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POLICE SCIENCE

EFFORTS AT DISGUISE IN TYPEWRITTEN DOCUMENTS*

JEAN GAYET

The author has for the last ten years been a member of the staff of the Lyon Police Laboratory (France). In addition he recently was placed in charge of the criminalistics course at the French National Police Academy which includes responsibility for its laboratory. Among the subjects on which he will lecture are firearms identification and document examination. The latter subject deals in part with typewriting identification and the investigation of altered papers, which are among the problems in which he has specialized at the Lyon Police Laboratory. Mr. Gayet has published several papers in European reviews and in 1953 his article, "A Method of Superimposed Photography Applied to Criminalistics," appeared in this Journal.—EDITOR.

Police science is characterized by an incessant struggle between the particularly astute malefactors who try to force the expert into error, and the expert who must find an answer to such innovations. The trick of the malefactor continually forces us to reconsider and perfect our methods of examination and the verse of Boileau:

"Cent fois sur le métier remettez votre ouvrage,
Polissez le sans cesse et le repolissez"¹

must always be present in our spirit to remind us that, whatever may be the precision of our methods of examination, we find ourselves sooner or later with a new case which forces us to "polish" our methods—and to assign chief importance to the factors which until then were considered as secondary and which were neglected by numerous experts.

The present article proposes to call the criminalists' attention to two examinations of typewritten texts which we carried out at the Police Laboratory of Lyons. In these two cases the malefactor has attempted to disguise the work of his machine so as to make its identification impossible. The two attempts have ended in failure for the culprit, and we have been able in the two cases:

To reconstruct the method of disguise utilized.

To identify the typewriter.

We have succeeded here, not by perfecting new methods, but by utilizing, with the maximum rigor, the customary knowledge.

We hope that the reader will derive profit from this article and will see the full importance which certain factors present, which he has perhaps been in the habit of neglecting in the course of his examinations.

*Translated from the French by Ordway Hilton, Examiner of Questioned Documents, New York.

¹ TRANSLATOR'S NOTE: From "L'art poetique" in which Boileau, seventeenth century French poet, advises contemporary poets on the need of serious self criticism. A free English translation of the quoted passage reads:

"In the profession take back your work a hundred times.
Polish it and repolish it without cessation."

The design of the writing is the element of identification which the culprit knows the best and on which he concentrates his efforts of disguise; the two cases which we have handled show this clearly. The culprits had used very different methods to reach their goal, each of which had their advantages and their inconveniences.

In the first case, the typist had printed the letters of his machine with the aid of coarse fabric which he had placed on top of carbon paper (This latter was utilized to compensate for the lack of ink in the tissue.) The writing is thus greatly altered by the coarse impression of the weave, and the design of letters is barely legible, which complicates the examination to some extent. Such an attempt at disguise cannot escape the expert who immediately notes, even with the naked eye, that the impressions are too coarse to have been made with the aid of a typewriting ribbon, even of very poor quality. If one very easily recognizes the fraud, such an operation has on the other hand a great advantage of not altering the typewriter in such a way that examination of it can contribute any new element to the charge against the culprit.

In the second case the culprit filed the characters on his typewriter. He thus modified the characteristics of the work in the hope that the expert would be deceived and would state erroneously that the writing had different sources. Such a hope could be justified by the fact that the tampering does not appear in an evident way in the writing, and that thus, his attention not being alerted, the expert risks basing his examination on only the broken characters, so falling into the trap which the culprit set for him. But indeed such hopes are very deceptive, and the fraud is of relatively little danger if investigators and experts act much in this way.

In the first place, let us specify that if there exists a series of suspicions against the individual, the attempt at disguise is without results. The investigator in fact furnishes a series of standard writing coming from the suspect's typewriter, some of these are contemporary to the anonymous writing—therefore before the manipulation—others, recent, are subsequent to it. The first will show the same typewriting characteristics as the document under study and will permit its identification. On the other hand, the comparison between the various standards will reveal that the work of the typewriter is greatly altered in too short a time for this change to be due to normal use of the typewriter. The expert immediately suspects manipulation.

The attempt at disguise is only of interest to this writer when the investigators do not have any particular suspicion. They then submit only work taken from each possible typewriter—a specimen of work of all typewriters used in a small town for example—and ask the expert to show them the culprit. The comparison texts are then after the manipulation and differ from the anonymous matter in such a way that an insufficiently informed expert risks not recognizing the sought after machine and leading the investigators astray. But if the expert works according to sufficiently precise methods, he will succeed in spite of the attempt at disguise, in identifying the writing. Noting the abnormal alterations in the typewriter he will ask for its seizure so that he is able to study it without undue haste. He will note then that the characters have been filed. It is very doubtful that the suspect, interrogated as to the reasons why he had carried out such an operation, will be able to make a convincing explanation, and the manipulation of the typewriter will constitute secondary proof of his guilt.

Figure 1

Disguise by the Use of a Coarse Cloth

Note the canvas like appearance of the writing. Besides in this case, the end of the first line shows the characteristics of a carbon copy. This phenomenon arises from the fact that the forger had badly arranged the tissue, which did not entirely cover the document.

These introductory remarks having been made, let us now study in detail each method of disguise.

USE OF A COARSE TISSUE

The operation is very simple. The malefactor proceeds as if he wished to typewrite a text in two copies, but he takes care to place between the first sheet of paper and the carbon a fabric of convenient dimensions. The first sheet allows maintenance of the cloth in place and also the visibility of the text in the course of typewriting, but it does not serve any other use—since its writing is not disguised—and it will be destroyed. Only the carbon copy will be sent to the victim.

The expert who must study the document will be surprised by the appearance of weaved outlines, entirely unusual, which are present in the writing (figure 1). If the disguise is not too extended, he will ask himself if the text was not produced with the aid of a duplicator, the multigraph of the Addressograph-Multigraph Company for example.² (Equipment of this type, in fact, is often equipped with a coarser ribbon than that used on a typewriter.) His first task—which will constitute the first stage of his examination—will then be to establish by what process—typewriter or duplicator—the document had been prepared.

The simple examination with the naked eye will already permit him to express an opinion:

An erroneous letter or a symbol is corrected by overtyping with the proper letter: here is what necessarily indicates that the text had been prepared on a typewriter.

The regularity of the stroke—we more precisely say the regularity of pressure—of all the letters of the same line, here is an element which will indicate multiple copies. Further in this case the pressure of each line varies as an inverse function of its length.

² Duplicators are principally equipped with a half cylinder furnished with grooves in which is set each line of the text which are composed by assembling loose type. Each line is held fixed at either end by small lugs. The composition completed, the cylinder is covered with an inked cloth, similar to the typewriter ribbon, but which covers the entire document. Such a duplicator is used to reproduce circulars, which thus have the appearance of a personally typewritten letter and reaches the clientele more readily.

Figure 2

Disguise by the Use of a Coarse Cloth

First and second lines: Despite the disguise the comparison of the design of letters is possible. Note besides, the first letter of the first line shows the correction of a typing error by superimposition of the proper letter (*l* typed over an *m*).

Third and fourth lines: The disguise has not affected the malalignment of the writing.

The expert will note immediately, without any instrument, the factors which we have just mentioned, but it is the magnifying glass which will permit him to make a better diagnosis. It will permit him to recognize that the document with which he is concerned is not an original in ink, but a carbon copy, and in practice it is the "speckled" imprints, that multitude of little colored points distributed in the immediate vicinity of the letters, which will permit him to specify the method of fraud.

This preliminary work completed, in the course of which the expert has established:

That the incriminating document was prepared on a typewriter,

That the malefactor attempted to disguise the writing by inserting a coarse weave tissue,

there remains still the second stage of the examination, the most important, to identify the typewriter. The operation is entirely possible and should be carried on with success, in spite of the disguised writing. The study of the document should hardly be more difficult than that of a writing typed with a too freshly inked ribbon, or even a carbon copy. There still remain characteristic elements which allow the expert to reach a precise conclusion.

Dimensions of the letters. The expert will only distinguish the type of letter. He will recognize for example that the disguised text is printed with elite or pica characters; but he will not be able to hope for a more extend selection by precisely measuring the height of the letters. This always delicate operation, when the stroke is printed through a fine ribbon, is here completely deceptive.

Escapement (Pitch). One will estimate it easily thanks to the glass test plates constructed for this purpose.

Letter Forms. The comparison will be limited to the design of the particularly simple characters, (figure 2). It is so in the examination which we have carried out,

we were able to study: M, t, ' (apostrophe), ° (degree symbol), 3, 4, 7.³ The design of the "j" was doubtful, and that of the "g" impossible to specify.

Defects in the Impressions. The design of the characters appeared too imperfect through the coarse weave, for one to be able to hope to recognize the breaks, the recesses in the metal due to use. In the same way, except for the exception, one could not be able to recognize the inequality in the impression of the letters, one could not for example state precisely that the right downstroke of the "n" prints heavier than the left. There does remain a fault however that the cloth could not obscure—the malalignment of the letter—and it was thanks to this that we could make an identification. We recognized that a letter is twisted, prints too high or too low, too much to the right or to the left.

FILING OF THE CHARACTERS

The principle is the following: The malefactor after having typed the criminal letters files the characters of his typewriter to lead the investigation astray. If in fact the investigators submitted for examination standards postdating the manipulation, the expert could be deceived by the different appearance between the two writings and declare falsely that the comparison specimens and the anonymous letters came from two different typewriters.

For such an operation the malefactor is caught in the following dilemma:

Either to make a discreet disguise which will only affect some letters, but under these conditions the manipulation will be insufficient and will not prevent identification of the writing.

Or otherwise make an extensive disguise which will alter the impressions a great deal; but then the expert will note the abnormal manipulation;⁴ and besides it is probable that, despite the disguise, he will effect an identification of the writing, thus eluding the expectations of the malefactor.

DISCLOSURE OF THE FRAUD

In the examination which we have handled, the manipulation was very extensive, all of the characters having been filed (figure 3). The alterations—this is what could be ascertained directly from the typewriter—affected even the symbols which one only uses very occasionally (+, =, (), /, &, °, and the abbreviation symbols Fr and $\frac{1}{2}$) and which are habitually intact. Under these conditions all of the letters of the comparison specimens printed in a defective manner, and we first had thought of a general maladjustment of the typewriter—maladjustment of the motion⁵ and a bad position of the ring;⁶ but a more profound examination showed us that these causes

³ For more details concerning the letter forms on which we base our examination we refer to the discussion in our article "Le dessin de l'écriture dactylographique" (The design of typewriter type-faces) *Revue internationale de criminologie et police technique* (Geneva) January 1954.

⁴ Suspecting manipulation, he will request seizure of the typewriter, which would be regrettable for the malefactor.

⁵ In such a case the cylinder is not at a suitable height which causes an unequal vertical displace of the writing: The top of letters printing more (or less) heavy than the foot.

⁶ In such a case the trajectory of the typebar is not stopped by the ring, the characters then striking the cylinder directly, penetrating into the rubber, and beginning to vibrate; they may then provide a crushed and slightly shaded impression.

Figure 3

Disguise by Filing

At the left is a portion of the anonymous letter; at the right, a copy of this letter on the suspected machine after it had been disguised by filing the type faces.

could not have been at work here. In the absence of natural causes for this number of defects, we suspected a filing of the characters, the only remaining hypothesis possible.

Before specifying by what criteria one recognizes that a typeface has been tampered with, it is necessary to recall several fundamental principles concerning the type face impressions of a new typewriter and the alterations which these impressions undergo in the course of use.

A. *The normal typeface impression.* We should recall especially three important factors:

1. If we examine a typewriter character, we notice that the printing surface of each symbol is curved inward in such a way as to correspond exactly with the curvature of the cylinder around which the sheet of paper is placed. Under these conditions alone the symbol strikes the rubber properly and prints an impression of uniform width and inking.

2. If the bar at the end of which the character is soldered is twisted, a portion of the symbol will strike the cylinder harder, will penetrate deeper into the rubber, will give a heavier impression, larger and more deeply inked. If we examine the impression under oblique lighting, we will notice that in this region *embossing is a good deal more marked*. The inequality of impression varies according to the twisting which the bar has undergone: Laterally when, for example, the right part of a letter prints heavier than the left (or inversely), or vertically when the top of the letter prints heavier than the base or inversely.⁷ The two symbols of the same character are a solid piece, and if one of them prints irregularly, the same defect must be

⁷ The vertical inequality of the impression is found also when the motion is out of adjustment, but then the fault affects the entire writing. For more details on this question see "The Identification of the Individual Typewriter" appearing in the *International Criminal Police Review*.

found in the other. If the right downstroke of the *m*, for example, prints heavier, this should be the same for the right side of the *M*.

3. After a certain period of operation (as a result of the errors in manipulation by the typist who depresses two keys at once, to the detriment of the characters) the surface of the symbols is altered, the metal is broken in on the sides. One says that the character is "broken".

We are able to distinguish between two types of breaks according to whether the metal is broken and deflected or simply depressed. In the first case the defect is easy to recognize because the letter appears deformed. The second case is more complex: the widened and flattened area of the metal sometimes cannot touch the cylinder and as a result does not give any imprint, but it is able in another case to touch very weakly, thus furnishing an impression *without embossing, weakly inked*, but however *thickish* since it is produced by a line itself widened

So we see that the thickening can have two very distinctive causes:

1. Twisting of the bar carrying the character,
2. Damage to the metal and breaking of the character, but it is easy to distinguish owing to the intensity of the inking and to the existence or absence of embossing.

The two elements which we have just mentioned, inking and embossing, permit us to specify the origin of a defective impression, but still we are to dispose of a means of resolving the problem: the slowness and progressiveness of the deterioration of a stroke. When a bar becomes twisted, the thickening is very progressive and its maximum affects the whole side of the letter; when a character is broken, the thickening is abrupt and affects only a slight part of the letter.

Let us mention beside that the breaks are practically always produced at the same place for a given letter, as we have been able to establish in the course of research that we have carried out, but which is not yet published. Without proceeding here with a detailed study of the breaks, we can clearly state two points:

1. In a typewriter of the classic type (utilizing characters on which the capitals are engraved on the top and the lower case on the bottom) the breaks are more frequent on the lower case than on the capitals. The frequency of breaks is the inverse if the disposition of symbols on the characters is contrary.
2. In a classic typewriter the breaks on the capitals appear especially at the base of the letter, in the outer parts of the serifs.

All of these generalities that we have just formulated are very important when they establish for us the appearance which must be present in a normal impression, and as a consequence, all infractions of the phenomena which we have just stated make us suspect a manipulation of the typewriter.

B. Recognition of the Fraud. In the case of extensive disguise, we will be astonished upon the first examination of the disguised text to find the impressions so poor; but before having thought of a manipulation, we must study all the hypotheses which could explain this writing with the aid of natural causes.

The widening of the strokes make us think of a *well used typewriter*, on which the characters have been flattened by continually striking against the cylinder. It would be necessary for the machine to have had a great deal of use, but then a number of letters ought to be malaligned, and also, in the extreme case (when the segment

and type-guide are used) it ought to produce a general wavering of the writing; the same letter printing sometimes properly, sometimes too much to the right, sometimes too much to the left.

Also in the case of normal use, the thickening of strokes in the writing is necessarily accompanied by a malalignment of letters; whereas in the case of manipulation, widening of the strokes and malalignment are not concurrent.

One will note also that *the writing is not homogeneous*, certain letters imprinting deeper than others. It cannot be a *poor position of the ring*, because in this case the defective letters imprint *too depressed* and *too large*, and besides should be shaded, whereas in the document which we are studying the largest letters are the least depressed.

Each letter, besides, prints defectively, whole portions of its design scarcely marking. If *the motion* was *out of adjustment*, the capitals would not print in alignment with the lower case, and besides, for all letters, it would have been the same areas which print weakly. On the contrary, in the document which we are studying, *the areas which mark too weakly are found in different places for each letter*.⁸

If the manipulation is of small extent and affects only several letters, the remarks which we have just formulated are without interest. We will then recognize the manipulation by carefully studying the *impression of each letter*. We will find certain faults unexplainable by natural causes. This study is indispensable, whatever may be the extent of the manipulation, and it is what will permit us to establish the fraud with certainty.

We shall set up a table and, for each letter we shall note the places where the impression appears *without embossing, widening and insufficiently inked*. These three factors are inseparable,⁹ and their simultaneous presence will permit us to distinguish between the defect produced by filing the characters and that produced by the twisting of the typebar.¹⁰ We shall easily recognize the insufficient inking and the absence of embossing, but it will be more difficult to estimate the enlargement of the stroke.

⁸ TRANSLATOR'S NOTE: A further possible explanation for the appearance of the badly defective typewriting could be a seriously worn and pitted platen. This would only be present on a well used machine, and the defects should again include poorly aligned letters; but even more significant would be the marked variation from one impression of a given letter to another. Instead of all impressions showing the same defects, due to the irregularity of the cylinder surface, different parts of the letter would fail to print or would print too heavy.

⁹ In filing the character the malefactor had widened the stroke, also he had altered the contour of the symbol in such a way that the filed part had contracted the normal printing surface. The manipulated area then prints weaker (less ink and with a weaker embossing). There also ought to be a widening of the stroke, when the metal is even wider at this place, but the phenomena is more complex. The flattening of the writing is produced from the effect of two different causes: the energy of the stroke and the larger printing surface. In the case of filing the two causes tend to compensate; the altered part should naturally be large and the intact part—although corresponding to a fine stroke—should be enlarged as a result of its stronger impression against the cylinder.

One must even admit that in certain cases a *filed character prints a stroke of constant thickness*. It is certainly a hypothesis, but one will hold that the relative enlargement of a stroke in altered areas, will never be as great as one would expect.

¹⁰ We have in effect indicated above, that when we find present a twisted typebar, the embossing and the inking are of as much importance as stroke printing too thick.

Figure 4

Appearance of the Filed Characters

First line: At the left, the bottom and top of the letters print incompletely although the impression of the center is normal. At the right, for a given letter the areas of heaviest inking are those which print the least wide.

Second and third lines: Several abnormal breaks in letter or unusual defects in the impression.

We shall locate with the maximum of precision each altered area. Their location will often permit us to recognize their cause by showing us that it is not possible for this to be a broken character.

We shall note the importance, that is to say the extent of the alteration, as well as its *progressiveness*. A sharp break in the inking for a limited portion of the outline will result from a broken character or a very localized filing (figure 4). The location of the alteration will make it possible for us to choose one or the other hypothesis. A progressive weakening of the inking over an extended length of the design will result from either the twisting of the typebar or from filing. We have indicated above how we are able to distinguish between the two causes.

It is a defect which we will find often in the case of filing and which we must point out with care: *the top and bottom of the letters print poorly, while the middle of the letter prints with maximum strength*. Such a defect cannot occur with modification of the curvature of the type bar, nor a poor cylinder-basket position (the motion out of adjustment).¹¹ Again, one can judge that the contour of the letter is not suitable and that one has placed on a portable model the characters designed for an office machine. But we have already pointed out¹² that such an operation in practice does not alter the impression, contrary to that which happens when one effects the inverse operation.

The particular fact which we have just pointed out is due to the fact that the malefactor had filed the character longitudinally, that is to say in direction of the height of the letter (figure 5); he had removed a coating of metal at the foot as well

¹¹ In these cases only the foot or the top prints weakly, but not the two areas at one time.

¹² For this subject see: "The Identification of the Make of Typewriter by the Characters: The mechanical elements, the contour of the symbols" appearing in the *International Criminal Police Review*, number 27, page 18 (April, 1949).

Figure 5

A Character Disguised by Filing

Detail of a letter showing the strokes of the file.

as at the top of the symbol, in such a way that these areas print weakly. It is a defect which one will recognize easily and which besides is *characteristic of the fraud*.

Several times we will note that the right and left of a symbol prints weakly, while the intermediate area prints with more ink. One sees, for example, that the first and last downstroke of the *m* are weakly inked while the second downstroke prints with a great deal of strength. The malefactor had filed this letter longitudinally, but the extreme parts have been given the most attention with the file. One evidently could not be deceived and attribute this typing fault to the twisting of the typebar.

The expert has now completed the study and critique of the defects which he has pointed out in each letter. His work has not terminated, there still remains one operation: *to compare the work of the capitals and that of the small letters*, to study whether the twisting of the bar agrees for the two symbols.¹³

The two symbols, cut on the same character, are in fact a single unit, and all uneven impression of one ought to be found in the other. If the right downstroke of the *n*, for example, prints heavier, it should be the same for the right downstroke of the *N*. Here is a particular which the malefactor, who made an effort at different manipulation for the two symbols, evidently did not think of: one of the symbols will be correct although the other will print defectively (figure 6). Frequently, the difference will again be more important, and the defects of each symbol will be reversed; for one of these it will be the right side which prints too heavy, for the other the left side, for one of the symbols the top will mark too intensely, for the other it will be the foot. Here are particulars which are easy to recognize and characteristics of the fraud.

¹³ We understand by this inexact but very concise formula that the expert notes for each letter the uneven impressions affecting all sides of the symbol (the top or the bottom, the right or the left) and which usually are the result of a twisted typebar.

Figure 6

Comparison of Capitals and Lower Case Letters

Note that the irregularities of impression do not correspond contrary to that which occurs when the typebar is twisted.

C. Identification of the Typewriting. The expert has at hand two documents: the first, an anonymous letter shows undisguised typewriting; the second, a comparison text which is manipulated. It will generally be easy to request the seizure of the typewriter and to study directly the surfaces of the characters; the abrasion has left a number of scratches which will reveal the fraud (figure 5), and it is of little likelihood that the malefactor can furnish a plausible explanation for this phenomena.

The seizure of the machine, although we advise it strongly, is not absolutely indispensable, and we can conduct the comparison of the two writings with success.

We will study the dimensions of the typefaces, the escapement, the design of literal forms (letters, numbers, and symbols), in summary we will proceed to a group identification of the typewriter from which we will demonstrate that the two documents came from a typewriter of the same make and model.

The exact identification will be possible by a study of the typewriting defects.

Broken Characters. One could believe that a broken character is a constant defect which will still remain visible in the impression despite filing, but this is not correct. In fact if the break had caused a slighter depression in the metal than that caused by the filing, it will print again although the filed zone will not mark. In a word, it will be dispensed with as if *the break in the character was displaced*, in reality the break remains but no longer causes a visible alteration in the typed impression.

This is so in the matter which we have been treating, a break originally was present in the left side of the lower serif of the *i*, after the filing it is the right side of this same serif which no longer marks while the break printed a little more normally (figure 3).

Then an expert ought not to take into account the broken characters if he works only on the documents. If he has possession of the typewriter he will be able to point out the breaks which appear in the incriminating document and then directly examine the character to see if the alteration in the metal still exists. We recognize these easily because the "imprinted" surface of the break is smooth, without any striations, and that the metal is compressed on the edges of the stroke although in the case of filing the surface is marked with striations and there is a removal of metal.

Figure 7

Comparison of Malalignment of Filed Characters

This method of disguise does not modify the malalignment of the letters, in such a manner the impressions are still identifiable.

First column: The disguised writing.

Second column: The writing before disguise. Note besides that the filing has modified the break in the *i*.

Twisted Type Bars. We are not able to study this among symbols which have been tampered with since the filing modifies the impression of the characters in a manner resembling twisted typebars. (Filing and twisting in fact both modify the presentation of the character against the cylinder.)

We will then be able to study this typing defect only on those symbols which have *certainly* not been filed. The operation will be easier with the seizure of the typewriter.

Malalignment of Letters. They have not been modified by the maneuvers of the malefactor, and they will be a great help to us in identifying the writing, even if one does not have the suspected typewriter (figure 7).

The three defects which we have just indicated are the most standard, and we call attention to them constantly in our examinations. To simplify this study, we will not treat the other defects, a good deal more rare, and we will leave to each expert the need to determine whether they persisted or whether they disappeared after filing.

Beside the expert is able to dispense with identifying an anonymous text with the aid of disguised typewriting. In fact, as soon as he will recognize the filing, he will seek after new comparison specimens predating the manipulation.¹⁴ He will then be able to work under his usual methods of examination.

Thus, the expert is not disarmed and can identify perfectly the disguised writing provided he works with these rigorous methods. Besides, we do not wish him to encounter such an affair, always delicate to handle. We desire only that even if the expert never encounters a manipulation he will have learned from our article how it is useful to state precisely and to improve his methods of examination. In this we hope that our study has not been useless.

¹⁴ The safest is to obtain writing very slightly before the anonymous text.