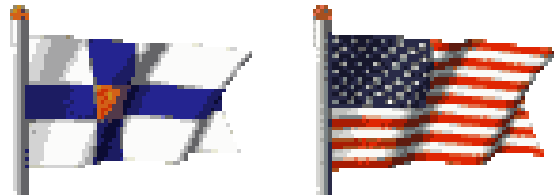


**FIBRES, METAL BUTTONS,
WELDING FUME PARTICLES AND PAINT CHIP
AS INCRIMINATING EVIDENCE IN SOLVING
TWO HOMICIDES COMMITTED BY THE SAME PERSON**



**Raili Sulkava
NBI Crime Laboratory, Finland**

Trace Evidence Symposium
Clearwater Beach, Florida USA
August 14th, 2007






The cases of PIA K. and PIA T.

- The forensic investigation of two alleged sexual homicide cases is described.
- In both cases the victims were young women (17 and 20 years), whose backgrounds and lifestyles were similar.
- The forensic investigations were in many ways unusual and in both cases the scene of crime remained unknown.
- Both victims were found in water, partly unclothed, but neither of them was drowned.
- Victim in **case 1** was found some hours after her disappearance while the victim in **case 2** was found approximately six months after she was last seen.



- 
- These two homicide cases had been under investigation for five years and were resolved by profiling and trace evidence analysis.
 - During the investigation, collaboration between the crime laboratory and the crime scene investigators was exceptionally intense.
 - The experience gained in this work has led to the development of a new approach to trace evidence analysis and to collection of samples for trace evidence.
 - A tedious but rewarding project.





Oct. 4th:
Pia K.
disappears

Oct. 5th:
Body of Pia K.
discovered

Jan. 1st:
Suspect taken
into custody

Jan. 27th:
Suspect
released

April 19th:
Suspect
arrested



Sept. 30th:
Pia T.
disappears

March 26th:
Body of Pia T.
discovered



Case 1: PIA K.

- Pia K. was last seen October 4th at midnight:
 - Her clothes had just been washed
 - She borrowed a white shirt from her sister and a blue denim jacket from a friend
- Her body was found by a fisherman next morning at seven o'clock, in the sea, close to the seashore.





Case 1: Investigations and Methods

- The clothes of the victim were dried in air and fibre samples were collected first as tape lifts using Scotch 800 both from the inside and the outside of the clothes and after taping also by vacuuming.
- Fibre samples were taken by combing from pubic and head hair.
- DNA samples were recovered.





- During the next three years a lot of investigative work was carried out by the police and the NBI Crime Laboratory.
- All natural sources of fibres and trace evidence were excluded.
- No correlations between the trace evidence from the victim and from any of the initial suspects and their cars or boats were confirmed.





Case 2: PIA T.

- Almost exactly three years later Pia T. disappeared on Friday, September 30th.
- She was last seen just after midnight.
- Her apartment was carefully investigated and plenty of informative samples (background fibres etc.) were recovered.
- The forensic investigation was focused on the clothing and accessories worn by Pia T. when she was last seen: a **tailor-made red woollen coat**, black jeans, a black T-shirt, a **red-black handbag**, a **waist coat**, a pair of brown leather boots, a pantyhose, panties and a bra.






- During the three years between the two disappearances, several sexual assault and rape cases were reported in the region where both girls had lived.
- A summary of these cases was made.
- Profiling of the suspect was done according to FBI guidelines.



A suspect

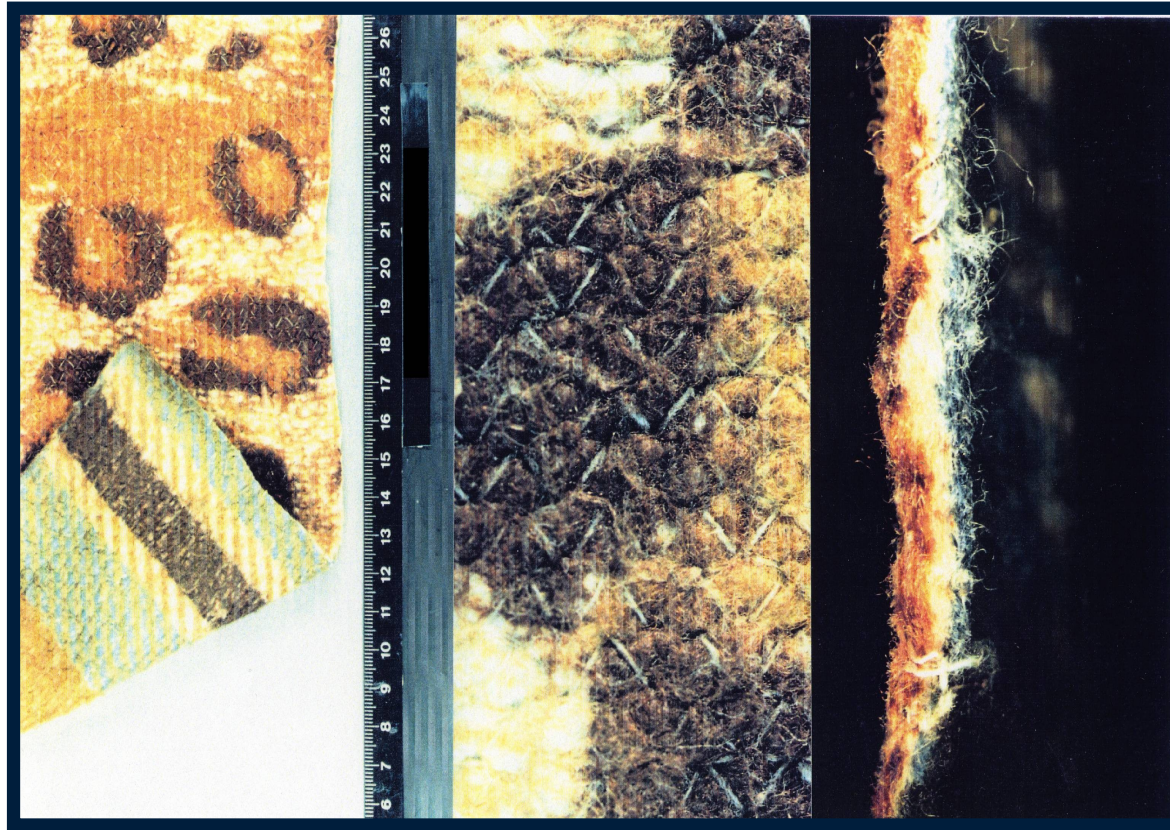
- On January 1st the next year a suspect was taken into custody.
- His residence was investigated and his car confiscated.
- He had bought his car 18 months prior to the first incident.



- 
- Samples were collected from the car of the suspect:
 - Tappings on the seats and on the trunk
 - Samples by vacuuming
 - Reference fibre samples were taken from the clothing and residence of the suspect.



A blanket on the front seat of the suspect's car





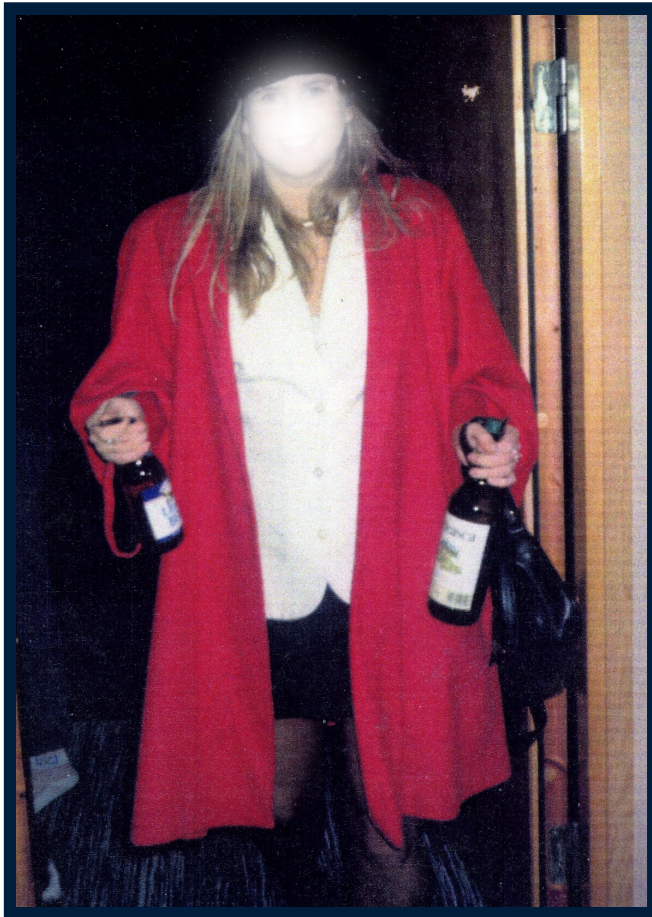
The suspect was released on January 27th
due to lack of incriminating evidence.



Six months after her disappearance,
on March 26th, Pia T. was found in a lake



Her tailor-made red woollen coat and handbag were missing.



Also her waistcoat and watch were missing.





Case 2: Investigations and Methods


- The body of Pia T. was in a very poor condition.
- All clothing was muddy.
- Her cotton jeans and T-shirt were badly damaged, but panties, polyamide pantyhose and bra were practically undamaged.





- All loose material was collected on petri dishes.
- The clothes were then brushed with a nail brush and a toothbrush.
- Despite the brushing a lot of fine mud particles remained on the fabrics between the fibres.
- It turned out to be impossible to take tape lifts using Scotch 800 from the clothes of the victim.



- 
- Instead of taping the pantyhose and panties **were washed in an ultra-sonic cleaning bath.**
 - The water was filtered and the filter and the residue dried on petri dishes. **This residue** was searched for fibres and other trace evidence.
 - DNA samples were recovered but head hair or pubic hair combings could not be taken.





Case 2: Investigations and Methods

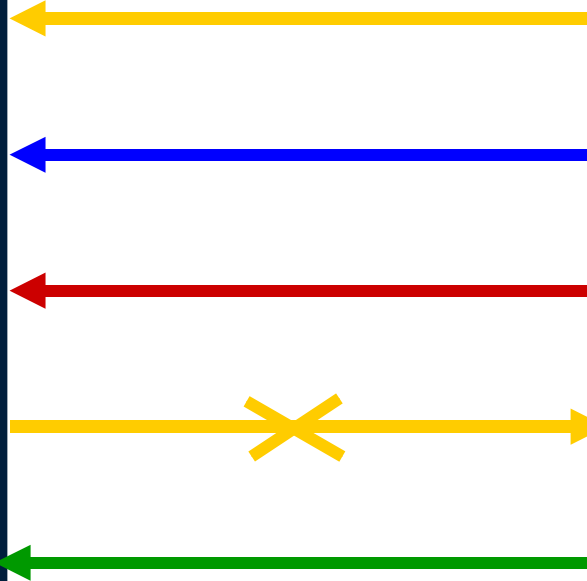
- Extensive publicity of these cases in the media was prominent during the investigations and proved useful.
- As an example, the man who had found Pia T's handbag handed it to the police after seeing the picture of the lost handbag on TV. The handbag had been found in a river just one day after she was last seen, on a site 7 km from the suspect's residence.
- On April 15th the suspect was taken into custody again and arrested on April 19th.



A metal buckle and partly melted buttons were found in an ash pile in the back yard of the suspect's residence



Pia K. - Results

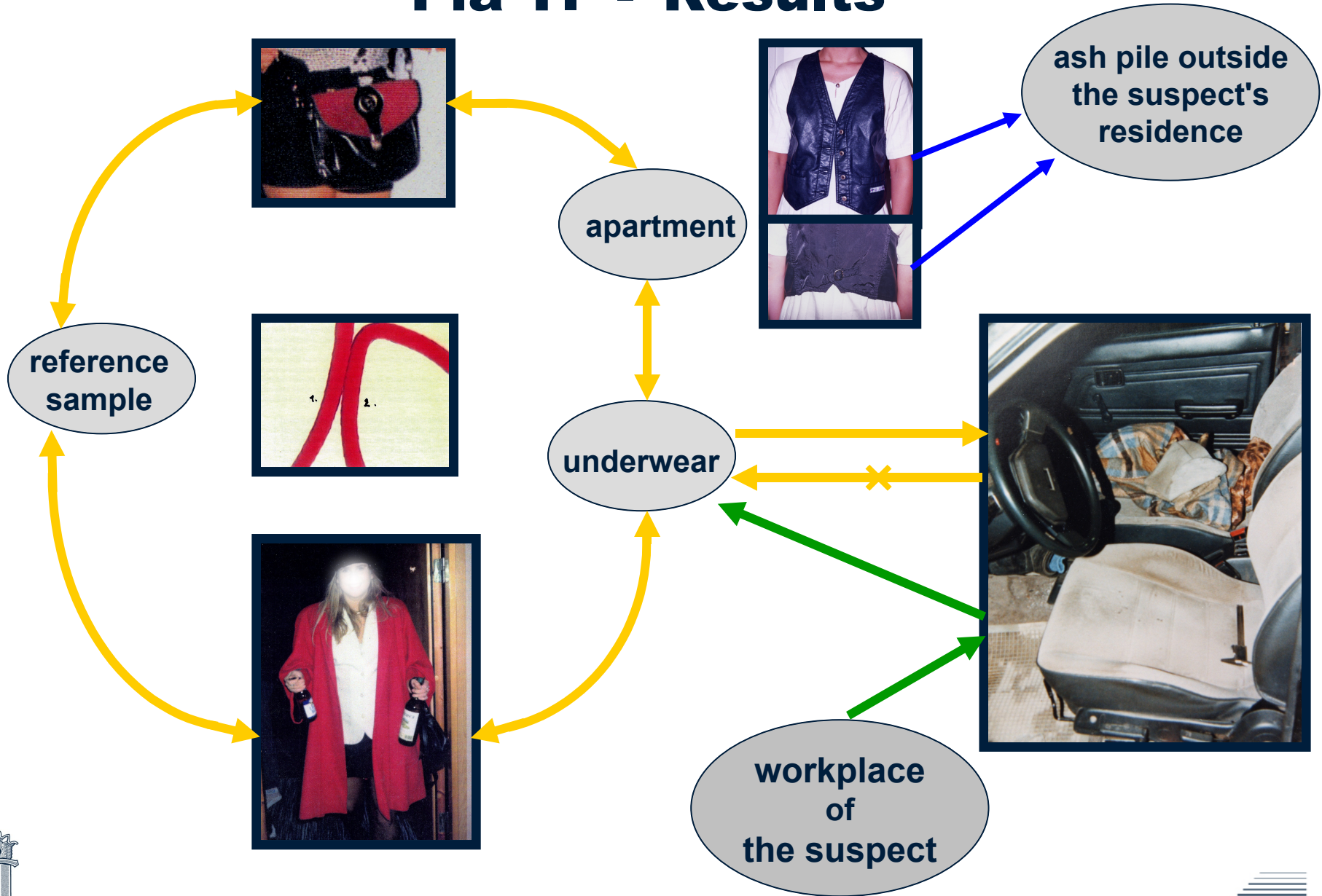


- fibres
- paint
- oil stains
- metal balls

workplace
of
the suspect



Pia T. - Results





The techniques used in the Crime Laboratory for trace evidence analysis in these cases:

- Stereomicroscopy
- Bright field, polarising and fluorescence microscopy
- Comparison microscopy
- UV-VIS microspectrophotometry
- FTIR microscopy
- Pyrolysis GC
- SEM/EDX





Final chapters

- The suspect denied all allegations of having had any contact with the two victims.
- With the forensic evidence presented by the prosecution the District Court sentenced the defendant to imprisonment for sixteen years and eight months.
- The Court of Appeal raised the sentence to twenty years and six months.
- The Supreme Court did not grant a right to reappeal.





Conclusions

- Fibres, metal buttons, welding fume particles and paint chip were incriminating evidence in solving two homicide cases committed by the same person.
- Intense collaboration between the crime laboratory and the crime scene investigators was the key to success.



Thank you for your attention!

raili.sulkava@poliisi.fi

