

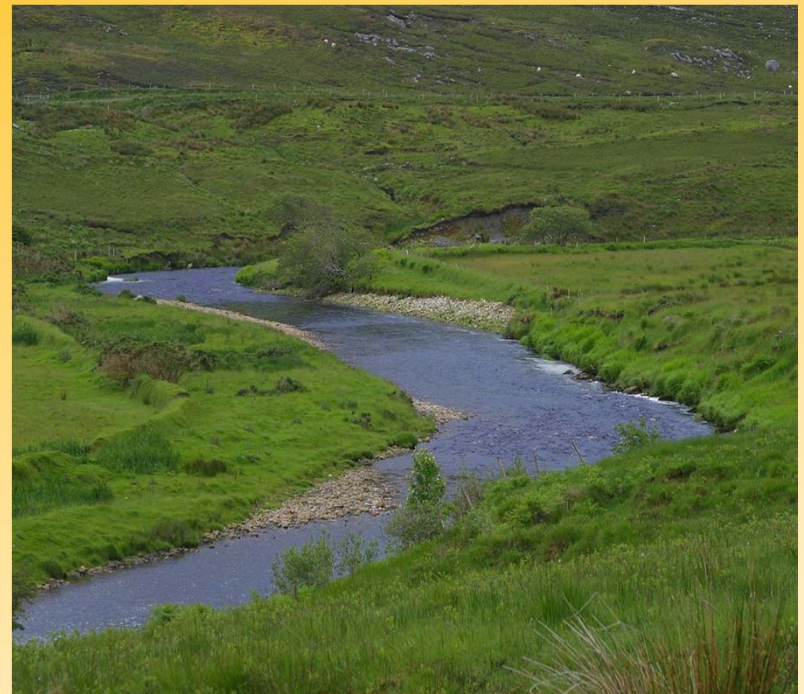
Environmental Contamination

Seasonal flooding caused crop failure and livestock sickness.

The water was tested using chromatography.

The separated metals had to be located on the chromatogram with UV light.

The spots were developed chemically and compared to standards to determine the identity of the metals.



Environmental Pollution

**The metals were identified, but
where did they come from?**

A magnet manufacturer?

A maker of brass hardware?

A rechargeable battery company?



Trace Evidence: Qualitative Analysis

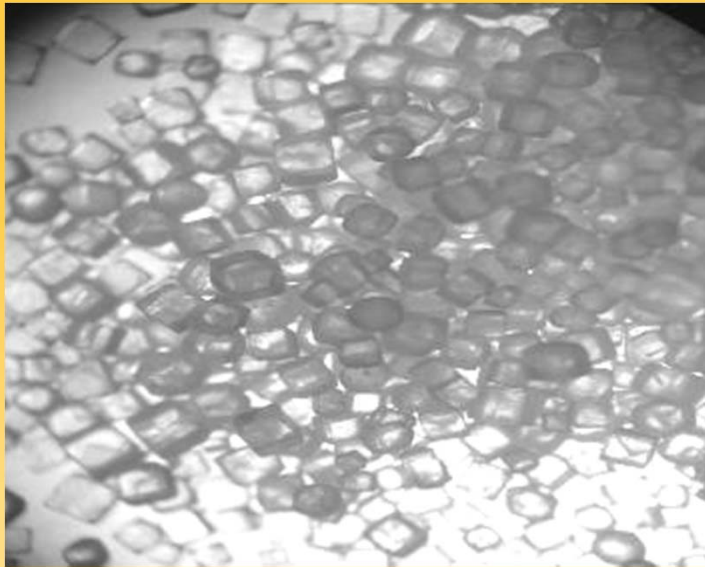
When investigators find substances at the scene of a crime and send them to the laboratory for identification, the forensic chemist uses several techniques or lab tests to identify them. One of these techniques is qualitative analysis. For example:

A number of white powders that appear the same can be identified by their physical and chemical properties.



Qualitative Analysis

Microscopic Examination



Qualitative Analysis, *continued*

Check for:

Solubility

pH

Chemical reactions

- Color
- Precipitate formation
- Evolution of gas



Flame Colors

Many metal salts show a distinct color when heated.

Sometimes this property can be used in an analysis.



A Historical Crime

In 1912, Emile Gourbin was a bank clerk in Lyons, France. He came under suspicion of strangling his girlfriend, Marie Latelle. Gourbin was arrested but had what appeared to be an airtight alibi. Edmond Locard went to Gourbin's cell and removed scrapings from under his fingernails. The scrapings contained tissue that possibly came from Marie's neck, but this was not provable. Locard noticed that the tissue was coated with a pink dust, which he identified as rice starch. On the particles he found bismuth, magnesium stearate, zinc oxide, and a reddish iron oxide pigment called Venetian red. Examination of the face powder used by Marie revealed that a powder prepared for her by a Lyons druggist was similar in composition. In these days of mass-produced face powder, this evidence would have far less significance. However, in 1912, because of the special preparation, it led to the confession of Gourbin.

A More Recent Crime

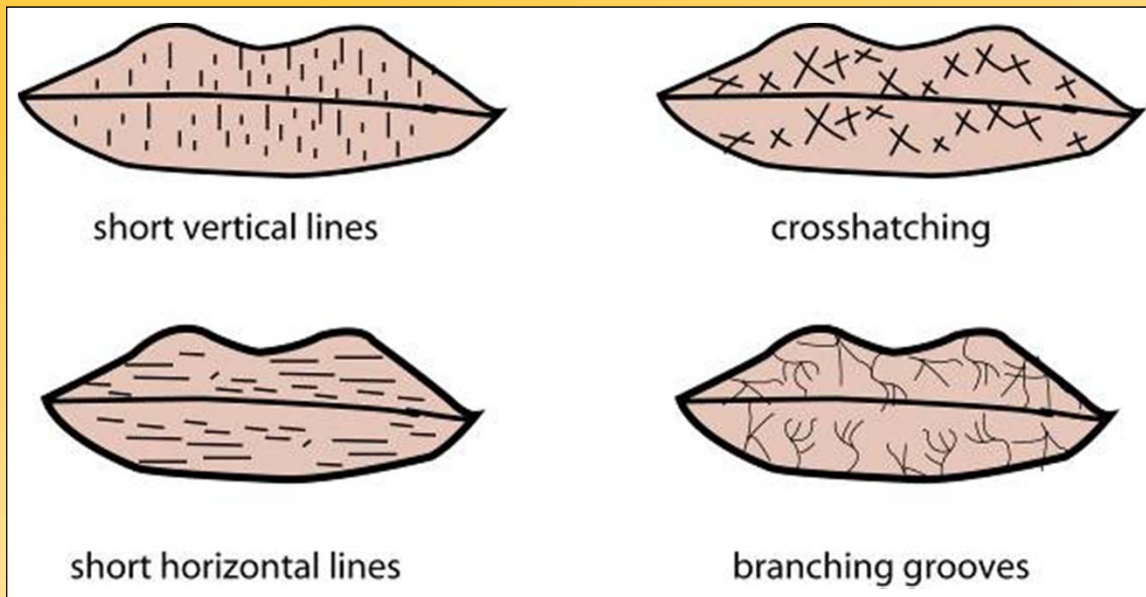
A bank robber was startled by an alarm just as the teller handed her the money. She grabbed it and, in her haste to get away, ran smack-dab into a glass door. Nevertheless, she recovered and got away. Subsequent examination of the door revealed a red lipstick imprint of the perpetrator's mouth. Police later picked up a suspect, but needed evidence to link her to the robbery. Are lip prints unique enough to tie the suspect to the crime?

http://www.hbo.com/autopsy/episode/episode_6_the_telltale_imprint.html



Lip Prints

Lip prints are different and can be used to identify suspects.
There are several general patterns:



Chromatography of Lipsticks

The lipstick used by the suspect could also have been compared to the residue on the door.

Thin-layer chromatography (TLC) can be used to separate the components of a lipstick. The chromatograms can then be compared for a possible match.



Paint

Paint can be used as evidence in hit-and-run cases.

The layers of different paints in a cross section may be unique.

