. (New York: Abbeville Press, 2019).

- 43 Taft, *Photography and the American Scene*, 437. *The Daily Graphic* should not be confused with the London newspaper *The Graphic*, which started publication in 1869 (the same year as the *Canadian Illustrated News*) as a competitor for the *Illustrated London News*. See Korda, *Printing and Painting the News in Victorian London*.
- 44 Taft, *Photography and the American Scene*, 437.
- 45 Stephen H. Horgan, *Horgan's Half-Tone and Photomechanical Processes* (Chicago: The Inland Printer Company, 1913), vii.
- 46 McIntosh, "W.A. Leggo and G.E. Desbarats," 148.
- 47 McIntosh, "W.A. Leggo and G.E. Desbarats," 148.