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THE EXPERT EXAMINATION OF SIGNATURES

JACQUES MATHYER

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Today, signatures have assumed great importance and everybody, regardless of the social level in which he lives, must sign his name daily or many times a day. Under these conditions, the question often arises whether a disputed signature is genuine or not. In many cases a document examiner will be asked to determine whether a suspected signature is genuine or forged. However, the problem is often difficult, and it would seem useful for us to consider the principles and the difficulties in the identification of signatures.

WHAT IS A SIGNATURE?

In the dictionary, we find that a signature is a name or a mark that a person puts at the end of a document to attest that he is its author or that he ratifies its contents.

Those who cannot read or write must sign the document with a simple cross. We have here the simplest signature which, if it can have legal value, certainly does not present great security because it has absolutely no personality. It is not possible to know who signed because a simple cross cannot designate a person. Persons with little writing ability who only write their name, with or without the first name, write exactly the same way as if they were writing a common name; they are rather numerous. With such signatures, the identification of the person who signed is a little bit easier, because that person is designated by his name and his writing is more or less personal.

Those who are frequently called upon to sign, for example bankers, business men, lawyers, doctors, etc, must use their signature many times a day, perhaps many times every hour, and voluntarily or not, they transform their way of writing their name. The signature which was first a legible name in which it was possible to recognize the

letters tends to be simplified, to be condensed; the first name or names are replaced by initials, the several letters of the family name are no longer recognizable and differentiable one from the other, and a more or less legible, complex movement appears. This name is now a "signature" where this word does not correspond exactly to the earlier mentioned definition. The "signature" is again a mark, but this mark is now personal; it is a personal combination of strokes in which it is possible to recognize the writer. To be complete, it must be said that it is not only a desire

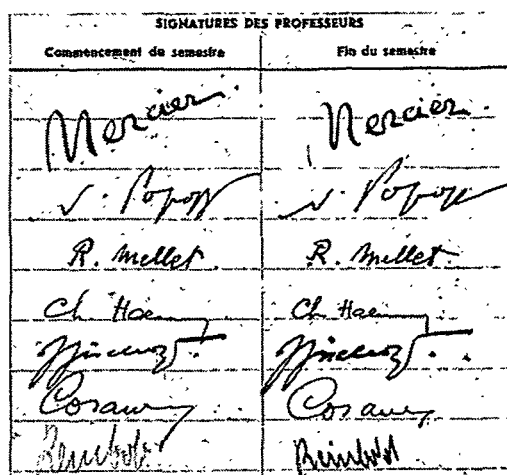


FIGURE 1

Some examples of signatures of profession men (professors at the University of Lausanne). Observe especially the difference in the simplification of the three letters "off" which ends the names "N. Popoff" (line 2) and "Bischoff" (line 5). From top to bottom the names are: "Mercier", "N. Popoff", "R. Mellet", "Ch. Haenny", "Bischoff", "Cosandey", and "Reinbold". The signatures at the left were written about five months before those which are seen at the right.

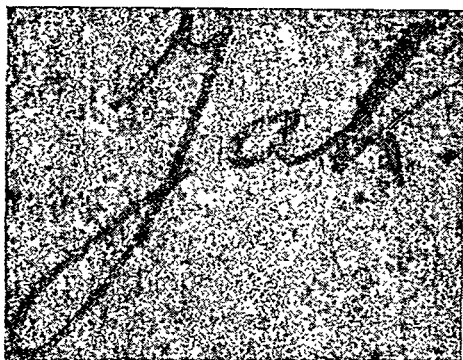


FIGURE 3

Photograph showing the remains of pencil under the ink stroke.

useful to review all the theoretically possible answers to the question: Genuine signature or forged signature? They are:

- A. A signature contested by its author, which in reality is genuine and corresponds perfectly to the ordinary and habitual signatures of that person.
- B. A signature contested by its author, which in reality was written by him but in a way which was different from the ordinary manner and which is more or less different from the common genuine signatures of that person.
- C. A signature contested by its author, which in reality was written by a third person and which is a forgery written in attempted imitation of a model.
- D. A "spurious signature" written by somebody who did not attempt to imitate the signature of a person, but who uses a fictitious name and tries to give his work the appearance of that we call "a signature."
- E. An uncontested signature, in fact genuine, but written by an unknown person whose name must be deciphered by the document examiner.

In our country (Switzerland) the most common of the above enumerated possibilities are those under A and C. The cases D and especially E are more rare, even very rare, and the case B is more theoretical than practical. Naturally, this enumeration is not an exhaustive one, and it is possible that other cases exist.

FORGED SIGNATURES

There are different methods of imitating someone's signature, and it is important that an expert knows the following methods.

Traced forged signatures. The forger first chooses a model signature and copies it by following the strokes of the model. We have a *direct* tracing if the copy is made by transmitted light. To do that, the forger will use the natural transparency of the paper or he will place his paper against a window or a glass plate which is illuminated from behind. He will work directly with ink, or first with a pencil and then will cover the pencil stroke with ink. For the *indirect* tracing the forger will use carbon paper and will place the documents on which he will trace the forged signature under the document bearing the model signature with carbon paper between the two. With the aid of a dry pen, a pencil, or a ball pen he will trace the outline of the model, and in that way, he will obtain a carbon outline on the bottom sheet which he will cover afterwards with ink by retracing the carbon outline.

It is naturally possible to modify these techniques of forgery, but the main principles remain the same.

Forged signatures obtained by the means of a "stamped facsimile of a signature". Certain people who are called upon to sign very often use a stamped facsimile of their signature. It is possible to use such stamps to prepare forgeries in two different ways: either apply the stamp coated with traces of ink from the inkpad at the place where you want the forged signature and cover the outline obtained with the ink of an ordinary pen, or dip the stamp directly in ordinary ink and apply it to the paper. This second technique is difficult, because it is necessary to have the exact amount of fluid ink to avoid accidents with the strokes.

Forged signatures made by servile imitation. Here too, the forgery can be made directly or indirectly. In both cases it is a question of a servile copy of a model, made by the forger on the chosen document. The forger makes an effort to obtain a reproduction of the model-signature which looks as much like the model as possible; he works slowly, stroke after stroke. In the direct technique, he will work directly with ink and in the indirect way, he will work first with a pencil and will afterwards cover the pencil strokes with ink or a ball point pen (figure 3).

Free hand forged signatures. This method is used by the forgers who have a certain skill to write or to draw. After some practice, the forger tries to write a copy of the model quickly. We know cases where the forger was able to reproduce

a signature without having the model in view and obtained rather good results.

Spurious signatures. The forger does not try to copy a model, but writes something resembling what we ordinarily call a "signature." For this he uses a false name and makes a rapid stroke. In cases where the forger will use the same false name many times, he will naturally use the same spurious signature, and it can happen that he will employ two or more "signatures". Logically, the signatures of his different identities will show the same graphic elements, so that theoretically it can be possible to identify the forger by his handwriting.

METHOD OF EXAMINATION

In our opinion, it is not possible to make an expert examination of signatures in a really scientific way, *i.e.* that it is not possible to apply to these problems purely technical or mathematical methods, which allow one to say, with an absolute precision, that the disputed signature is or is not forged. How must we proceed?

First of all, the document examiner must be able to work with the *original documents* and not from photographic reproductions of the disputed signature or of the comparison signatures. It is well known that the reproduction of documents by photography, or photocopy, is not absolutely accurate, especially in the structure of the stroke because it is sometimes even difficult to determine on such a reproduction if we have an ink written or pencil written signature. It is also difficult, maybe even impossible, to determine from a photographic reproduction if the disputed signature is an original or a carbon copy. It is preferable to avoid examining only a carbon copy of a signature, because here too many important graphic elements are hidden or have completely disappeared.

The expert must first *examine the disputed signature itself*. This examination must be conducted from the general to the details: an initial study with the naked eye must show if the dimensions of the signature and its disposition on the document agrees with the available place or with the kind of document, for example. The general examination must be followed by a complete study with a magnifying glass or with the microscope at different magnification and under different kinds of lighting. The best instrument for this work is the stereoscopic microscope with magnification of about 5 to 30 times. The signature will be examined by normal incident light, by oblique or

side light, and by transmitted light. In many cases, it will be useful to use colored filters to extinguish more or less the color of the ink, to make possible the search for pencil strokes under the ink. Study with an infrared image converter may be necessary and useful too.

In the indirect traced forged signatures we will find, under or besides the inkstrokes, traces of pencil or traces of carbon from the carbon paper, and it will be useful to examine the documents with transparent light with magnifications of 20 to 25 \times to determine if the colored particles are always on the same side of the paperfibers (pencil) or if they are everywhere, without relation to the structure of the fibers (carbon). The presence of pencil traces under or beside the inkstrokes indicate that we are dealing with an indirect traced forgery or with a servile forgery constructed with a preliminary drawing. The presence of carbon traces under or besides the inkstrokes is a proof of an indirect tracing.

It will be interesting too to observe the disputed signature and its surroundings with strong side light to look for the presence of traces of india-rubber that the forger would have used to remove the traces of pencil or carbon. With such lighting it is possible also to reveal ridges which will perhaps not exactly match the ink strokes and which will prove an indirect tracing done with a pen or another instrument without coloring matter.

As to the strokes of the signature themselves, in case of a *direct or an indirect traced signature*, or in case of a *forged signature written with a preliminary design* the peculiarities are very much the same. The stroke is of poor quality, always having the same breadth, it lacks quickness and suppleness, etc. The stroke shows some hesitations, some tremor, and also stops or interruptions which take place at abnormal places, some retracing and retouching which depends upon the fact that the forger cannot see the whole signature at one time, because his own hand hides the forthcoming part of the signature. He must then interrupt his work, lift the instrument, and begin again (figure 4). These interruptions are sometimes visible in the stroke with the naked eye, sometimes only under the microscope. In many cases, it is possible to note that the forger has made a mistake, because he has not understood the normal flow of the movements which compose the model signature. Often, once the signature is finished, the presence of corrections which are done later can be observed and which in the mind of the forger serve to correct

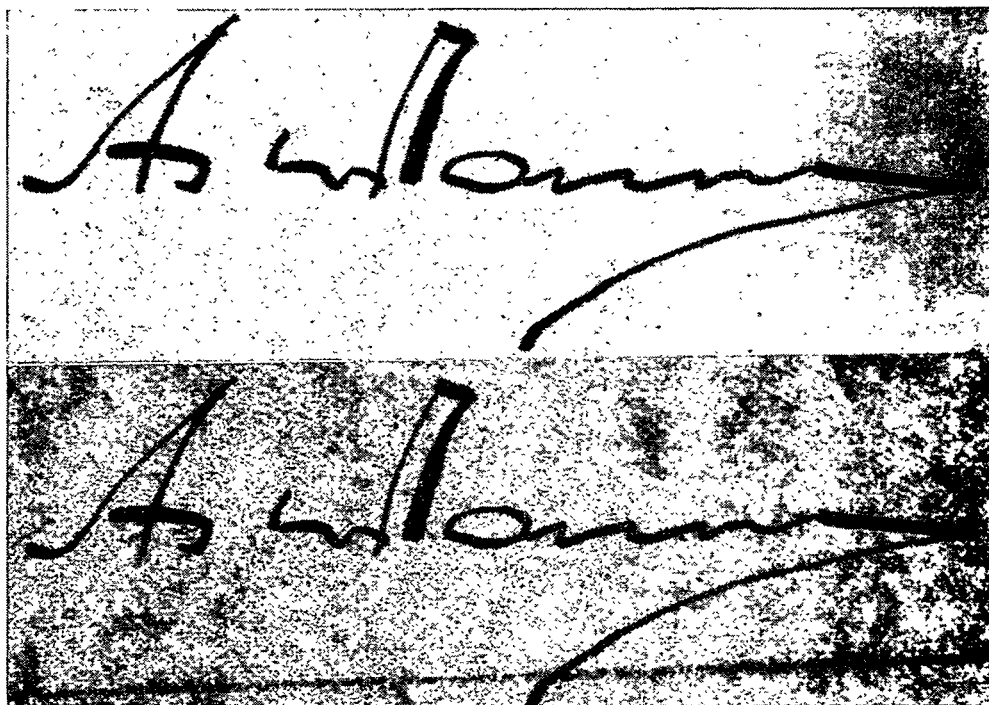


FIGURE 4

Type of a traced signature (direct): the same signature photographed in reflected light (above) and by transmitted light (below)

the form of the signature so that it would not be possible to recognize immediately that the signature is suspected.

The *forged signature made by the use of a stamped facsimile of a signature* which was dipped directly in the liquid ink has an appearance of rapidity and sincerity. But a microscopic examination reveals the absence of the characteristics of a normal pen stroke and a peculiar constitution of the borders of the stroke which are more or less fringed. Further, where the inkstroke makes a sharp angle, the ink will fill the angle in a characteristic way (figures 5 and 6).

The *forged signature traced by covering a preliminary design obtained with a stamped facsimile of the signature* permits recognition of the inkstamp under or beside the liquid inkstroke, and the appearance of these is many times so characteristic that it is certain that it came from a stamp and cannot have another origin (figure 7).

In the *forged signature made by servile imitation* we can observe characteristics which are very close to those described above in the section dealing with traced signatures. In reality, the process differs only by the fact that in one case the model is under the paper and that in the other case, the mode

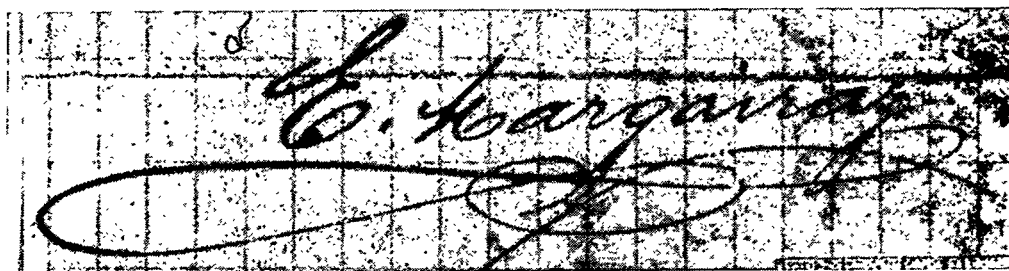


FIGURE 5

Forged signature made with a stamped facsimile of a signature dipped directly in the liquid ink



FIGURE 6

Detail of figure 5 showing the characteristic ink filled angles.

is in front of the forger. If there was a preliminary design, we have the same case as with a signature traced with pencil. When there is no preliminary design, we must note the tremor of the strokes, the abnormal interruptions, the rewriting, etc.

When we are confronted with a *free hand signature* or of a *spurious signature*, the preliminary examination will now show the forgery characteristics described above. By definition, these kinds of forged signatures are quickly written and presents the same appearances of quickness, of sureness as a genuine signature, so that it is quite impossible, without a comparison, to recognize immediately a forged signature.

To be complete, it is necessary to mention that the genuine signatures of persons who cannot write or who write very badly very often show characteristics which make them appear suspect because they seem to be forged.

Before speaking of the techniques of comparison of the forged signatures with the genuine ones, it is important to deal with the comparison material.

COMPARISON SPECIMENS

Comparison signatures are very important, and it is necessary to assemble the most complete comparison material possible. The expert must not hesitate to ask for comparison signatures of the same period as the forged or disputed or for comparison signatures older than the disputed one. When possible, the comparison signatures should be written with pencil if the suspected writing is with pencil, with ink if ink written, and so on. In many cases it is



FIGURE 7

Traces of ink-stamp under the liquid ink stroke

important too for the expert to have available signatures subsequent to the date of the disputed in order to determine whether perhaps a change exists in the comparison signatures written before and after the date of the disputed. It is useful for the comparison signature to figure on documents of the same kind as the questioned document, and the expert must suggest to the judge, or the lawyer who ask for the examination, the places where it will be logically possible to find some more comparison material. It is impossible in this article to enumerate these places because it depends naturally on the country and on a lot of different factors, but each expert must be able to enumerate these places.

In cases where it is impossible to find any material for the comparison, but when the person is still alive, the expert must ask the person in question to write a number of comparison signatures, under the same conditions as the disputed signature. That person must sign documents of the same kind and the same size as the questioned document and with a similar or the same instrument. As example, it is possible to ask the person to write 10 signatures on ten documents taking care that this person has only one signature before him and removing each signature from view when it is finished. In some cases, it is necessary and very useful to repeat these steps again a few days or a few weeks later, or it is useful too to ask the

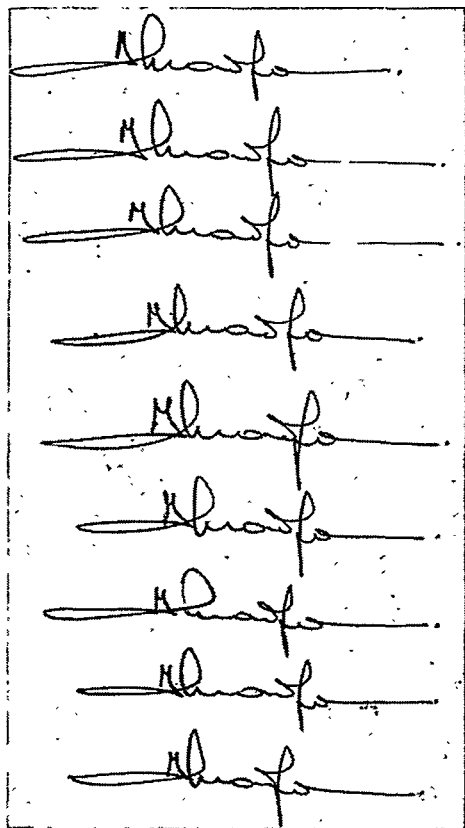


FIGURE 8

Normal variations on 9 signatures of the author, signatures which were written one after the other with the same instrument (fountain pen) and under the same conditions.

person to write signatures with another instrument than the one used for the 10 documents.

When it is necessary to ask for many comparison signatures, it is prudent to described the operations exactly, and it is very useful when possible to control the requested signatures with at least one spontaneously written signature in order to be able to judge their representativeness.

Concerning the comparison material it is very important that the signatures are acknowledged or worn to by the person, to avoid a dispute.

Afterwards, the expert must proceed with a *systematic study of the comparison signatures* so that he can become completely familiar with these signatures. He can in this way see if the person has or has not a constant way of signing, or if, on the contrary, there exists variations and what importance these variations have. Naturally, there always exists a certain number of variations between one signature and another, even if the

signatures have been written immediately one after the other (figure 8). This study of the genuine signatures is very important, and it will be necessary to note the observed elements and the extreme variations in dimensions, proportions, details, etc. We must also note the external conditions which can perhaps explain this or that variation. It will be important, too, to see if a variation is a function of some external conditions—one person will always precede his signature with the abbreviation "Dr." in certain cases and never in others. The influence of the available space, etc., must also be determined.

THE COMPARISON

After having made the examination and the study of the disputed, and after having made the examination and comparison of all the comparison signatures, the expert is allowed to *compare the disputed signature with the genuine ones*.

It must be clear here that the preliminary examination of the disputed or contested signature must have lead to the chief verifications. Often, before seeing a genuine signature, it is possible to make a determination about the questioned signature. If the expert observed proof of forgery (pencil or carbon under the ink strokes, poor quality of the stroke, tremor, rewriting, retouching, etc.) he can seriously doubt the genuineness of the signature, even explain the *modus operandi* of the forger. But, if the disputed signature is written quickly without abnormal details, it will be quite impossible to reach an opinion about its quality, and it will be necessary to compare the questioned signature with the genuine ones.

In the case of a *traced signature*, direct or indirect, the comparison with the genuine signature is naturally conducted to determine the presence of complete similarity of appearance; it is always possible to find agreements in the details, except where the forger has not understood the movement he is copying. While the preliminary examination of the disputed signature has revealed marks of forgery, it is not necessary to proceed to a complete comparison, because there necessarily appears similarities in the forms and details. The comparison involves the peculiarities of the dynamics of the signatures which generally differ completely between the forged one and the genuine. It will be important, too, to compare the dimensions of the disputed signature to the dimensions of the genuine signatures, to see if it is not possible to find the model which was used (figure 9). In

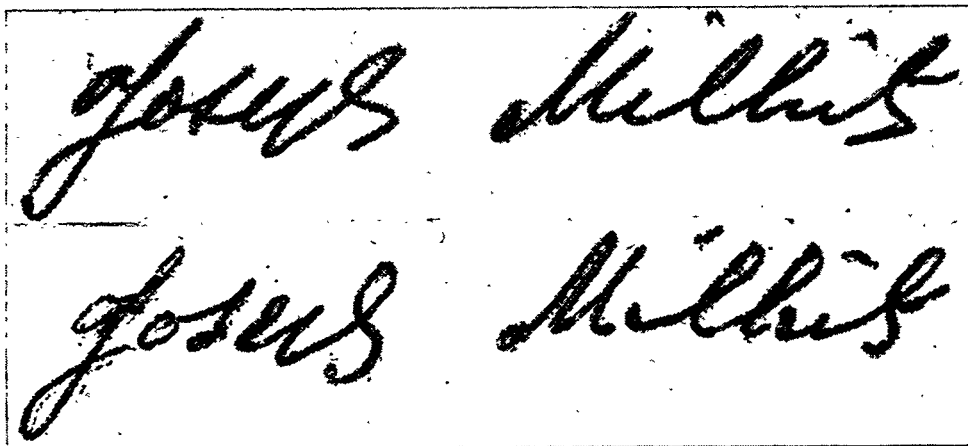


FIGURE 9

Agreement in form and dimensions between a forged signature (below) and its genuine model (above)

case of striking similarities, an examination in transmitted light, and by superposition of the traced signature on its model, reveals immediately the agreement in forms and dimensions.

In some places, it is possible to observe that the superposition is not absolutely correct, because the forger cannot follow the model exactly. When the model signature can be discovered, it is necessary to examine it conscientiously because it can contain marks of the forgery. A demonstration by superposition will be convincing if, for example, we superimpose a diapositive of the questioned signature on a negative of the model and if we expose a paper positive through this composite "negative." On the paper positive, the places with common strokes appear in grey, the over-extension of the forged signature are white and those of the model are black. Many easy methods can be imagined to demonstrate the fact that the disputed signature and its genuine model superimpose. Here is something of great importance, because it is well known that *a certain person will never write his signature exactly the same twice*. If we have two signatures which can be exactly superimposed, one of them must be a forgery, a traced forgery (unless they are both traced forgeries of one single model!).

In the case of *signatures overwritten on a preliminary design*, as already said, the peculiarities of the forgery will be nearly the same as for the traced forgeries but without the possibility of superposition with a model. On the contrary, the systematic comparison of the forms and the movements are certainly to reveal more or less important differences, certain of which go beyond the limits of normal variations in the comparison signatures.

The same verifications could be made in the cases of servile imitation, but without the remainder of the preliminary design.

The comparison of the graphic elements becomes very difficult and complex in the case of a *well done freehand forgery* and in the case *where the disputed signature is really genuine*.

Starting from the idea that the examination of the disputed signature has not revealed specific marks of forgery and that this signature shows on the contrary all the general peculiarities (dynamics, quickness, spontaneity, etc.) of a genuine signature, two possibilities are present. Either the signature is a skillful freehand imitation, or it is a really genuine signature.

In such cases, the expert is in fact faced with the same problem as the one which consists of the identification of a very short handwritten text, one or two words, for example. After having studied the disputed signature itself, and after having studied each comparison signature and compared them together, the expert must proceed to a systematic comparison of the disputed signature with the genuine ones. We propose to apply the method here that we have applied for many years and which in fact consists in a comparative study of going from the general elements to the details. First of all, we compare the manner in which the signatures are placed on the documents, and we determine if that emplacement matches or not with what is found with the genuine signatures. In cases where differences appear, we must find whether there is a reason which allows these differences to be explained (bad pen action, defect in the paper, presence of a part of the text, or a printed part of the text, at the place on the

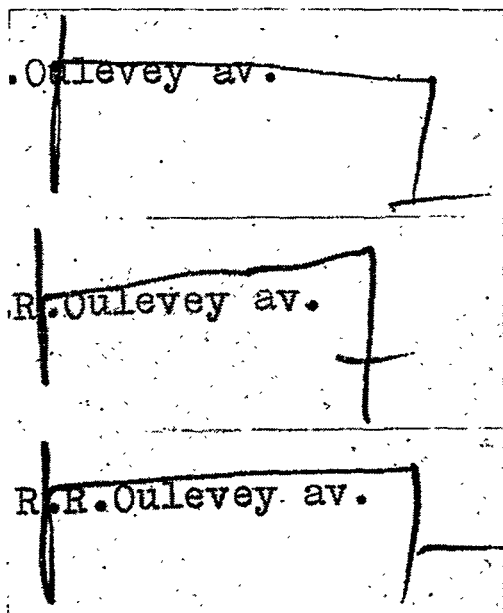


FIGURE 10

Three examples of a very simplified signature

document where the signature must come, etc.), and we must find out too if the disputed signature is placed in a different way than all the genuine signatures, or only a few of them and establish a kind of statistic. Afterwards, we must study the dimensions and the proportions of the disputed signature and compare them with the same elements of the comparison signatures. In this case too it will be necessary to see if the eventual differences exists between all the comparison signatures or only between some of them and find out if any of these differences perhaps have a valid reason. Following, the expert studies and discusses the similarities and differences which he observes in how the writing instrument is held, which is an important element, unfortunately impossible to determine with ball point pen or pencil written signatures; dynamic of the handwriting (that is to say that succession of shaded and very fine strokes) which can depend upon the instrument, or the material which is under the document. At last, the examiner studies one after the other in order the details of the letters which make up the signature. This study is applied not only to the form and the design of the letters, but especially to the formation and structure of the strokes and all the internal details of the strokes which are very important; generally these particulars are the best studied by transparency

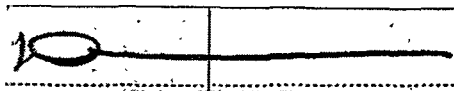


FIGURE 11

Very simplified signature (P. Cavin)

with a medium magnification. This part of the comparison is very important, and the document examiner must try to "understand" the movements of the strokes that he is studying; it is not sufficient that two strokes in two signatures have the same shape to show similarity, it is also necessary that both these elements have the same structure, the same origin, and the same reason.

In many cases, the comparison becomes easier when the signatures are more or less complex and when they present a whole series of distinct movements. In other cases, the problem is more delicate, because either the signatures are very short (a few letters) or very simplified, as is seen in figures 10 and 11.

The comparison of a disputed signature with genuine signatures is also difficult and does not lead to an explicit conclusion when the questioned signatures are only composed of a simple succession of common movements, without peculiarities and without personality.

In other cases, the expert encounters signatures of persons who write very little or very badly, or who can just sign; these signatures are generally without constant elements and are very variable in their make up. It is very difficult to determine objectively if the observed differences depend upon a real difference in the writers or if they result from a very important but normal variation of signatures of one person. The preliminary and complete study of the disputed signature alone allow one to determine whether or not the disputed signature falls within the limits of variations of the genuine signatures.

The expert must also take in consideration all the factors which can cause a person to sign in a manner which is abnormal. For example, signatures made when the person is in an unusual position, standing up, lying in a bed, signatures made in a train or car, or written when the documents were on a shaky table, rested against a wall, etc. One must also consider signatures written with very cold hands, when the person wears gloves, is under the influence of a recent wound, is sick, has fever, is under the influence of alcohol, cannot see well, is blind, etc. Naturally, the expert must be informed of these facts if they are

known, because ignoring them can lead to error. For that reason, the document examiner should always be able to study the brief.

THE OPINION

We can see that the expert examination of signatures is not a simple thing, and a good expert must venture to give no conclusion or to give a conclusion with more or less probability. In our mind, it is impossible to give a rule which allow some to say: "If you observe this thing, or if you did not observe that thing, the signature that you are studying is, or is not forged." When his comparative work is finished, work during which he will naturally have taken notes and make sketches, the expert must make a synthesis of all the facts revealed. It is not only a simple addition of the agreements on one side and of the differences on the other side, to see where is the maximum. In fact, each element must be studied and discussed for itself so that, at the end, the expert receives a valuable opinion. An expert examination of a signature should never be done quickly, but should be done in two or three times, with interruptions, so that the expert can begin again with a fresh mind. The expert must discuss with himself the elements he has observed to see if these elements are or are not in accord with the facts of the process. The ideal is to be able to speak of these problems with a collaborator who does not know the problem and whose reactions will be very useful. This collaborator will try, perhaps, to minimize the importance of such an element to lead to a discussion.

We always find advantage in repeating the examinations many times, to understand as completely as possible the different facts of the problem, and we illustrate our report with pictures (photography) which show the disputed and many of the genuine signatures together, reproduced under the same conditions. In practice, it is very often impossible to examine at the same time, to compare, the disputed signature and all the comparison signatures, because they are on different documents, at different pages of the same book or on sheets the dimension of which will not allow the comparison in one movement of the eyes. The grouping of the different signatures to compare is very important; we always do this, putting the photograph of the questioned signature at the top and the pictures of numerous comparison signatures on the same cardboard, all these pictures with the same enlargement. Generally, we have 3 to

5 cardboards which can be placed close to one another so that they can be studied all together. On these cardboards, little arrows point out the described elements.

Finally, the *way to write the report* is very important. We think, in accord with our teachers, Prof. Bischoff (Lausanne) and Prof. Ed. Locard (Lyons), that when a lay person reads a report he should think that it was not necessary to ask for a report on that problem, the conclusion appears so clear to everybody. The report must lead the reader into making all the verifications the expert has so that he naturally follows the demonstration and understands the observations and, finally, the conclusion. Maybe, the reader cannot agree with the expert and is not able to follow his discussion and will ask for further explanations; this will lead to a profitable discussion by which the conclusion will be reenforced or on the contrary weakened.

DANGERS OF GRAPHOMETRY

Certain experts are using the method known by the name of graphometry for the examination of signatures; either they measure some dimensions on the disputed signature and on the genuine ones, and they compare the results obtained; or they translate the movements of the different strokes in the disputed signature to a curve which is compared to the curve obtained in the same manner for the genuine signatures. We think that these techniques are dangerous; for the comparison of handwritings, the graphometry is applicable only when a large number of documents is available, so that it is possible to compare not absolute numbers, but averages. In the case of signatures, only a few letters of the alphabet are present, and for the most of them only once in each signature, so that the law of the large numbers cannot be applied. If one of the measured dimensions of the disputed signature falls in the average for the same element of many of the comparison signatures, it does not signify anything, no more than if the dimension in question is different of the average. In the same way, the translation of a stroke to more or less complicated curves is dangerous, because two different experts working one after the other will certainly get different curves, because they do not place the tangent to a certain curve in the same manner, etc. In a signature, the angles and the curves are not geometrically constructed but are extremely complex, so that it is impossible to construct a tangent mathemati-

cally to a curve or a perpendicular to a stroke; the personal equation of the expert plays a too large rôle.

WHO IS THE FORGER?

When an expert reaches the conclusion that a disputed signature is really forged, he will quite certainly be asked to answer the question *who made the forgery*. This problem is really difficult to resolve and many times impossible. What was the technique of forgery (except in case of spurious signatures)? It is easy to understand that the forger who tries to imitate a model is going to make a forgery in which we will find very few of the elements of his own writing. This is true, because one of the best systems of disguising his own handwriting is to imitate that of another person. With the imitations of signatures by tracing, or starting from a stamped facsimile, or with a servile imitation we have more of the design of the real signature. In such cases, it is frequent that the question of who was the author of the forgeries remains unanswered.

On the other hand, when we have a freehand forgery, which is quickly written, it is possible that the forger puts into his work some characteristics of his own handwriting which are just those which differ from the model signature. In a spurious signature, generally the forger does not try to disguise his handwriting, and he will as a rule be easily identified.

In all cases, the technique of comparison consists of comparing the disputed forgery with the ordinary handwriting and with normal signatures of the suspect, so that the names of comparison reproduce the same wording as the disputed signature. It is not rare to observe interesting agreements in the arrangement of the signatures because the forger tries more to imitate the forms and details than to imitate the general elements as those of arrangement. He places the forged signature on the document as he ordinarily places his own signature on some documents. Naturally, this is nothing absolute, but only an example of the kind of elements we must look for.

CONCLUSIONS

As told at the beginning of this article, the expert examination of signatures does not rest on a bases as scientific as the identifications of firearms, or the toxicological search of poisons, for example. It is not possible to improvise as a docu-

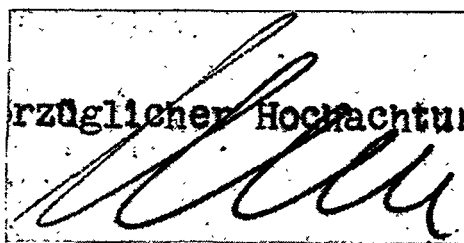


FIGURE 12

Example of a signature without personality, relatively easy to imitate.

ment examiner, or an expert in signatures. Every expert must have first received a theoretical and practical training and afterwards must have worked under the direction of an experienced teacher, before beginning his own practice because in this profession nothing can replace the experience which comes slowly.

Upon the whole, we have tried in this article to show how vast the problem of the expert examination of signatures is and how numerous the difficulties encountered by the expert are. There exists different ways to imitate a signature, each of which have their own more or less typical peculiarities and which an expert must know completely. The expert must arrange for sufficient and accurate comparison material, and it is important too that the examinations are conducted systematically, beginning with the complete study of the disputed signatures, following with the complete study and the comparison one to the other of the genuine signatures, and ending with the comparison between the disputed and the genuine signatures, comparison which must go from the general elements to the details. It is evident that the conclusion will not be the arithmetical count of the positive elements on one side and of the negative elements on the other, but the expert must appreciate and discuss the factors found. Even when all the favorable conditions are reunited, it will not be possible in some cases to reach a conclusion, because the degree of accuracy of the conclusion depends on the kind and nature of the questioned signature and of the genuine ones. The expert examination of a signature similar to that reproduced in the figure 12 cannot lead the expert to a definite conclusion; he must use phrases like "It seems to be perfectly possible that . . ." or "It is probable that . . ." because it is evident that the perfect imitation of such a signature without personality is not so difficult.

In the same point of view, a definite conclusion will not be possible when the comparison signatures vary in their constructions and details. In such cases, the expert can only with difficulty determine if a difference between the disputed signature and one of the genuine signatures is a proof of a different writer or if it is only a normal variation of a stroke traced by a single person.

To conclude, it seems useful to point out one other possibility which can happen and that we have encountered in our practice; a testament of a few lines of text was contested by some of the heirs, who pretend that the handwriting and the signatures of that testament were not those of the deceased person. A very important comparison material of signatures and handwriting was at the disposal of the expert and the examinations and studies led to the conclusion that there was no

reason to doubt the genuineness of the handwriting, which was certainly that of the deceased. About the signature on the contrary, we observed that it was similar to the handwriting, but did not seem like the usual signatures. It was evident that it was very probably, even quite certain, that this disputed signature was written by the deceased who has not "signed", but written his name. In such a case, the expert can naturally not answer the question "Is the signature genuine or not?" because we are not dealing with the "signature" but with the name of the deceased written by himself. It seems in this case that the disputed testament was in reality a draft, or a first sketch of last will on which the testator had, under his last will, "written" his name instead of executing his ordinary "signature," with the intention of establishing later a real testament with a real and ordinary signature.