



The Value of Diatoms and Botanical Evidence in a Police Brutality Case

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The Case

- A man walking home in the early morning hours of July 5th, 1997 was stopped by 3 Riverside Police Department officers for possibly being intoxicated.
- The officers allegedly drove the man to Lake Evans in Riverside, California, beat him, and threw him in the Lake.

Lake Evans







Diatoms

- Single-celled algae with silicified cell walls
- Close to 100,000 species
- Some live as 'floaters' (Pelagic) in open water; others at the water-sediment interface (benthic)



Examples of Diatoms as Evidence

- Drowning cases
- Fillers in matches/paint
- In soils
- Indicators of environment (e.g. water rich environments) and environmental conditions
- Safe Insulations

Case Approach

- Victim's Clothing was examined for:
 - Evidence indicating that clothing had been wet
 - Plant Material
 - Diatoms

The Investigation and Evidence

- Riverside Police Department detectives investigated allegations of police brutality reported by the victim.
- Investigators submitted the victim's clothing to the crime lab for examinations of any evidence that could corroborate the victim's allegations, including that he was in or around Lake Evans.
- The officers' clothing items were not submitted because they had cleaned their clothing shortly after the incident.

Evidence Collected in Laboratory

- Plant material
- Loose debris
- From victims clothing:

Tape-lifts

Debris from scraping and 'shaking'

Cuttings of stained areas

Cuttings of clean ('control') areas

Lake Evans Samples for Comparisons

- Lake water close to shore near site of incident
- Lake water from middle of lake
- Sand samples from shoreline near site
- Sand samples west and across a street from site
- Botanical samples

Evidence Analysis

- Examinations of evidence from victim's clothing:
 - Visual and Stereomicroscopic
 - Polarizing Light Microscopy
 - Botanical Evidence collected and analyzed by University of California, Riverside botanist.

Methodology for Diatom Searching

- First tried looking at the scraped/shaken debris from the victim's clothing for diatoms by mounting sieved portions of the debris in ultra-purified water and examining under PLM – but to no avail.
- Then tried mounting tape lifts, sticky side up onto slides and used ultra-purified water as mounting medium and examining under PLM – with success.
- Was interested in finding the presence of diatoms to show victim was in or near a standing body of water.

Consultants/Resources

- Botanist from the University of California, Riverside Botanical Gardens/Herbarium
- Diatom expert at the California Academy of Sciences in San Francisco

Findings

- Diffuse brown stains on victim's boots and jeans indicating they had been wet.
- Several diatoms on tape-lifts of victim's clothing that were similar in appearance to diatoms observed in the lake water and in the sand samples surrounding the lake.
- Leaves and cone scales on victim's clothing from Mexican Bald Cypress tree(s) (*Taxodium mucronatum*)

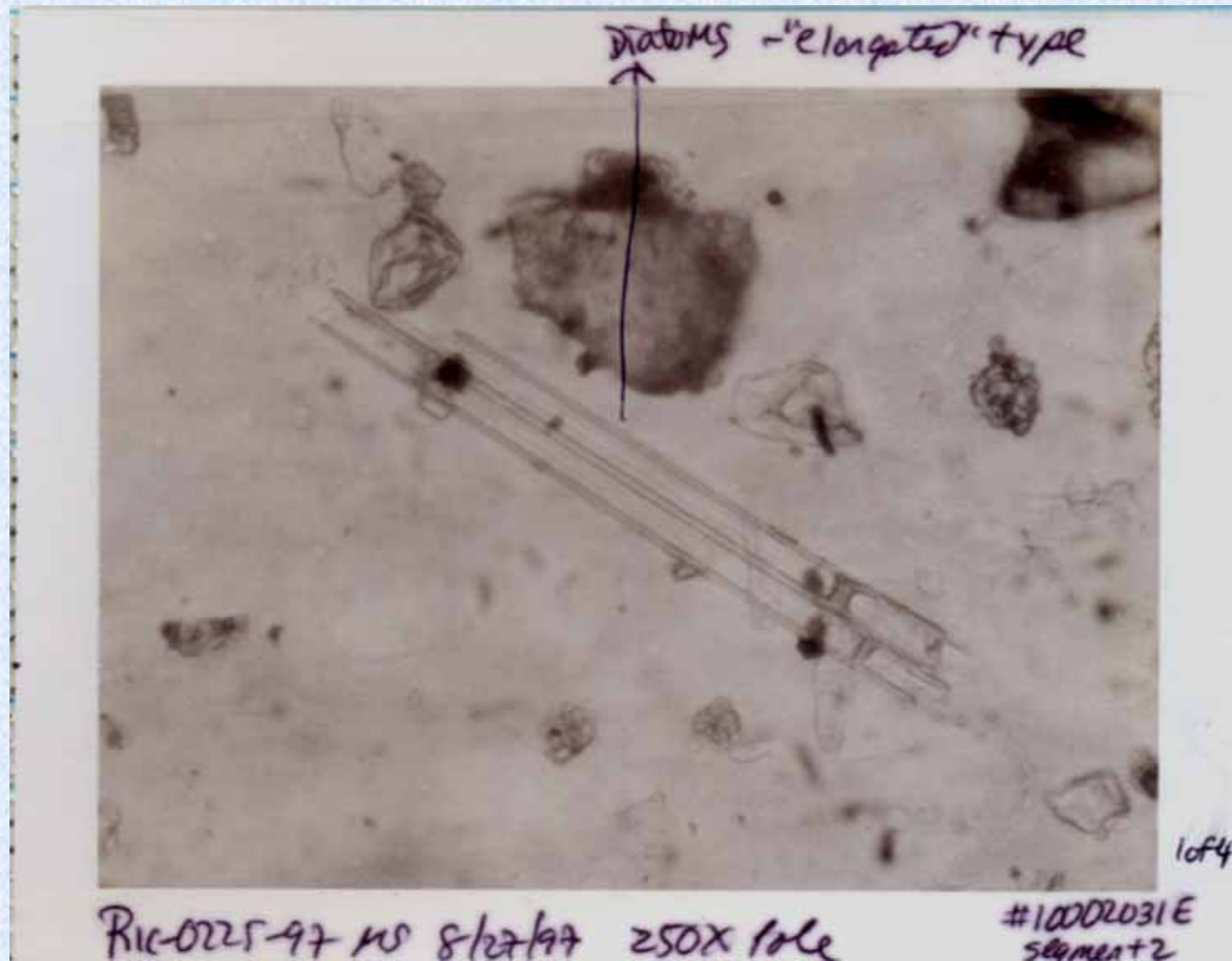
Mexican Bald Cypress tree



Botanical Findings

- Mexican Bald Cypress trees were imported to Riverside in the early 1900s specifically to be planted around Lake Evans.
- The botanist knew of only one other of these types of trees in the Riverside area and this one was in the UC Riverside Botanical Gardens - approximately 10 miles away from the scene.

Diatoms from Victim's Clothing



Diatoms from Lake



Conclusions

- The diatoms, botanical findings and the presence of the diffuse stains on the victim's clothing provided strong evidence that the victim had been in Lake Evans or its immediate vicinity.

Comment on Method

- The method used to search for the diatoms in this case is simple and allows for easy tracking of the diatoms during examinations, thus preserving positional information that may be useful in an investigation.

Mounting Method



Consequences

- The three police officers were fired and all pled guilty to assault charges.

Acknowledgements

- UC Riverside Herbarium Curator, Andy Sanders
- Diatom expert, Pat Kociolek of the California Academy of Sciences in San Francisco