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## Mullner Moulage Method

Hans Mullner

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letter and not upon a legal document, would have been conclusive that the signature was not genuine. The lines were wavering and hesitating, there were frequent breaks in unusual places, the formation of the letters was abnormal, and there were traces of graphite at the edges of some of the strokes. The significance of these points, however, was discounted by the fact that none of them was inconsistent with the other hypothesis, namely, that they were the results of an attempt to make a slavish copy of a signature previously outlined by a solicitor in blacklead pencil.

#### DISCUSSION

Mr. A. Lucas confirmed Dr. Mitchell's statement that chemists who attempted to confine their work to the microscopical and chemical examination of documents were eventually compelled to take up the examination of handwriting. He gave a few examples of cases in his own experience, illustrating points which had been raised in the paper. In one of the cases cited, an ink that was alleged to be a mixed ink was proved not to be a mixture. In another case an anachronism was discovered in the composition of paper, which contained wood cellulose, although the date upon the document was about 60 years before that material was used as an ingredient of paper. Mr. Lucas also confirmed the value of Osborn's comparison microscope for the examination of documents.

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## THE MÜLLNER MOULAGE METHOD<sup>1</sup>

HANS MÜLLNER<sup>2</sup>

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*Editor's Note:* The following is a translation of an article that appeared originally in Volume IV, No. 12, 1930, of the *Kriminalistische Monatshefte*, published in Berlin, Germany.

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The greater the number of details which an imprint contains, the more valuable it proves as evidence in court procedure. Those in soft materials, such as dust, flour, fresh snow, and mud, exhibit the most numerous and exact markings, but are, at the same time, difficult to reproduce.

In this work, it is necessary to become accustomed to the fact that it cannot be conducted without the aid of materials which are a little more complicated than those employed in methods formerly in

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<sup>1</sup>Translated by L. J. Kaempfer, Scientific Crime Detection Laboratory.

<sup>2</sup>Graz, Austria.

use. The simplest handicraft requires its particular materials and tools. How, then, could a work so delicate as taking of an imprint in the dust be accomplished without special material and more detailed methods?

The author developed, in 1923, a method for taking casts of impressions left in soft materials. The system was tried out at the Institute of Criminology of the University of Graz, by Dr. Ernst Seelig, and described by him in the *Archiv für Kriminologie*, Volume 78, No. 4, 1926. It was recognized as superior by Dr. Arnold Lichem, Assistant Chief of Police and Director of the Police School of Graz, and is at present being used by the Austrian police.

These officers now make use of but two methods, the usual one which involves employing plaster for reproducing imprints upon relatively firm substances, and the Müllner process for copying those in soft media. No matter which technique is applied, the imprint, once found, is protected from damage by covering it with an inverted empty box until molding materials may be brought from the nearest police station.

The essence of the Müllner method is to cover the imprint as described further on, with a thin layer of plaster so delicate that it will not efface even the most minute details present; next to strengthen this so that we may pour upon it ordinary plaster and thus produce a solid plaster mold.

For the Müllner method the following materials are necessary:

1. A strong cardboard tube about 75 centimeters (30 inches) long, of a diameter which must exceed the length of the imprint. This is fastened together by encircling it with a cord, and set over the imprint, being careful not to damage the latter in so doing.

2. An apparatus for applying powdered plaster, a sort of atomizer mounted upon a small reservoir filled with fine, fresh, plaster. We fill the reservoir only three-quarters full, and spray the powder on the inside of the tube. The result is that this falls very evenly within the cylinder and, landing gently on the imprint, covers it with an absolutely homogenous layer. There is no process more certain than this for securing so thin and uniform a layer of plaster. As we do not spray directly on the imprint, but on the inside of the tube, we prevent globules of plaster from falling directly upon it and injuring it, since these globules strike along the wall of the carton and outside of the imprint.

We spray the powdered plaster upon the impression until it is covered with a layer about a quarter of a millimeter deep. It is easy to gauge the depth, if, at the beginning a bit of paper has been

placed on the ground near the imprint. The tube may be lifted and the depth of the layer on the paper observed.

3. The third item of equipment is an alcohol vaporizer similar to those employed by hair-dressers. The ideal instrument for this purpose will be a long narrow flask in which the tube of the metallic vaporizer mounted above extends almost to the bottom. This should be held about ten centimeters above the imprint, the nozzle pointing upward, and the alcohol sprayed into the air so that it will fall lightly upon the coat of plaster, since spraying directly upon the imprint would destroy it. This manoeuver should be carried out first at the edge of the imprint, and only after it has been ascertained that the vaporizer is giving a steady, fine, shower of alcohol should it be applied to the impression itself. It is necessary to use 96% alcohol because this permits a finer and better vaporization, and water cannot be distributed in as fine a shower.

Apply the alcohol until it has completely penetrated the layer of plaster, which absorbs much of it. It is only in this way that one may be certain of obtaining a mold which exhibits all of the details of the original. If there be wind or currents of air which blow away the shower of alcohol, a hole should be punched in the tube about ten centimeters above the ground in which to insert the nozzle of the vaporizer.

There are some dust-like substances, such as flour and red pepper, which, when saturated with alcohol, tend to develop cracks which traverse the entire imprint and distort its appearance. Molds in such materials are possible only if the layer of plaster is very thin and even, and if one applies the alcohol only until this layer is saturated. It is not necessary that it penetrate the powder to the extent of producing cracks.

If the plaster is applied in any other manner, for example, by being blown from the hand, or sifted on, it would necessarily form an uneven coating, and we would have to apply a larger quantity of alcohol in order to penetrate this to the bottom, and consequently, where the depth was greatest, more alcohol would be necessary. This would result in cracks which would injure both the original and the cast.

The first coat of plaster being finished, a second is added in the same manner, and, if necessary, a third. Each time the tube is placed over the imprint, powdered plaster applied to a depth of another quarter of a millimeter, the tube removed, and the plaster saturated with alcohol.

When the alcohol has evaporated, the crust of plaster thus pro-

duced will be sufficiently hard to permit pouring a very fine milky plaster suspension upon it. This should be applied gently by means of a spoon, and must be thin, so that if by chance the plaster has not been completely impregnated with alcohol it will now become so with the plaster suspension. It is only after we have poured this suspension upon the imprint that plaster mixture of ordinary consistency is added and strengthened with bits of wood.

Let the mold dry for five or six hours, then lift it carefully from the ground, hold it under a faucet and carefully remove the powder with water and wash the cast.

This process requires from one-half to three-quarters of an hour, and reproduces the finest details of the imprint in a most exact manner. The method is so sure that with average care, destruction of the imprint, or failure, is almost impossible if the cautions mentioned above have been observed.

The method of making copies from imprints in powder, which up to the present time has been considered the best, was that of applying dissolved gelatine. It was compared, at the Institute of Criminology, of the University of Graz, with the Müllner method. According to the former method, the gelatine is sprayed by means of a vaporizer upon the imprint in the powder, until it forms a crust sufficiently strong to support an ordinary plaster paste.

Gelatine is a substance of the Colloid type and is only slowly soluble in pure alcohol. Its greatest fault is that it unites as well with the plaster as with the powder. To avoid this, it is necessary to coat the crust of gelatine with a sufficiently large amount of talcum powder. If too little of this is applied, the plaster mold will be covered with so much powder that it will be necessary to wash it with alcohol a long time, and even then it will be difficult to clean. If, on the other hand, enough of the talcum powder be applied to the gelatine to prevent the powder adhering to the plaster, the latter will efface many of the details, or at least diminish them so much that imprints of nails, prominent at first, would show only vaguely in the cast.

Following the gelatine solution method, the original imprint is covered with a fine crust of gelatine, which is later coated with talcum powder. The plaster mold then gives the form of the crust of gelatine, but not the details of the original. These last are reproduced more or less incompletely.

According to the Müllner method, the plaster is placed directly on the details of the original, and the details of the imprint thus reproduced, and not diminished or flattened, and on the whole, are

as perfect as possible. It is necessary to dissolve a considerable quantity of gelatine in order to secure enough to obtain a resistant crust. While, by the Müllner method an eighth to a sixth of a litre of alcohol is sufficient, a quarter to a third of a litre is required for the gelatine solution.

Whereas in the Müllner method the moulage is finished in half an hour, it is necessary by the gelatine process to wait a half hour before forming the plaster layer, after having completed that of the thin gelatine coating.

Much time is required to dissolve the gelatine, so the solution must be prepared before visiting the scene of the imprint. Further, this substance is not distributed as finely as is pure alcohol. If the solution be thin, it requires a long time for the formation of a crust, and if it be thick, it does not spread so evenly. Still, larger drop-lets may damage the imprint. The Müllner method is more accurate. Also, when spraying the gelatine the fingers become stained and these stains remain for some days.

The advantages of the Müllner method as compared with the gelatine process are:

1. Absolutely exact reproduction of the imprint.
2. A fifty per cent saving of alcohol which, considering its price, is not negligible.
3. A saving of time (thirty to forty minutes), while the gelatine method requires one to one and a half hours.

With regard to the purchase of the necessary materials, these are easy to procure everywhere. Moreover, these, with the exception of the cardboard tube, are also obtainable, neatly arranged in a wooden box, from Mr. Hans Müllner, Police Divisional Inspector, Karmeliterplatz 3, Graz, Austria, at the price of 16 Austrian schillings.

This system, already tested and approved, as previously stated, at the Institute of Criminology of the University of Graz, by Professor Ernst Seelig, was again tested recently by the Assistant of the same Institute, Dr. Gustav Müller, who commented upon it as follows: "The Müllner moulage process surpasses, as proved by recent experiments, all preceding ones, and especially the dissolved gelatine method. The Müllner method must be recommended, for practical use, as being the simplest, most exact, and surest, for making copies of imprints in powder."