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A Revised Method of Classifying Fraudulent Checks in a Document Examination Laboratory

When the Fraudulent Cheque File was organized in this laboratory in 1959, checks were filed under such headings as *modus operandi*, company names, suspects' names, dates of birth, and aliases, as well as headings related to the actual composition of the check—typewriting, checkwriting, etc. Only when search under these headings was successful could a handwriting comparison be made.

The first group of headings mentioned above involved encroaching on investigative functions better carried out by the police. In fact, filing and searching under these headings had been carried out very efficiently by the national police for many years.

A document examination laboratory should, however, concern itself primarily with the handwriting, typewriting, checkwriting, and rubber stamp impressions on a check. Accordingly, efforts were made to analyze the handwriting and mechanical impressions on checks and, when a scheme of classification was finally evolved, the old system was abandoned and the checks were filed according to a system more appropriate to the document section of a laboratory.

In course of time the scheme of classification was further refined and computerized, and a relatively high percentage of identifications was achieved. Further refinement involved defining criteria more rigidly. This not only meant that some writings were unclassifiable but also called for measurements which were found to be time-consuming. More time was spent in drawing the files indicated by the output of the computer before a comparison could be made with a questioned check. Less time was available for becoming familiar with the checks themselves and, as every worker in this field becomes aware, memory plays a key role in the identification of passers of fraudulent checks. To counteract this, and also to deal with checks which were up to then unclassifiable, recourse was made to pasting checks on a board running the length of the laboratory. Soon a system of mounting them on the board evolved, based on the characteristics of the writing and mechanical impressions on them. Even before the board became crowded, it became apparent that not only could the unclassifiable checks be classified and even identified, but the rate of identification was higher than that obtained from the computer. It was but a step from this to perfecting the classification evolved for mounting checks on the board and transferring them to a device capable of holding many more checks without appreciable loss of accessibility. Many devices were considered and a card wheel, discarded when the first system was abandoned, was found to be the most satisfactory.

FIG. 1—*Card wheel furnished with three drums.*

The one in use in this laboratory, illustrated in Fig. 1, is capable of holding photographs of 18,000 checks when these are pared down to the relevant material and mounted two to each side of a card. The ones on the back are mounted upside-down for easy reference. The cards are mushroom-holed, slide easily along the drum, and can be flipped through as fast as the searcher can scan them. The sections of the file, "male" and "female," are numbered to correspond with the twelve classes and 38 subclasses in the classification.

Classifying a check takes about a minute or two. It can be done efficiently by a clerk with only 2–3 months practice and requires no training as a document examiner. Searching a file can only be successfully accomplished by a competent document examiner. The classifier-searcher ratio may be 2 to 1.

Individual variations among classifiers may occur when checks exhibit two outstanding characteristics. This is dealt with by having the checks filed according to both characteristics. Since both classifiers and searchers are aware of this, it presents no great problem. Sometimes dual filing is inevitable, for example, when the sex of the writer of a signature like "J. Smith" is not known from the investigator's report.
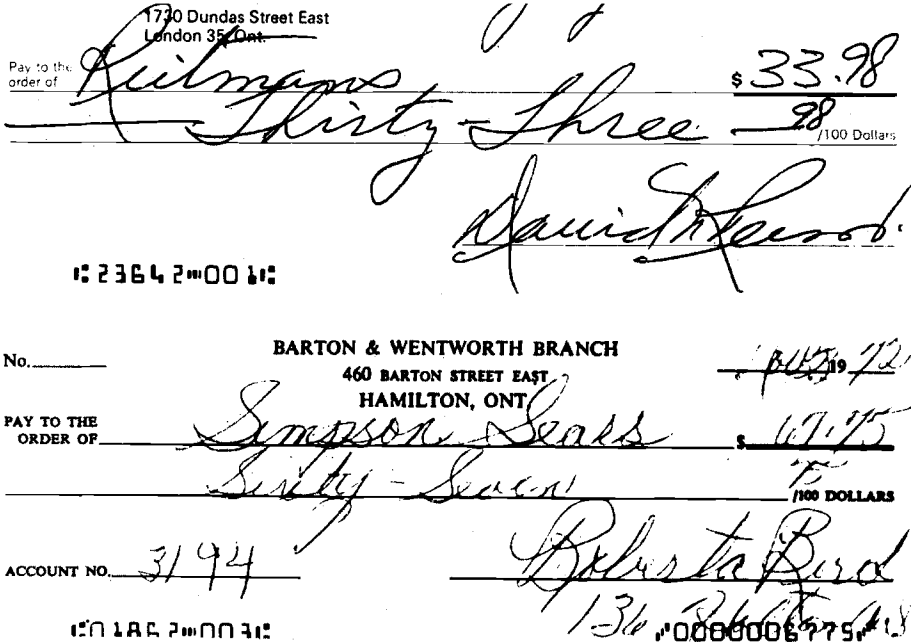
FIG. 2—*Examples of checks classified under Flourishes and Large Writing.*

The classes used are designated

1. Rubber Stamp	7. Flourishes
2. Checkwriter	8. Large Letters
3. Typewriting	9. Angular Letters
4. Handprinting	10. Short or Small Letters
5. Foreign Authorship	11. Tall Letters
6. Slant (Other)	12. Nondistinctive Writing

They will be fully described below. They are arranged in order of increasing frequency of occurrence of the characteristics they describe. This order has been found to apply to Canadian fraudulent checks; if it is not in accordance with conditions prevailing elsewhere, the order should be changed. It is recommended that preliminary studies be made before applying the system lest, to take an extreme example, 90 percent of the checks classified fall into the classification "Check Protector" and the sensitivity of the system be blunted.

Because the characteristics are listed in order of rarity, a check bearing a writing containing flourishes (7) and also large letters (8) should always be classified under the heading appearing first on the list, namely Flourishes. It may also be classified under Large Writing. Examples are shown in Fig. 2.

The criteria used to assign checks to their proper classes and subclasses are given below.
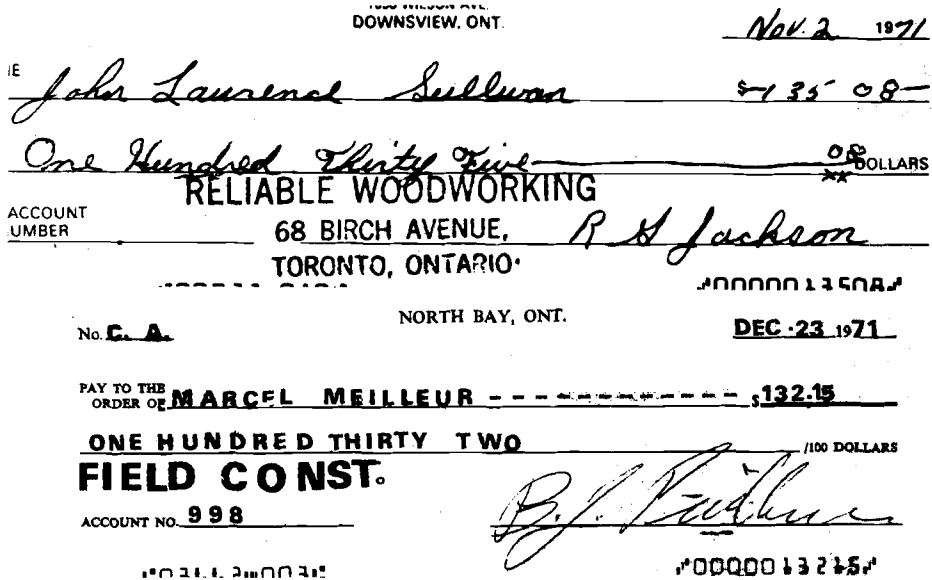
DOWNSVIEW. ONT.

Nov 2, 1971

IE *John Laurence Sullivan*   *$ 135 08*

One Hundred Thirty Five   O $ DOLLARS

ACCOUNT
UMBER   RELIABLE WOODWORKING
                        68 BIRCH AVENUE,   *R H Jackson*
                        TORONTO, ONTARIO·
                                                      ⸴⁰⁰⁰⁰⁰⁰⁰ ¹ ³ ⁵⁰⁸⸴

No. C. A.   NORTH BAY, ONT.   DEC·23 1971

PAY TO THE
ORDER OF M A R C E L   M E I L L E U R – – – – ⸺⸺⸺⸺⸺ – – – ₅132.15

ONE H U N D R E D THIRTY TWO   /100 DOLLARS

FIELD CONST.

ACCOUNT NO. 9 9 8

ı•⁰ ³ ı. ı. ³••⁰⁰ ³ı⁞   ⸴⁰⁰⁰⁰⁰⁰ ¹ ³ ² ¹⁵⸴

FIG. 3—*Examples of Class 1—Rubber Stamp:* (top) *rubber stamp and* (bottom) *Letraset.*

Class 1—Rubber Stamp

The criterion for inclusion in this class is the presence of a rubber stamp impression as part of the original composition of the check. Such impressions may occur on any part of a check. Figure 3 illustrates this class. For the purpose of this classification the following are treated as rubber stamp impressions.

Subclasses

1(a)—Impressions are made with any printing device, for example, Letraset, hand set, or machine composed.

1(b)—Counterfeit printing of an entire check.

Class 2—Checkwriter

The criterion for inclusion in this class is the presence of checkwriter impressions. This class is comprised of two subclasses.

Subclasses

2(a)—The impressions are made with a Paymaster 'Cheque-Writer.

2(b)—The impressions are made with any other make of checkwriter.

This classification depends, therefore, on the maintenance of a complete file of impressions made by Paymaster machines and as many impressions as possible made by other machines. The subclasses in this class would have to be changed in areas where Paymaster Cheque-Writers are not as widely used as in Canada.

Class 3—Typewriting

The criterion for inclusion in this class is the presence of typewritten impressions. This class is comprised of two subclasses.

Subclasses

3(a)—Only capital letters are used.

3(b)—Small letters are used.

Class 4—Handprinting

The criterion for inclusion in this class is the presence of any handprinted small or capital letters excluding the initials of names and the initial letters of words. This class is comprised of eight subclasses divided according to slant, height of letters, and whether or not the writing contains both small and capital letters.

Subclasses

4(a)—The handprinting contains small letters (see Fig. 4).

4(b)—The handprinting:
  (i) is written with a rightward slant,
  (ii) contains only capital letters, and
  (iii) measures more than 5 mm in height.

4(c)—The handprinting:
  (i) is written with a rightward slant,
  (ii) contains only capital letters,
  (iii) has first letters of the majority of the handprinted words taller than those of the other letters, and
  (iv) measures 3–5 mm in height.

4(cc)—This subclass differs from 4(c) in that the first letters of the majority of the words are not taller than those of the other letters.

4(d)—The handprinting:
  (i) is written with a rightward slant,
  (ii) contains only capital letters, and
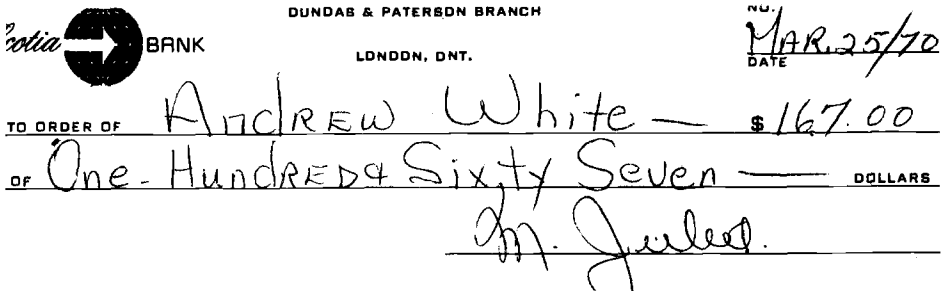 (iii) measures less than 3 mm in height.

FIG. 4—*Example of Class 4—Handprinting, Subclass 4(a), in which the handprinting contains small letters.*

FIG. 5—*Example of Class 4—Handprinting, Subclass 4(e), in which the handprinting is not written with a rightward slant, contains only capital letters, and measures more than 5 mm in height.*

4(e)—The handprinting (as shown in Fig. 5):
  (i) is not written with a rightward slant,
  (ii) contains only capital letters, and
  (iii) measures more than 5 mm in height.

4(f)—The handprinting:
  (i) is not written with a rightward slant,
  (ii) contains only capital letters, and
  (iii) measures 3–5 mm in height.

4(g)—The handprinting:
  (i) is not written with a rightward slant,
  (ii) contains only capital letters, and
  (iii) measures less than 3 mm in height.

Note:

  Whenever a measurement is specified in the descriptions of any of the classes or subclasses, it is to be understood as referring to the height of the majority of the letters. Judgment of height will be facilitated by the use of a transparent scale bearing parallel lines at the specified distances apart. The height of a letter, handprinted or handwritten, is measured from the foot to the top of the letter at the angle at which the letter is written, as shown in Fig. 6.
  The classifier will soon become familiar with the determination of the size of writing and measurements will be necessary only in doubtful cases.

Classes 5–12

  The criterion for inclusion in these classes is (1) the absence of rubberstamp impressions, checkwriting, typewriting, or handprinting; or (2) the presence of any of these,
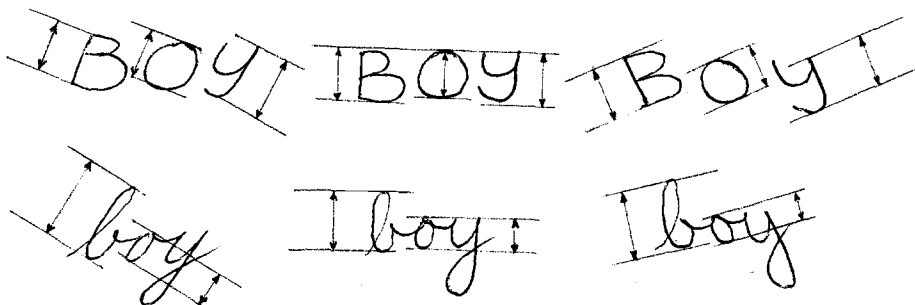

FIG. 6—*The height of a letter is measured from the foot to the the top at the angle at which the letter is written.*
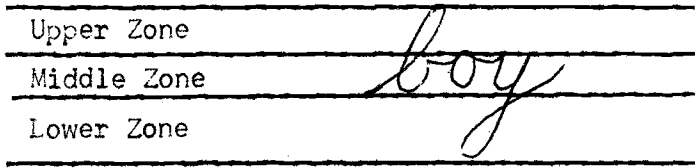
FIG. 7—*The three zones of handwriting.*

together with a handwriting in which any of the classes below predominates to an extreme degree. In this case, the check can be classified in both classes. The following general notes apply to these classes.

Size of Handwriting

To appraise size in written characters, it is necessary to establish a standard. Handwriting is divided into three zones: upper, middle, and lower. Figure 7 shows the letters of a word occupying all three zones of handwriting. In this system only the heights of the upper and middle zone letters are utilized.

For the purpose of this system we refer to the size of the upper zone letters as being tall, medium, or short. As the average height of an upper zone letter ranges from 6–9 mm, any upper zone letter exceeding the height of 9 mm is tall, and any upper zone letter shorter than 6 mm is short.

The size of the middle zone letters is referred to as being large, medium, or small. The medium size of the middle zone letters ranges from 2–3 mm; any middle zone letter exceeding the size of 3 mm is large and any smaller than 2 mm is small (see Fig. 8).

Class 5—Foreign Authorship

The criterion for inclusion in this class is the presence of handwriting characteristics usually found in the writing of persons who have learned to write in countries other than Canada and the U.S.A. The national origins indicated by the names on the checks are disregarded.

The feasibility of using this class in countries outside North America would have to be determined by an analysis of a representative sample of handwriting written by the inhabitants of those countries.

This class is comprised of three subclasses.

Subclasses

5(a)—The writing is tall or large.

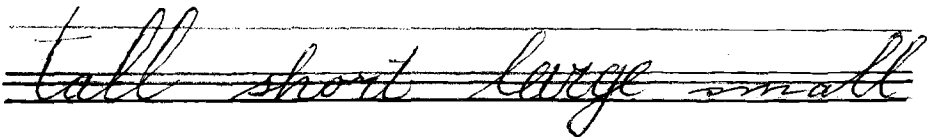5(b)—The writing is of medium height.

5(c)—The writing is short or small.

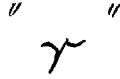FIG. 8—*Examples of the size of handwriting.*

FIG. 9—*Example of "r" classified under Class 5—Foreign Authorship.*

Note:

All handwriting in which the lower case "r" is written in the manner shown in Fig. 9 are filed in this class.

Examples of the three subclasses are shown in Figs. 10–12.

Class 6—Slant (Other)

The criterion for inclusion in this class is the presence of portions of writing which do not possess a distinct rightward slant. Even if there is only one letter deviating from a rightward slant the writing falls into this classification. This class is comprised of three subclasses.

Subclasses

6(*a*)—The writing is tall or large.

6(*b*)—The writing is of medium size.

6(*c*)—The writing is short or small.

Examples of these subclasses are shown in Figs. 13–15.

Class 7—Flourishes

The criterion for inclusion in this class is the presence of flourishes in the handwriting. For the purpose of this system, unusually long initial or terminal strokes, as well as underlines, are regarded as flourishes. This class is comprised of five subclasses.

Subclasses

7(*a*)*1*—The writing is tall or large and the flourishes are outstanding, may or may not occur in the payer signature, but do occur in the rest of the writing.

7(*a*)*2*—The writing is tall or large and the flourishes are not outstanding, may or may not occur in the payer signature, but do occur in the rest of the writing.

7(*a*)*3*—The writing is tall or large and the flourishes occur only in the payer signature.

7(*b*)—The writing is of medium size.

7(*c*)—The writing is short or small.

Examples of Subclasses 7(a)1 and 7(c) are shown in Figs. 16 and 17, respectively.

Class 8—Large Letters

The criterion for inclusion in this class is that the middle zone letters measure more than 3 mm. This class is comprised of three subclasses.

FIG. 10—*Example of Class 5—Foreign Authorship, Subclass 5(a), in which the writing is tall or large.*

FIG. 11—*Example of Class 5—Foreign Authorship, Subclass 5(b), in which the writing is of medium height.*

FIG. 12—Example of Class 5—Foreign Authorship, Subclass 5(c), in which the writing is short or small.

FIG. 13—Example of Class 6—Slant (Other), Subclass 6(a), in which the writing is tall or large.

FIG. 14—Example of Class 6—Slant (Other), Subclass 6(b), in which the writing is of medium size.

FIG. 15—Example of Class 6—Slant (Other), Subclass 6(c), in which the writing is short or small.

FIG. 16—Example of Class 7—Flourishes, Subclass 7(a)1, in which the writing is tall or large and the flourishes are outstanding, may or may not occur in the payer signature, but do occur in the rest of the writing.

Subclasses

  8(a)—The upper zone letters measure more than 9 mm.

  8(b)—The upper zone letters measure 6–9 mm.

  8(c)—The upper zone letters measure less than 6 mm.

  Examples of the three subclasses are shown in Figs. 18–20.

Class 9—Angular Letters

The criterion for inclusion in this class is the presence of a significant number of letters in which formations which are normally rounded are written in a pointed manner. This class is comprised of three subclasses.

Subclasses

  9(a)—The writing is tall.

  9(b)—The writing is of medium size.

  9(c)—The writing is short or small.

Class 10—Short or Small Letters

The criterion for inclusion in this class is either that the upper zone letters measure less than 6 mm or the middle zone letters measure less than 2 mm. This class is comprised of three subclasses.

Subclasses

  10(a)—The loops of the letters are wide.

  10(b)—The loops of the letters are normal.

  10(c)—The loops of the letters are narrow.

  Examples of Subclasses 10(a) and 10(c) are shown in Figs. 21 and 22, respectively.

Class 11—Tall Letters

The criterion for inclusion in this class is that the upper zone letters measure more than 9 mm. This class is comprised of three subclasses.

Subclasses

  11(a)—The loops of the letters are wide.

  11(b)—The loops of the letters are normal.

  11(c)—The loops of the letters are narrow.

Class 12—Nondistinctive Writing

The criterion for inclusion in this class is the absence of any of the above characteristics. This class is comprised of three subclasses.

Subclasses

  12(a)—The loops of the letters are wide.

  12(b)—The loops of the letters are normal.

  12(c)—The loops of the letters are narrow.

  Examples of Subclasses 12(a) and 12(b) are shown in Figs. 23 and 24, respectively.

FIG. 17—*Example of Class 7—Flourishes, Subclass 7(c), in which the writing is short or small.*

FIG. 18—*Example of Class 8—Large Letters, Subclass 8(a), in which the upper zone letters measure more than 9 mm.*

168 DUNDAS STREET WEST
TORONTO, ONT.

April 22 19 72

PAY TO THE
ORDER OF Eatons Shoppers World $ 28.35

Twenty eight .35

DOLLARS

Susan Marshall

SAVINGS ACCOUNT NO. 125

FIG. 19—*Example of Class 8—Large Letters, Subclass 8(b), in which the upper zone letters measure 6–9 mm.*

PAY TO THE
ORDER OF G. W. Robinson $ 14.15

Fourteen Dollars

** DOLLARS

Angela David

PERSONAL CHEQUING
ACCOUNT

FIG. 20—*Example of Class 8—Large Letters, Subclass 8(c), in which the upper zone letters measure less than 6 mm.*

FIG. 21—*Example of Class 10—Short or Small Letters, Subclass 10(a), in which the loops of the letters are wide.*

FIG. 22—*Example of Class 10—Short or Small Letters, Subclass 10(c), in which the loops of the letters are narrow.*

FIG. 23—*Example of Class 12—Nondistinctive Writing, Subclass 12(a), in which the loops of the letters are wide.*

FIG. 24—*Example of Class 12—Nondistinctive Writing, Subclass 12(b), in which the loops of the letters are normal.*

A summary of the above characteristics will be found in Table 1. In the beginning, this table is very useful for both the classifier and the searcher.

TABLE 1—*Summary of the characteristics of the twelve classes of checks and their subclasses.*

1. Rubber Stamp

2. Checkwriter
   (a) Paymaster
   (b) Other

3. Typewriting
   (a) All capitals
   (b) Lower case letters

4. Handprinting
   (a) Lower case letters
   (b) All capitals, rightward slant, large
   (c) All capitals, rightward slant, medium (3–5 mm), first letter taller
   (cc) All capitals, rightward slant, medium, first letter even
   (d) All capitals, rightward slant, small
   (e) All capitals, slant other, large
   (f) All capitals, slant other, medium
   (g) All capitals, slant other, small

5. Foreign Authorship
   (a) Tall or large
   (b) Medium (upper zone 6–9 mm, middle zone 2–3 mm)
   (c) Short or small

6. Slant (Other)
   (a) Tall or large
   (b) Medium
   (c) Short or small

7. Flourishes
   (a)1 Tall or large, outstanding flourishes
   (a)2 Tall or large, moderate flourishes
   (a)3 Tall or large, flourishes in signature only
   (b) Medium
   (c) Short or small

8. Large Letters
   (a) Tall
   (b) Medium
   (c) Short

9. Angular Letters
   (a) Tall
   (b) Medium
   (c) Short or small

10. Short or Small Letters
    (a) Loops wide
    (b) Loops medium
    (c) Loops narrow

11. Tall Letters
    (a) Loops wide
    (b) Loops medium
    (c) Loops narrow

12. Nondistinctive Writing
    (a) Loops wide
    (b) Loops medium
    (c) Loops narrow

The simplification of the process of classifying, filing, and retrieving enables the operator of a check file to deal with large numbers of checks speedily and effectively. After having operated this system for 15 months, in the first quarter of 1973 we were able to associate 84 percent of the "unknown" checks with earlier occurrences.

Summary

An improved system of classifying checks is described and discussed. Checks are filed according to the sex of the writer, handwriting characteristics, and habits in preparing the format of the check. Twelve major characteristics are divided into 38 subclasses. Five of these relate to mechanical impressions, the rest to handwriting peculiarities. All checks will fall into one or two of these subclasses. The classification of a check takes a minute or two after about two months of practice. Variations in individual judgment are counteracted by the possibility of filing a check in more than one section of the file, and by the searcher's awareness of this. The searcher must be an experienced document examiner. The system is designed as an aid to the searcher's memory, which is the most efficient means of connecting new incoming checks with those already on file.

After 15 months of operation, this system has been found to work very efficiently.

Acknowledgment

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