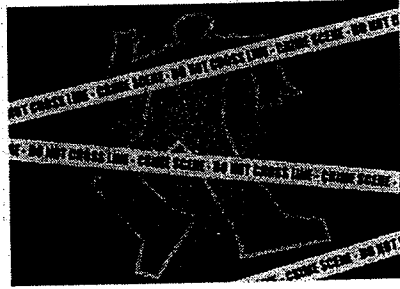


# CSI

Unlocking the Mystery of the Crime Scene  
to Prove Your Case



Mike Rexroad

December 26<sup>th</sup> at 10:46 a.m.



4958 Webbed Foot Way, Ellicott City, MD

## **Crime Scene**

Location of a crime, such as the room where a rape-homicide occurred or intersection where an automobile was carjacked. The crime scene contains physical evidence collected by crime scene technicians and analyzed and examined by forensic scientists to generate *identifiable data, class or individual* results that constitute relevant and admissible evidence of crime.

## **Objectives of Any Crime Scene Investigation**

1. *Recognition of physical evidence*
2. Documentation
3. Proper collection
4. Packaging
5. Preservation
6. *Interpretation*
7. *Scene reconstruction*

## Types of Crime Scene Information

- *Information on corpus delicti*
- *Information about modus operandi*
- *Linkage of persons, scenes and objects*
- *Proving or disproving witness statements*
- Identification of suspects
- Identification of unknown substances
- Providing investigative leads
- *Reconstruction of the crime*

## Corpus Delicti

- Literally, the body of the crime.
- Includes all facts and information that might relate to the crime.
- Determination of the initial facts of the investigation.
- Includes physical evidence, patterns of evidence and items to submitted for examination.
- Investigators and crime scene technicians *must not prejudge* the crime—be inclusive, not exclusive.

## Modus Operandi

- › Often referred to as MO or method of operation
- › Concept: Criminal will repeatedly use the same technique and evidence of the technique will provide a means of identifying the criminal.
- › Rule 404 (b): limitations of “signature” crimes
- › Examples:
  - Serial murder (BTK murders)
  - Burglary
  - Serial rape
  - Computer virus (source code)

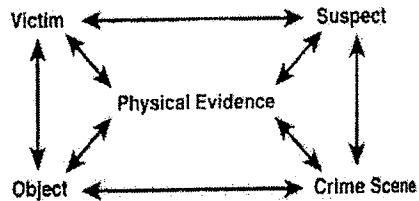
## Locard's Exchange Principle



*“Anyone, or anything, entering a crime scene both takes something of the scene with them, and leaves something of themselves behind when they leave.”*

## Linking Persons, Scenes and Objects

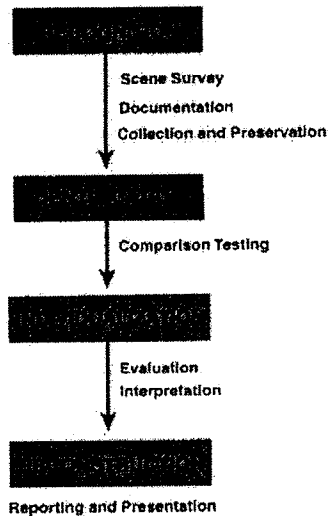
- Locard's Exchange Principle
- Linking suspects to victims:
  - Blood
  - DNA
  - Fibers
  - Hair
- Linking victims and suspects to objects and scenes by physical evidence:
  - Glass
  - Pollen



## Proving or Disproving Statements

- Many trials, particularly close ones, turn on the credibility of important witnesses.
- It can be crucial whether a witnesses' testimony is corroborated or not supported by the physical evidence in the case.
- Presence or absence of certain types of physical evidence is very useful in accessing credibility.
- Crime scene patterned evidence such as fingerprints, footwear impressions, footwear impressions and blood spatter are especially well suited for credibility issues.

## Science and Crime Scene Investigations

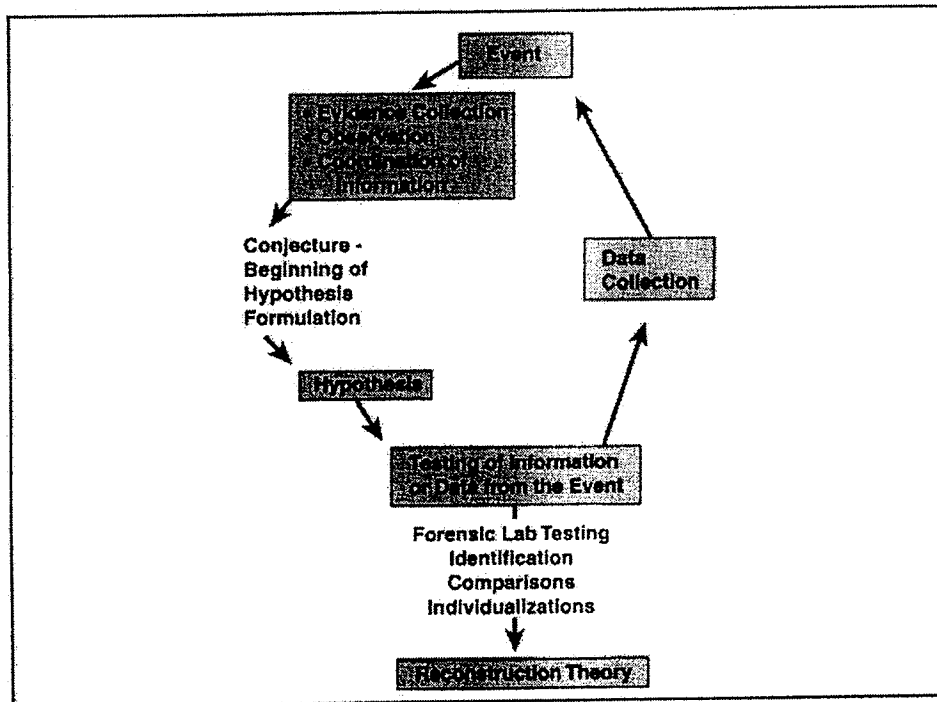


## Crime Scene Reconstruction

Involves scientific crime scene investigation, interpretation of patterned evidence at the scene, laboratory testing of the physical evidence, systematic study of related case information and the logical formulation of a theory. Its steps and stages follow basic scientific principles, theory formulation and logical methodology. It incorporates all investigative information with physical evidence analysis and interpretation molded into a reasonable explanation of the criminal activity and related events.

## Stages in Reconstruction

- *Data Collection:* All information, data, documentation, Physical evidence, patterns and impressions
- *Conjecture:* A preliminary explanation or conjecture of actions involved in crime scene. May be several alternative explanations.
- *Hypothesis Formulation:* Additional accumulation of data based on examination and interpretation of pattern evidence.
- *Testing:* Additional testing or experiments to prove or disprove hypothesis.
- *Theory Formulation:* Based on all current evidence, when hypothesis thoroughly tested and verified.



## Evidence and Reconstruction

- *Impression location/ position:* Fingerprints, footwear or tire tread marks
- *Glass Fracture patterns:* Direction of force or order of fire
- *Wound location or dynamics:* Angled entry GSW
- *Clothing location or damage:* Clothing defect or absence of defects in stabbing case
- *Shooting Investigations:* Range of fire or firearms residue discharge
- *Bloodstain patterns*

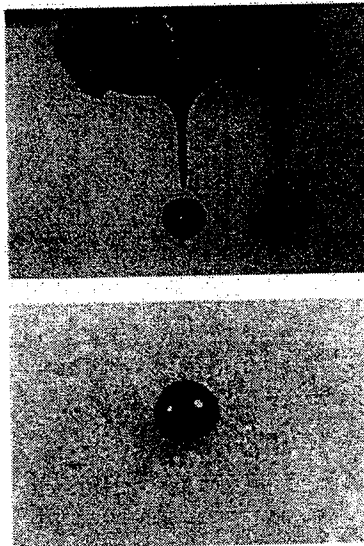
## A Primer on the Recognition of Bloodstain Patterns



## Physical Properties of Blood

- *Blood*: Held together by strong cohesive molecular properties.
- *Surface Tension*: Force that pulls the surface molecules toward the interior, resisting penetration.
- *Viscosity*: Mutual attraction of molecules of blood and the resistance to change of form or flow.
- *Passive Blood Drop*: Gravity and volume interacting with surface type and area.
- *Terminal Velocity*: Maximum speed of free-falling blood drop; approximately 25.1 feet per second. Diameter of free-falling drop function of volume, surface and—up to a point—distance fallen.

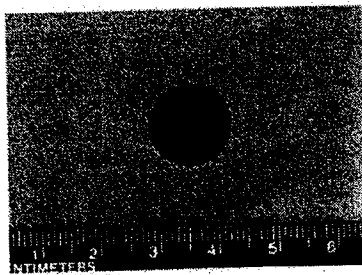
## Spheroid Shaped Blood Droplet



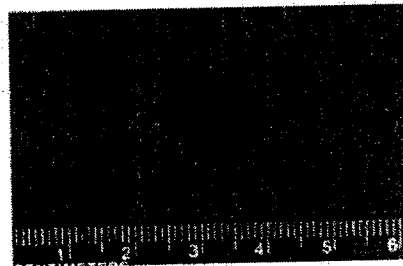
## Target Surface

- A falling drop of blood will not spatter or break into smaller droplets unless the surface tension is disrupted.
- One factor causing surface tension disruption is the physical nature of the target surface.
- Hard, smooth nonporous surfaces, such as smooth tile, will create little if any spatter.
- Rough surfaces such as wood or concrete can create significant spatter.
- The rough protuberances rupture surface tension, producing spatter and irregular parent stains with spiny or serrated edges.

### Target Surface: Vertical Drop of 30 in.



Smooth Tile



Wood Paneling

## Size, Shape and Directionality

- \* Geometry of bloodstains will generally allow for determination of their flight.
- \* *Directionality*: The narrow end of an elongated bloodstain usually points in the direction of travel.
- \* *Area of Convergence*: After directionality has been determined, an area or point of convergence may be established by drawing straight lines through the long axis of bloodstains. This convergence location is an area, not an exact point.

## Direction of Travel

