THE BNA PERFORATOR

Published by the British North America Philatelic Society – The BNA Perfin Study Group

Volume 43 Number 4 August 2022 Whole Number 162

Editor's Post:

¶ CAPEX 22 in Toronto has come and gone. I had the pleasure of attending and can report that were some very impressive one-frame exhibits. Pat Durbano's 5-hole OHMS was entered and showed very well. BNAPS held a Study Group information session where 9 SG's made short presentations on their individual fields of study. Pat presented on behalf of our SG and he was both entertaining and informative.

¶ One of the take-aways from the SG session is that more of them are no longer requiring their members to be BNAPS members and have lifted the embargo on their newsletters. The consensus in the room was that this is a more "welcoming" approach and adopting the practice has increased interest in BNAPS generally. It is a position I personally support and I did give some thought to this on my drive back to Nova Scotia. In addition to the SG membership, a complimentary copy of The Perforator goes to the Perfin Society of Great Britain, the Perfin Club in the USA, and the Perfin Club of New Zealand and Australia, the APS Research Library and the Timbre Perforeés in France. As well copies 6 BNAPS officers and just over 30 SG members on the distribution list who may or may not be BNAPS members receive email copies. It seems mean spirited to give it away to some dozens non-BNAPS SG members access and denying the casual BNAPS web-site visitor the opportunity to see what is current. This is especially true when the 6th Edition of the Handbook is readily accessible to any BNAPS website visitor.

¶ BNAPEX 22 in Calgary is right around the corner. It will be hosted at the Hyatt in Calgary opening on Friday September 2nd and closing September 4th. Our SG has a meeting room booked for 2:30pm, Saturday September 3rd. And there is the opportunity for those who attend to exchange views on the question of lifting the embargo..

Treasurer

Russell Sampson
48B Eastbrook Heights
Mansfield Center CT
USA 06250-1654

Editor

Jim Graham
2 Grandview Drive
Dartmouth Nova Scotia
Canada B2W 1X5

EDITORIAL

CAPEX is providing information on the overall success of the exhibition but our newsletter should capture, for posterity, the unqualified success achieved by Jon Johnson and Gary Tomasson, the Editors of Canadian Stamps with Perforated Initials Handbook (6th Edition). The Handbook was entered in the Literature Exhibits category and was awarded a Large Vermeil, the judges scoring it an impressive 87 points. Furthermore it ranked 19th among the 103 worldwide entries in this category and 7th in the list of the 47 Canadian entries—an impressive showing.

The success of the Handbook is richly deserved and all SG members know that the credit for this success rests squarely with the Jon and Gary. Under their stewardship it has grown from its very humble beginnings in the 1970's to its current format which includes all known

- Patterns
- Issues
- Positions
- Earliest and Latest known dates of use, and
- Appendices for die proofs and die differences, pre-cancels, revenues; etc.

It is on-line, updated annually and accessible to everyone and richly deserves the CAPEX22 judges Large Vermeil award.

It would be remiss not to pay tribute to Jon and Gary's unselfishness with the time they continue to invest in the Handbook, not for themselves but for the hobby's sake. And, with BNAPS agreement, they have made the Handbook free for anyone to use. This gift is rooted in their firm belief that the way to grow interest in our specialty, Canadian perfins, is to make all possible information readily accessible to everyone.

As SG members we too may take a small portion of the credit as collectively we have provided and to continue to provide the Editors with information to add. This is an important role to play in making the Handbook as excellent as it is. In saying this however we must continue to be inquisitive, discerning and diligent in reporting new finds, doing our very best to provide Jon and Gary with information that they can rely on.

I remember the expression "GIGO" from the time computers were first introduced into my work environment—GIGO stood for "garbage in; garbage out". I have a personal example of how this applies to contributors to the Handbook. I was so excited to think that I had found a 5c Medallion with an S22 Sun Life perfin and the 'blue nose' re-entry. It wasn't. I was very disappointed, doubly so because in my own mind I was convinced that I was right, but in the end grateful that I had asked for a second opinion from someone who would know. This kept the error out of the Handbook.

The very least we can do as members is commit to supporting the Editors with the best possible information for inclusion in the Handbook so that it maintains its world class status.

Jim Graham

The N31 Perfin – New York Central Systems.

Recent Discoveries and Analysis.

Russell D. Sampson

With valuable assistance from James Graham, Jon Johnson, Bob Szymanski and Gary Tomasson

INTRODUCTION

Ours is a hobby of mere fractions of a millimeter, fractions that can mean the difference between the mundane and the marvelous. Here is a story of such fractions and what they may mean. It is also a bit of a "how to" on one person's methods on examining perfins, deeply and analytically.

There are three New York Central railway (NYC) perfins known to exist on Canadian stamps; the N30, N31 and N32 (Johnson and Tomasson ed. 2021). It is likely – but not proven – that these originated from the New York headquarters of the railway. In the Catalog of United States Perfins (Endicott ed., 2018) there are four identified New York Central perfins, N182, N182A, N183 and N184. An unidentified US perfin (N185) has the same initials but the letters are arranged in a downward diagonal rather than in a horizontal line like those Canadian and US perfins already positively associated with the railway. The Canadian perfin patterns that most closely resemble the US patterns are the Canadian E-rated N30 (US N182, F- rated), the B-rated N31 (US N182A, E-rated), and the B-rated N32 (US N184, E-rated).

This article will present an analysis of 14 NYC perfins on Canadian stamps obtained by the author from a bulk-lot of perfins purchased from the April 2022 Ocean Park auction (see Figures 1 and 2). From an examination of the online description and images of the auction lot, it was assumed that the 14 NYC perfins were the more common N30 variety. However, after detailed examinations by the author and three other members of the BNA Perfin Study Group the consensus was that the perfins appear to be the much scarcer N31. This article will attempt to do the following: 1) outline the evidence in favor of an N31 identification, 2) describe further diagnostic tools to aid collectors in differentiating the N31 from the N30, 3) provide evidence to support the hypothesis that the N31 and N30 are produced by different perforating machines, 4) present a cursory die plating of the N31 and 5) present a step-by-step methodology for two techniques in plating perfins. It is hoped that this article will also provide some answers to the question posed by Szymanski (2016) regarding the origins of the N30 and N31.

THE SPECIMENS

The collection of suspected N31 perfins are comprised of 14 stamps with 11 complete NYC perfin impressions and five partial impressions (see Figures 1 and 2). All perfins are position 1 and no perforations appear to be blind or missing. All specimens are on Scott 104 (Dark green 1-cent Admiral, first issued December 22, 1911) and the specimens are comprised of two single stamps, three pairs and two strips-of-three. All the legible cancellations appear to be from Ottawa and are postmarked between May 27, 1915, and November 15, 1915 (see Table 1 and Figure 3).

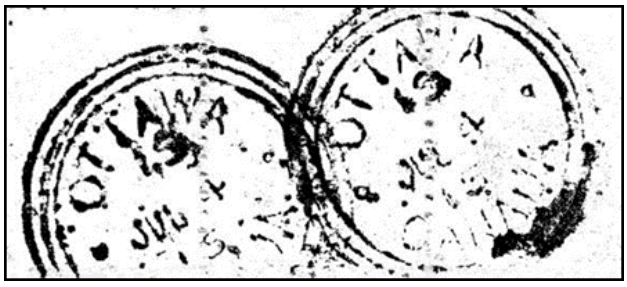

Figure 3: This cancel was extracted from stamps number 4, 5 and 6 using the online Battleship Revenue cancel extractor (Battleship Revenue Stamps, 2022). Due to the darkness of the green ink of the Scott 104 being close in colour value to the black cancellation ink, the Battleship Revenue cancel extractor had difficulty discerning the other cancels and their identification required the use of the more traditional eye-brain extractor.

Figure 1 and 2: The suspected N31 specimens plus a reference sample of a N30. Red lowercase letters are used to identify the 16 perfin strikes in the collection while white numerals are used to identify the 14 stamps. The red arrows point to locations where cancellation ink has apparently bled through the perfin perforations and stained the back of the stamp.

Stamp No.	Type of Cancellation	Legible Indicia
1, 2, 3	Machine wavy line	(OTTA)WA (CANAD)A -9 / ---M / ---5
4, 5, 6	3-ring Orb	• OTTAWA • / CANADA / 19 / JUL 4 / 15
7, 8	3-ring Orb	• OTTAWA • / CANADA / 21 / JUN 8 / 15
9, 10	Machine wavy line	(OT)TAWA / (CA)NADA / (N)OV 15 / 8 PM / 19(1)5
11, 12	3-ring Orb	• OTTAWA • / CANADA / 21 / MY 27 / 15
13	Machine wavy line	(OTTA)WA (CANA)DA -8 / ---M / ----
14	Machine wavy line	--

Table 1: Legible cancels from the 14 stamps

The most heavily cancelled specimens show clear signs of cancellation ink on the inside edges of the perfin perforations. In two specimens the cancellation ink is applied in such a manner that a tiny amount has bled through to the back of the stamp around the perfin perforation (see perfins "e" and "I" in Figure 1). This strongly suggests that the perfins in this study are not fakes.

IDENTIFICATION – N30 VERSUS N31

The difference between the more common N30 and the rare N31 is relatively subtle (Szymanski, 2017). The most diagnostic difference, as outlined in Appendix B of the 6th edition of the Canadian perfin handbook and the Catalog of United States Perfins, is the diagonal of the "N" and how it is positioned with respect to the two uprights of the "N".

However, the author and some of the contributors, observed that a few of the suspected N31 samples in this study appeared somewhat dissimilar to the illustration of the N31 in the Canadian and United States references (see for example perfin "j" in Figure 1). This caused some concern with respect to their unequivocal identification with the N31 pattern. Differences in the appearance of the perfins in this study even appeared side-by-side on the same strips-of-three or pair of stamps (see for example perfins "b" and "c" in Figures 1). This obviously implies that there are apparent variations in the dies on the same machine. In other words, the suspected N31 specimens appeared to show a fair degree of die variability. This is most obvious in the shape and spacing of the diagonal part of the "N". This also suggests that these differences could cause some confusion when collectors attempt to tell the difference between the N30 andthe N31.

Since the N30 and N31 appear so similar, it is not out of the question that the N31 may simply be a die variety of the N30 (Szymanski, 2017) and therefore the N30 and N31 could originate from the same machine. For example, if the N30 perforating machine was a 1 x 10-die machine and one of those 10 dies was in fact the N31. This could then help explain the difference in rarity factors between the N30 and N31. To understand this more fully, one can look at the following analysis.

A rarity factor of E (i.e., the N30) means, according to the 6th Edition of the Perfin Handbook, there are between 101 to 300 reported specimens. This gives an average of about 200 reported specimens. On the other hand, the N31 is reported as a B rated perfin, which has between 4 and 10 reported specimens. If one takes the average of the range for the B rate to be seven and then adds the suspected N31's from this study (i.e., 14) the result is approximately 21 reported N31's.

Now, if the N31 is produced by a single die variety of a 1 x 10-die N30 machine, then one would expect that for every nine specimens of the N30 there should be one N31. One ninth (1/9) of 200 is 22.2, which is only about one away from 21 – the estimated reported number of N31's as calculated above.

Thus, this rough estimation supports the hypothesis that the N31 could be a die variety of the N30 and not produced by a separate machine. Therefore, more evidence is needed to help settle the debate.

Since the diagonal of the "N" appears to be a somewhat ambiguous diagnostic tool, two additional diagnostic criteria were found that appear to clearly distinguish the specimens in this study from all N30's in the author's collection and Jim Graham's collection (see Figure 4 and 5). These new diagnostic criteria are also consistent with the images in the Canadian handbook and the equivalent perfins in the US catalog (i.e., the N182 and N182A).

Using these new diagnostic criteria, plus the accepted criteria involving the diagonal of the "N" it was apparent that all 14 specimens in this study are closest in appearance to the N31 die pattern, while none of them appear to resemble the N30 (see Figure 1 and 2).

If the N31 is a rare die variety of the N30, then the odds of 14 of them turning up without any N30's in a bulk auction lot appears to be very low. A "thought experiment" can help illustrate why this is so.

Say there is a pile of 10 perfins; nine with the N30 pattern and one with the N31 – as expected if the N31 was a die variety of the N30 machine. Now one perfin is picked at random from the pill, its identity recorded, returned to the pile and then the pile is shuffled. If one then repeated this operation 14-times (i.e., the number of suspected N31 perfins in this study), the odds of picking the exact same perfin (i.e., the lone N31) each time is about one chance in a hundred trillion (i.e., $1{:}10^{14}$). This statistical "*thought experiment*" is the same as calculating the odds of rolling a ten-sided die 14 times and getting the same number 14 times in a row.

However, as mentioned in a previous article (Sampson, April 2022) one cannot eliminate the possibility of "*collection bias*" (better known in statistics as "*selection bias*") where a

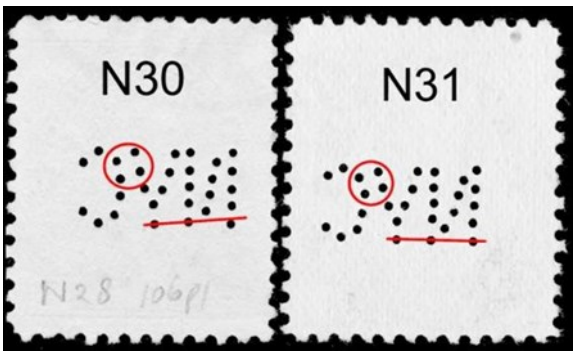

Figure 4 and 5: These two figures illustrate the two additional diagnostics to distinguish the N30 from the N31. The additional diagnostics are as follows. 1) The alignment of the bottom perforation of the "Y" and the bottom perforations of the "N". In the N30 if one joins the bottom perforation of the "Y" with the adjacent bottom perforation of the "N" this line produces an upward slope that passes above the center of the next bottom perforation of the "N". In the N31, this line is more horizontal, nearly bisecting all three perforations. All specimens in the suspected N31 sample in this study show a horizontal alignment.

2) The four perforations that form a box using the top two perforation of the "Y" and the adjacent two perforations of the "C". In the N30 this is more "diamond" shaped while in the N31 it is closer to square (see Figure 3). This is essentially an augmentation of the diagnostic criteria regarding the "C" as outlined in the US Perfin Catalogue (2018 Edition).

perfin collector might keep the rarer perfins and discard, sell or trade the more common. Yet, there appears to be no evidence for this collection bias, since the identity of these specimens as N31 was not given in the online auction lot description and one would expect that if 14 rare perfins turned up in a collection they would have been identified as such, removed from the bulk lot and auctioned on their own. This suggests that they may never have been properly identified and thus were initially assumed to be the more common N30.

To add further evidence to the hypothesis that the N31 is not from the N30 machine but was produced by its own machine, one must consider that all the multiples in the study,

(i.e., the strips of three and pairs) showed diagnostic characteristics that firmly place them closer to a N31 in design, and not the N30. If the N31 was a rare die variety of the N30 one would expect there to be at least one perfin in the multiples, especially the strips-of- three, that would be a N30 – and there are none. This strongly suggests that the N30 and N31 were produced by different machines.

Therefore, this evidence appears to confirm that these 14 specimens are all N31's and that they were produced from a different perforating machine than the N30. Additional evidence for this conclusion is provided in the following section.

HISTORICAL EVIDENCE

One of the distinguishing characteristics of this sample of suspected N31 perfins are their postmarks. Not only are they all from the same city – Ottawa – but they are all confined to a relatively short period of time (May 27 to November 15, 1915). What could this mean?

First, the date range nicely matches the range of the N31 as reported in the handbook of Canadian perfins. This provides further evidence that the sample of suspected N31 specimens in this study are legitimate.

In addition, the handbook indicates that the few reported specimens of the N31 have cancellations from "Beauharnais, QC, Cornwall, and Ottawa". The fact that the reported cancellations on the N31 in the handbook includes Ottawa clearly supports the hypothesis that the specimens in this study are also N31 perfins. Out of 55 specimens of the more common N30 in the author's and Jim Graham's collection, none had cancellations from Ottawa.

In addition, if all the samples in this study are the rare N31, the relatively large number contained in the Ocean Park auction (i.e., 14) suggests that the perfins originated from mail sent to a singular mailing address. It is somewhat unrealistic to assume that such rare perfins were accumulated by a collector one-at-a-time, from various sources and therefore likely from various original mailing addresses. In other words, these NYC perfins were most likely attached to mail addressed to a common destination and that an employee at that destination extracted them from the incoming mail stream. Therefore, it appears that this accumulation was kept intact for over 100-years. One could easily imagine numerous examples of such a common mailing destination. For instance, it could have been frequent recipients of NYC mail such as their accountants, law offices, suppliers, contractors, or corporate customers. In support of this conjecture is the fact that contained in the same bulk auction lot, were 25 specimens of the G14 perfin (GTR, Grand Trunk Railway System) all on the Scott MR1. Those G14's with legible cancellations all showed the same Ottawa 3-ring orb cancel as many of the N31's. Also, the range of dates for the postmarks on the G14's was between April 19 and June 12, 1915 and is therefore within the same date range of the suspected N31's in this study. Therefore, it appears reasonable that the mailing address was an agency or individual who conducted business with the railways in Ottawa.

The short flurry of N31 usage found in this study and in the date-range contained in the handbook suggests that something special may have been happening in Ottawa around 1915 with respect to the New York Central railway.

The historical record of the early railway service between Ottawa and the United States supplies some tantalizing clues. . After a series of machinations and take-overs the Northern Adirondack Railroad (established in 1883) became the Ottawa & New York Railway and was finally purchased by the New York Central Railway in 1913 (Wikipedia, 2022). The time of the final acquisition by the NYC nicely coincides with the earliest reported usage of the N31 (1913/01/31).

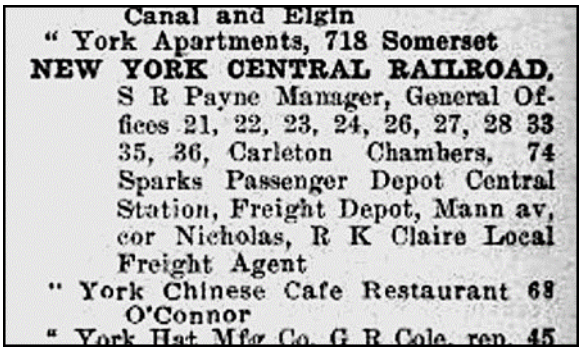
Canal and Elgin
" York Apartments, 718 Somerset
NEW YORK CENTRAL RAILROAD,
S R Payne Manager, General Offices 21, 22, 23, 24, 26, 27, 28 33 35, 36, Carleton Chambers, 74 Sparks Passenger Depot Central Station, Freight Depot, Mann av, cor Nicholas, R K Claire Local Freight Agent
" York Chinese Cafe Restaurant 68 O'Connor
" York Hat Mfg Co, G R Cole, rep, 45

Figure 6: A screenshot from the online Might's Ottawa City Directory for 1916 showing the first appearance of the New York Central Railway's office in the city. This clearly implies that the NYC office was being established in 1915 during the period of use of the N31 samples in this study.

To further explore the historical evidence, the city directories for Ottawa were accessed from the online Toronto Public Library's holdings. Examining the online copies of the 1913 to 1916 Might's City Directory for Ottawa revealed that the New York Central railway did not have an office in Ottawa until 1915, since their entry in the directory did not appear until 1916 (see Figure 6). This strongly suggests that the "flurry" of mail that produced this accumulation of suspected N31 perfins came about because of the intense corporate activity necessary for the construction and establishment of the Ottawa office of the New York Central railway.

The final historical evidence comes from the date range of the N30 and the N31. The date ranges in both the Canadian perfin handbook and the US perfin catalogue suggests that the New York Central may have retired the N31 around 1915 and replaced it with the N30 machine around that same time. According to the 6th Edition of the Canadian Perfin Handbook the earliest reported usage of the N31 was 1913/01/31 and for the N30 it was 1915/-/-.

The latest reported usage of the N31 is 1915/07/10 from the Handbook and 1915/11/15 from this study and therefore, the overlap of the two date ranges of the N30 and N31 appears to be very short, if at all. This suggests that the two perfins were used in separate periods of time and further supports the hypothesis that the two perfins were produced by two different machines. However, the reported stamp issues in the handbook, plus samples from the author's collection, have similar stamp issues for both the N30 and N31. For example, the N30 and the N31 both appear on the Scott 104, and thus, there may still be some room for debate.

To acquire additional historical evidence, Ocean Park Auctions was contacted to see if there was any information from the previous owner of the lot that could help in this investigation. The owner was contacted and even though the owner was very excited to cooperate, unfortunately the owner could not find any additional information.

Nonetheless, the weight of the historical evidence clearly suggests that the specimens in this study are all N31 and that they came about because of the intense corporate activity necessary for the construction and establishment of the Ottawa office of the New York Central railway.

PLATING THE N31

Due to the relatively small sample of perfins, only a cursory plating of the N31 die could be expected. Yet, the five multiples in this collection (two strips-of- three and three pairs) provides an encouraging first attempt and a promising foundation for future work.

The US catalog and the Canadian perfin handbook gives no information on which model of perforating machine was used to make the New York Central perfins.

However, a reasonable starting point in plating the N31 would be the assumption that the machine was a Cummins Model 52 (i.e., a 1 x 5-die array). To help justify this assumption four conditions must first be met; 1) the Model 52 machine must be in use during the period of the N31, 2) the multiple perfins on the pairs and strips-of- three must show excellent parallelism (i.e., have each perfin design in the pairs of stamps and strips-of-three in near perfect alignment with each other), 3) those same perfins must be consistently spaced and have their average spacing close to the spacing of the standard sheet of stamps of the era (i.e., the Admiral issues in Canada and Washington issues in the US) and finally, 4) the number of dies in the assumed machine should be consistent with the number of observed die variations found in the perfin patterns in the samples (i.e., for a Model 52 perforator there should no more than five variations). The evidence for each of these criteria shall follow. However, before continuing, a little history of the Cummins postage perforators may be useful.

According to the May 25, 1909, Cummins "Catalogue of Price List and Perforators" (Anonymous, 1993 and Cutler, 1996, Anonymous, 2012), the United States Post Office officially sanctioned the use of postage perforators on May 4, 1908. In response to this ruling, Cummins produced several models of postage perforating machine with four different die arrays: a single die (Model 50), a 1 x 2 array (Model 51), a 1 x 5 array (Model 52) and a 1 x 10 array (Models 53 and the electrically operated Model 55). All these basic die arrays were offered in their 1909 product catalogue and therefore it is expected that each model was available at the time of the NYC perfins. It should be notes that the array dimensions in this article are expressed using the same nomenclature as that describing a matrix: "rows x columns".

There is little easily accessible data in the US catalog regarding the perfin patterns and their corresponding perforating machines. However, in the Canadian handbook there are nine confirmed Canadian patterns from the 1 x 5-die Cummins Model 52 and 10 confirmed on the 1 x 10-die Model 53. The earliest reported Canadian usage of the Model 52 is October 15, 1910 (an unpublished ERU from the author's collection of the M23 perfin, Montreal Rolling Mills Company). On the other hand, the earliest reported Canadian usage of the 1 x 10-die Cummins Model 53 is September 20, 1921 (W5, Workman's Compensation Board of British Columbia, 6th Edition of the Canadian Perfin Handbook). Therefore, since the ERU of the N31 is 1913, it appears reasonable that the 1 x 5-die Model 52 is the more likely candidate.

The second criterium of parallelism was explored by fitting computer generated parallel lines to the bottom and tops of the multiple-die samples (i.e., the pairs and strips-of-three). Parallel lines were produced in PowerPoint by first drawing a line connecting the bottom perforations and then copying, pasting and moving that line onto the top of the row of perfins. One can easily see in Figure 7 that each one of the samples shows a high degree of parallelism. Since the two strips-of-three show no discontinuity in their alignment, this clearly suggest the N31 was produced by a horizontally arrayed multi-die machine with greater than a 1 x 2-die array, such as the Model 52.

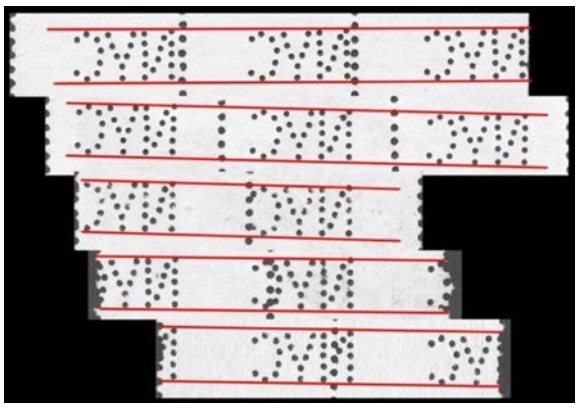

Figure 7: This figure demonstrates the level of parallelism in the perfin strikes found on the pairs and strips-of-three. The computer-generated red lines are parallel for each sample. It is apparent from their alignment with the perfin patterns that each pattern shows a high degree of parallelism and thus supports the hypothesis that the N31 was produced by a multi-die machine like the Cummins Model 52.

It should be noted that since no perfin strikes were found with a vertical arrangement (i.e., perfins above or below each other), one cannot eliminate the possibility of a multi-row machine such as a 2 x 5 die array. Nonetheless, such machines are the exception and not the rule in Canadian and American perfins and so – without additional evidence – such a possibility should most reasonably be relegated to a secondary hypothesis.

To estimate the horizontal spacing of the dies, measurements were made from 800 ppi scans of the samples. Pixel coordinates were measured from the bottom perforation of the "C", the "Y" and the bottom outside perforation of the "N" to the corresponding perfin on the next strike on each pair and strip-of-three specimen (see Figure 8). This produced 21 measurements which were then corrected using Pythagoras Theorem for the tilt of the perfin array with respect to the scanner array and then further corrected for the calibrated systematic error in the scanner (+0.33% in the x-direction). After correcting for these sources of error, the aver-age separation between dies was found to be ±0.07-mm. The "plus or minus" 0.07- mm is the standard deviation of the measurements and indicates the statistical "spread" of the individual measurements and thus provides a degree of confidence and consistency in the calculated average of the measurements. The smaller the standard deviation relative to the average, the higher the confidence and the greater the consistency. The small value of the standard deviation of the N31 measurements implies that the spacing of the perfin dies in the sample was very consistent since 0.07-mm is only 0.33% of the average spacing of 21.1-mm. The consistency of the perfin spacing suggests that the perfins in the strips of three were not produced by a 1-die or a 1 x 2 die machine

Of course, the manufacturer of the perforating machines must match the distance between the perfin dies with the horizontal spacing of the standard stamp issues of that era. In the case of the N31 the most obvious standard stamp issue would have been the Canadian Admirals and US Washington issues (e.g., 2-cent rose US Scott 499). Using a set of multiples as a standard, the spacing of these stamps was measured employing the techniques and corrections as described above. The average horizontal spacing of the 2-cent Washington was found to be 21.6 ±0.08-mm while the Admiral stamps were found to be ±0.07-mm. For the Washington stamps, this is a 2.3% (+0.5-mm) deviation from the measured die perfin die spacing and only 0.5% different (+0.1-mm) for the Admirals. The agreement between the spacing of the perfin dies and the spacing of the Admiral and Washington stamps clearly adds weight to the hypothesis that the perfins in this sample were produced by a horizontally arrayed multi-die machine like the Model 52.

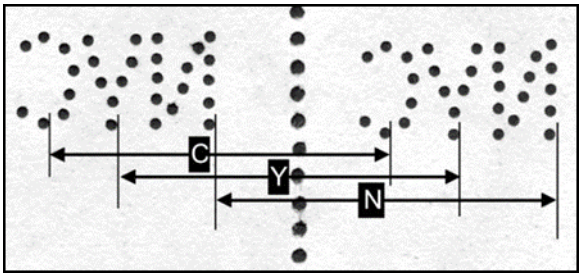

Figure 8: This illustration shows where each measurement was taken to determine the spacing of the dies. Pixel coordinates were extracted using the Preview application for iMac.

It is interesting to note that the agreement between apparent die spacing of the perforating machine and the spacing of the stamps is better for the Canadian than the US stamps – even though it is assumed that the machine was manufactured for the US market. This opens the possibility that the N31 machine may have been manufactured with Canadian usage in mind. Whether the machine was housed in Canada, most likely at the Ottawa office of the NYC, may be stretching the current evidence a little too far, but is still worthy of consideration for future investigations into the NYC perfins.

Exploring this further, if the assumed perforating machine had a 1 x 10-die array, then a deviation of 2.3% in *each* die spacing from the US stamps – if consistent across the sheet of stamps – would accumulate to a total displacement of 21% at the end of the sheet of 10 stamps (i.e., 9 times 2.3%, since there are nine spaces *between* dies in a 10-die machine).

If the first perfin die was perfectly centered upon the first stamp of a row of 10 Washington stamps, then the 10th stamp would have its perfin pattern displaced 4.5-mm from the center of the stamp (i.e., 0.21 x 21.6 mm). The N31 pattern is slightly less than half an inch wide (as per US Post Office regulation) or 12.1- mm. Displacing this perfin pattern by 4.5- mm off of center for such a Washington stamp, would put the edge of the perfin pattern 10.6-mm from the center of the stamp, which is only 2-mm from the edge of the *next* stamp – thus producing a perfin strike dangerously close to the stamp's perforations. Therefore, the normal operation of a presumptive 1 x 10-die N31 machine could place some of the perfin impressions uncomfortably close to the edge of the stamps – something the manufacture and the customer may find unacceptable.

However, if the machine was a 1 x 5-die array, this accumulated displacement would add up to about 9% (again, there are four spaces between dies in a 1 x 5-die machine) making the accumulated displacement closer to 2-mm and keeping the perfin pattern more within the boundaries of a row of five Washington stamps. This is all well and good but, what do the actual samples in this study tell us? If one examines the samples in Figure 1 and 2, it is obvious that eight of the sixteen patterns are straddling the stamp's perforations. This might be evidence supporting the 1 x 10-die hypothesis. However, since these are Admiral stamps, and the spacing of these stamps is much closer to the measured perfin die spacing, the irregularity in the perfin spacing of the samples in this study appears to be more in keeping with operator error rather than manufacturer's error. Therefore, the initial assumption of a 1 x 5-die array remains as a good first-guess.

The next step in plating this assumed 1 x 5-die pattern, was to try and find the first or last die in the array. For a Cummins Model 52 this would be either die-I or die-V. Die numbers in this study were given Roman Numerals in order to prevent confusion with the stamp numbers. Perfin "i" in stamp "9" appears to have the best

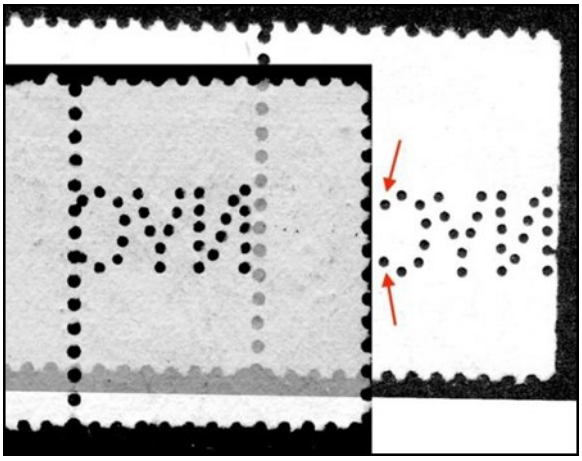

Figure 9: This composite image was produced in PowerPoint and shows where the hypothetical perfin would have appeared to the right of perfin "I" on stamp 9. This illustration clearly shows that the leftmost two perforations of the mirror-reversed "C" would have been placed close to the stamp perforations and would have likely caused an irregularity in the tear-line of the stamp (for an example of such an irregularity, see perfin "m" in Figure 1). Since there is no apparent evidence of tear-line irregularity at this location, it is assumed there was no perfin die at this location and therefore perfin "I" is likely Die-I.

chances of being Die-I (see Figure 1). Using another pair of perfins and then offsetting this specimen, one can see that the next hypothetical die pattern would have placed the ends of the "C" of "NYC" very close to the stamp perforations (see Figure 9). As outlined in a previous article (Sampson, February 2022), perfin perforations close to the stamp perforations tend to cause a deviation in the tear-line of the stamp. For an example of this see perfin "m" in Figure 1. Since there is no such evidence for such a deviation in the tear-line of the "9" stamp this suggests that perfin "I" is likely Die-I.

After meeting the spacing criteria, the samples were examined in order to find any consistent die varieties that that could help to distinguish the individual perfin dies. Here the diagonal of the "N" in "NYC" appears to provide the greatest amount of variability (see Figure 10). After noting these die variations, the plating could proceed by sequentially matching die varieties starting with the established Die-I.

This sequencing is illustrated in Figure 11. A strip of five was then assembled by cutting and pasting the best representatives of each die (see Figure 12).

It should be noted that in Figure 10 there are four apparent die variations with Dies III and V appearing very similar. The position of Die-III and Die-V in the strips-of-three clearly indicate that even though they are similar in appearance they are different in their positions. Since four die variations were found among 12 complete perfin strikes this supports the hypothesis that the N31 was produced by a 1 x 5-die machine, and therefore most likely the Cummins Model 52. However, this evidence does not eliminate the possibility of the 1 x 10-die machines. Therefore, until more concrete evidence is found (e.g., finding the machine or a very large multiple of perfinned stamps) there is considerable room for additional investigations.

To illustrate the relative cursory nature of this plating, one should consider stamp number "3" and perfin "c" in Figure 1. Stamp "3" clearly shows a straight edge. Under high magnification this stamp exhibits the relatively rough edge indicative of a "straight edge" Admiral (Van Someren, 2022). Straight edged Admirals first appeared in January of 1914, which is consistent with the time period of the N31 samples in this study and those reported in the handbook. One would expect that if the N31 machine was a 1 x 5-die Cummins 52, and the postage was fed through the machine as half-sheets (i.e., 10 x 5 multiples), then stamp "3" and perfin "c" should be die-I and not die-III, as determined from the above analysis. However, attempts to plate the N31 samples using perfin "c" as die-I produced a plating that was far less successful. This suggests two possibilities. The first possibility is that the 1 x 5-die assumption is incorrect and the N31 was produced from a 1 x 10-die machine. This would imply that the die varieties found in the sample were insufficient to properly plate the perfin die array. The second possibility is that stamps "1, 2 and 3" in this sample were fed though the 1 x 5-die machine as part of an unconventional array of stamps (e.g., as a 10 x 3 partial sheet).

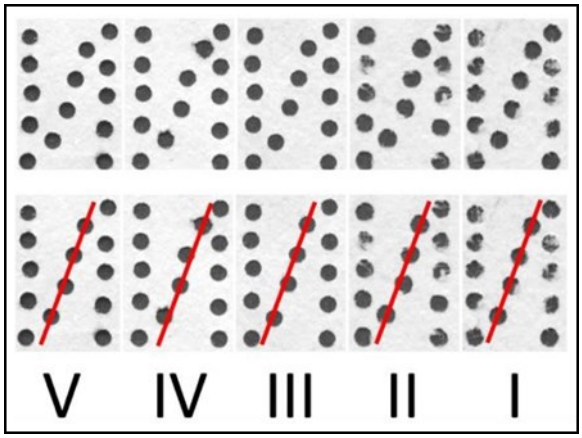

Figure 10: This figure shows the apparent die variations in the N31 samples. The red diagonal line provides a visual reference to reveal the variations in the alignment and the spacing of the diagonal part of the perfin. Die I is the most uniform of the five, showing little or no variation in either the spacing or alignment of the four perforations that make up the diagonal. Die IV appears to exhibit the greatest variation with the alignment of the upper two perforations parallel but offset from the lower two. This produces a zigzag-like kink in the alignment of the four perforations. Die-II appears to have the next most obvious variation, where the bottom perforation in the diagonal is obviously offset from the line produced by the top three perforations. Finally, both Die-III and Die-V appear almost the same with both showing a slight alignment offset of the second perforation from the bottom, plus a relatively larger spacing between the bottom perforation and the one above it. The placement of Die-III and Die-V with respect to each other on the strips-of-three samples clearly indicates that even though they are similar in appearance, they are different dies.

At this point it is also interesting to note that the reported positions of the N31 also provide evidence in support of the 1 x 10- diehypothesis. Mailroom operators of the 1 x 5-die Cummins Model 52 have often folded the sheets of stamps before feeding them through the machine. Evidence for this come from the frequency of "even" positions (i.e., positions 2, 4, 6 and 8) and mirror pairs in such patterns as the C15 (Canadian General Electric).

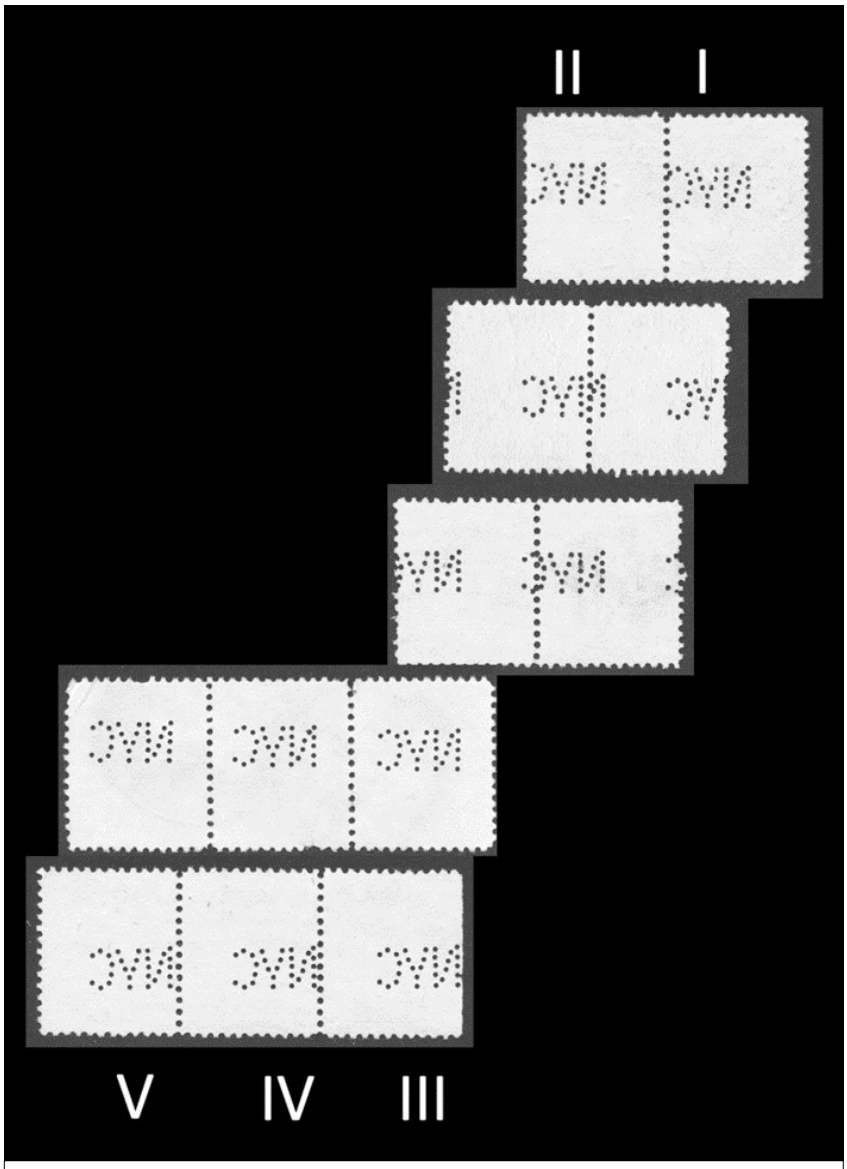

Figure 11: Once die variations were established the multiples were then used to establish a cursory die plating of the N31. Individual dies are read vertically.

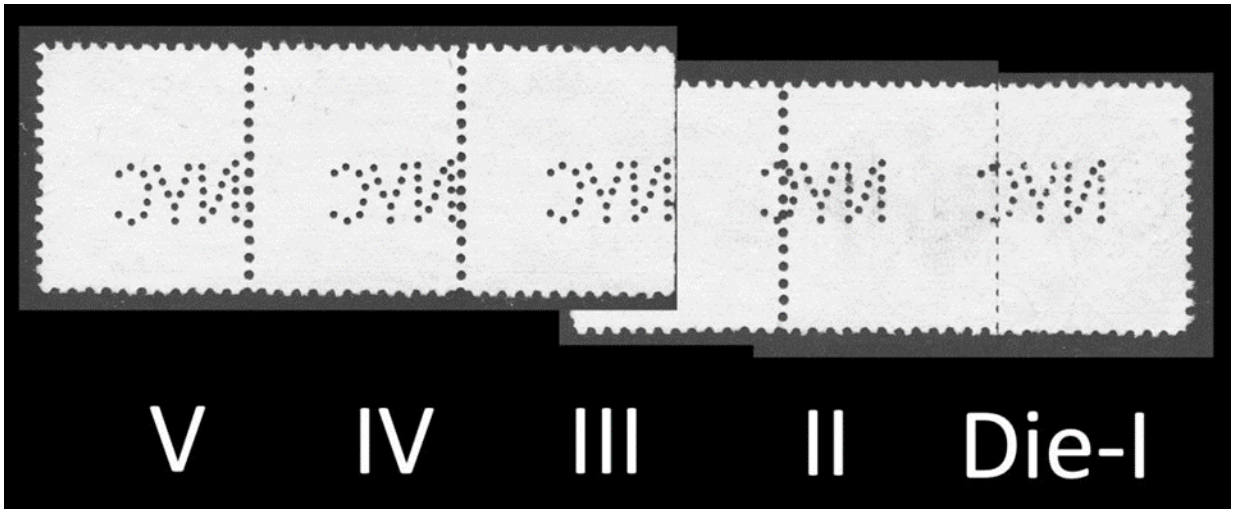

Figure 12: After selecting the clearest examples, the images from Figure 11 were cut and pasted into an assembled cursory die plating of the N31

However, there is no evidence of the sheets of stamps being folded and thus fed "face-down" though the N31 perforator since all positions of the samples in this study are position 1, and there is only one other position mentioned in the 6th Edition of the handbook – a position 3 on a Scott 104 (i.e., face-up but upside-down). The absence of even numbered positions in the reported samples suggests that Canadian postage fed through the N31 machine were not folded, as one often sees from perfins produced by 1 x 5-die machines.

To solve this enigma, more data is needed. It appears the best source of data would be from the equivalent US perfins – the N182A. If both US and Canadian postage were perforated with the same machine, then the larger reported stock of the N182A (i.e., the N182A is an E-rated perfin) may be the key to successfully plating this perfin.

PLATING THE N31 USING A MODIFIED TOMASSON & JOHNSON METHOD

In an attempt to further validate the above plating, the method pioneered by Gary Tomasson and Jon Johnson (Tomasson and Johnson, 1981) was modified and employed on the N31 samples in this study. A summary of the method is contained in the appendix to this article.

The results of this method suggests that the complete or near-complete N31 perfin patterns has three clearly differentiated die varieties found in the two strips-of-three (i.e., perfins "a, b, c" and perfins "d, e, f"). As described in the previous section, these perfin die varieties correspond to Die-III (perfins, c and f), Die-IV (perfins b and e) and Die-V (perfins "a" and "d"). The remaining perfins (i.e., perfins "g, l, j, l, o") appear to reveal no obvious and consistent die variations. Of the 11 complete N31 patterns those that match and thus indicate a possible die identification are given in Table 2. The five undifferentiated complete perfins (perfins, "g, I, j , l, o") all have displacements of 0.1 perforation diameter or less. From this, it may be assumed that these perfins are so similar to each other that the perforation displacements could be attributed to random variations caused by such things as; a) the vagaries of the paper such as clumps of fibers, b) random displacement of the pins due to manufacturing tolerances (e.g., "slop" produced by differences in the diameter of the pin versus diameter of the machined hole which receives the pin), c) irregular perforations caused by the pins becoming clogged with chads, and d) alignment error when matching the two image files in PowerPoint. For example, PowerPoint only allows increments of single degrees when rotating image files. Until all these variables are quantified through carefully controlled experimentation and measurements, there can be no definitive assessment of which of these small differences (i.e., 0.1 perforation diameter or less) are consistent perfin die varieties, or are due to random variations as outlined above.

The similarities of these five perfins now reveals a problem. If they are so similar then they could be produced by more than one die. In other words, if there are no obvious and consistent differences between these five perfins, what is to say they were not made by two – or even five – different dies? Thus, this modified Tomasson & Johnson plating analysis appears not to bring any resolution to whether the machine was a 1 x 5 or a 1 x 10-die array. For a comparison between N31 perfins with obvious die varieties and those problematic perfins apparently produced by two or more similar dies see Table 2 and Figure A2.

Finally, if one uses this same technique to compare the N30 with the N31, it becomes abundantly clear that the N30 exhibits many more dramatic pin displacements than those found from the above plating study of the N31 (see Figure 13 and 14). This appears to provide significant and supporting evidence that the two perfins were produced by two different machines.

Displacement

[Perforation Diameter]

0.05 0.1 0.2 0.3 0.4

Perforation Number

Perfin	N 1	N 2	N 3	N 4	N 5	N 6	N 7	N 8	N 9	N 10	N 11	N 12	N 13	N 14	Y 1	Y 2	Y 3	Y 4	Y 5	Y 6	Y 7	Y 8	C 1	C 2	C 3	C 4	C 5	C 6	C 7	C 8
a																				20		350						40	40	
d								230												40		340								
b						40	240																260				120			
e						50																	240				130			
c									190									200										90		
f		90							180																			80		
g																														
i		90				90																					120			
l							190				180																			
o		130					190				160											60						80		
j					200													0		10										

Table 2: After using a modified Tomasson and Johnson plating method, the displacement in fraction of a perforation diameter (colour coded cells) and angle of displacement in degrees (numerals inside cells) were put in an Excel spreadsheet then grouped to reveal similar die varieties. From the previous plating attempt it is apparent that perfins "a" and "d" represent Die-V, perfins "b" and "e" are Die-IV and perfins "c" and "f" correspond to Die-III. Note how the first pair (perfins a and d) have mis-matched variations in N8, C6 and C7. This suggests that other factors may be at work in producing apparent variations in perforation locations.

CONCLUSIONS

The empirical and historical evidence appears to strongly suggest that the samples in this study are all N31 patterns and furthermore, the N30 and N31 was produced by different machines. Therefore, the November 15, 1915, postmark provides a new LRU for the N31. The identification of these 14 specimens as N31 perfins changes the rarity factor of the N31 from a "B" to a "C". Since significant die variations appear to occur with the N31, collectors are encouraged to use the entire set of diagnostic criteria presented in the US catalog, Canadian handbook and this study to ensure their specimens are

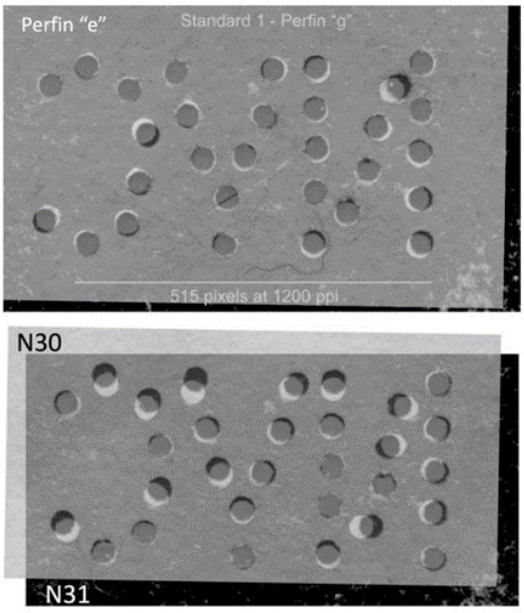

Figure 13 and 14: The top image shows a comparison of perfin "e" and "g" from the N31 collection using a modified Tomasson and Johnson method. These two N31 perfins show the largest die variations (see perforations N6, C1 and C5). The bottom figure (Figure 14) shows a comparison of an N30 and N31 using the same method. The apparent difference between the N30 and the N31 is revealed when the N30 specimen is compared with the same N31 master perfin (i.e., perfin "g").

correctly identified. The plating of the N31 appears to be consistent with perfins produced by a machine with a horizontal die array greater than 1 x 2. The evidence provided in this study is consistent with the N31 being produced by a 1 x 5-die Cummins Model 52 but the analysis does not eliminate the possibility of a 1 x 10-die perforator. The resulting plating study provided in this study is therefore cursory in nature and additional samples (most likely from the US equivalent – the N182A) and analysis are necessary before a particular die array can be firmly identified.

————————————————-

REFERENCES:

Anonymous, (1993), (**Pages copied from the 1909 Cummins "Catalogue of Price List and Perforators"),** The Perfins Bulletin, Vol. 46. Pages, 11, 140-141 and 191.

Anonymous, (2012), (**Pages copied from the 1909 Cummins "Catalogue of Price List and Perforators"**), The Perfins Bulletin, Vol. 66. Page 30 (March/April).

Battleship Revenue Stamps (accessed May 2022), **Online Cancel Extractor**, http://www.battleship- revenues.com/extract.xhtml

Cutler, Douglas J. (1996), **Cummins Postage Stamp Perforator**, The Perfins Bulletin, Vol. 50, No. 2, pages 35-36, (February)

Endicott, Stephen, (editor), (2018), **Catalog of United States Perfins**, The Perfins Club Inc.

Johnson, Jon and Tomasson, Gary (editors), (2021), **Canadian Stamps with Perforated Initial**, BNAPS Perfin Study Group, https://bnaps.org/PerfinHandbook/PerfinHandbook.htm

Might's Ottawa City Directory, 1913-16, (Accessed May 2022 from the Toronto Public Library online database) https://archive.org/details/ottawadirec191400midiuoft/page/684/mode/2up

Sampson, Russell D. (2022), **A Common Perfin on an Uncommon Stamp**, BNA Perforator, Vol.43, No. 2, pages 22-23 (February).

Sampson, Russell D. (2022), **What Causes Perfin Positions? – Part 1**, BNA Perforator, Vol.43, No. 3, pages 29-32 (April).

Szymanski, Robert (2016), **New York Central Railroad – Study Appeal**, The Perfins Bulletin, Vol. 70, No. 4 pages 70-81, (July/August)

Tomasson, Gary and Johnson, Jon,(1981), **A Perforated Insignia Coding System**, BNA Topics, Vol. 38, No. 5, pg. 14, (Sept. – Oct.)

Van Someren, Randall W. (accessed June 2022), **Guide to Admiral Stamps of Canada – Straight Edges**, BNAPS web site, https://bnaps.org/ore/VanSomeren- AdmiralStamps/VanSomeren-AdmiralStamps-StraightEdge.htm

Wikipedia (accessed June 2022), **New York and Ottawa Railway**, https://en.wikipedia.org/wiki/New_York_and_Ottawa_Railway

————————————————

APPENDIX – A Modified Tomasson and Johnson Plating Technique

This method of plating was performed using a MacBook Air and an Epsom Perfection V550 Photo scanner. What follows is a step-by-step procedure. Some of these steps may need to be modified to suit the reader's preferences and equipment.

1. Number each perfin sample. (e.g., "a", "b", etc.)
2. Establish a "master" or standard reference perfin strike.
3. Number each perforation in the master with the first letter matching the perfin letter (e.g., for the N31, NYC, N1, N2, etc., Y1, Y2, etc. and C1, C2, etc.) (See Figure A1)
4. Arrange all samples in 102B dealer-cards so that the perfin patterns are parallel to the edge of the card. This will minimize theerror due to tilting the perfin pattern in the image.
5. Place all the 102B dealer cards into the scanner with the card edges flush against the sides and top of the scanner.
6. Trace a scanning area rectangle that covers a single perfin pattern with a sufficient border.

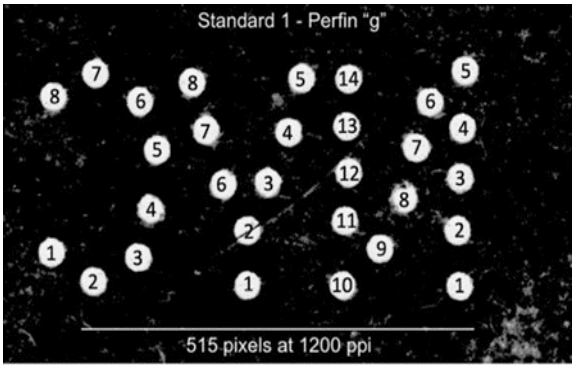

Figure A1: The perforation numbering scheme of the N31 as adopted from Tomasson and Johnson method.

7. Scan at a suitable resolution (e.g., 1200 ppi
8. Name each scan file according to the perfin lettering scheme (e.g., N31 perfin k.jpg)
9. Do not lift the lid of the scanner.
10. Move the scanning area rectangle from one perfin pattern to the next keeping its dimensions the same. Move the scan area with the center dot – DO NOT touch the corner dots or the dimensions may be changed and you'll have to start all over again.
11. Import "master" to image software (e.g., "Preview" for Mac).
12. Convert the "master" perfin image to a high contrast negative (i.e., white holes and black stamp).
13. Using the image software, draw a straight line on the "master"
14. Measure this line length in pixels – record this length and the scale on image (e.g., "576 pixels at 1200 ppi")
15. Import the "master" into PowerPoint. Expand image to fit the slide (e.g., 1500%). Do not use the mouse to enlarge the image, instead use the "Image Size" option and enter the percentage (e.g., 1500%).
16. Make enough copies of this slide to analyze each perfin sample. Import all test subject images one at a time to each slide – making sure to label each slide (e.g., Perfin "k".)
17. Adjust size of test subject to match size of "master" (i.e., 1500%).
18. Adjust transparency of test subject until both "master" and test subject are visible (e.g., 25% transparency).
19. Adjust tilt of test subject. Adjust position of test subject to match "master" perfin position as best as possible. Find the two to four pins that have the greatest displacement.
20. Record the displacement in fraction of a perforation (e.g., "0.1" is one-tenth of a perforation diameter) and position angle of displacement (e.g., 90° means the test

21. In “Edit” select all the image component, then select “Group” in “Arrange”. This will lock your image and prevent accidental movements of the test or master image.
22. Take screen shot of image, store files.
23. Arrange all screen shots in PowerPoint. (See Figure A2)
24. Place all values in a spreadsheet using a gradation of cell colors to signify displacement in fractions of a perforation diameter and numerical values for the angle of displacement. (See Table 2.
25. Perform a comparison to determine which displacement and therefor which die are which.

———————————

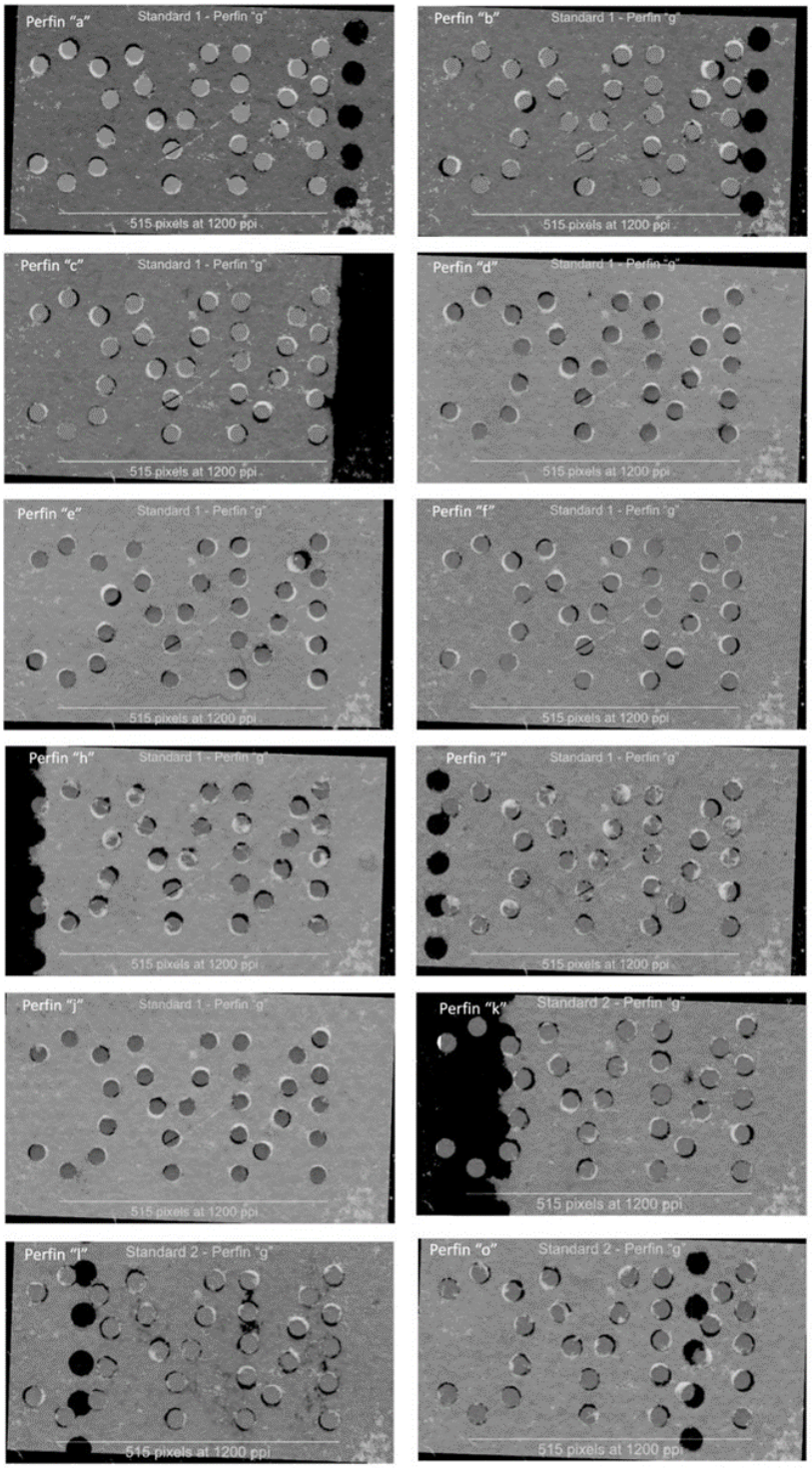

Figure A2: A assembly of all complete N31 perfins as compared to the master perfin (perfin g) using a modified Tomasson and Johnson method