

The Power of Physical Evidence: A Capital Murder Case Study (State of the art physical evidence, including the first recorded image enhanced fingerprint identification, leads to a Capital Murder Guilty Plea).

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March, 1990 had proven to be a busy period for the Henrico County Police Forensic Unit. While deep into the investigation of a multiple homicide of three family members, yet another homicide was reported. This one dealt with the sexual assault and stabbing death of 22 year old Dawn Bruce.

As the body of the victim was removed and the evidence kits were being packed away, the scene investigator left with little information. After an intensive scene search, little recognizably significant evidence had been collected. The only hopeful evidence was a pillow case located adjacent to Bruce's body which displayed several blood stains. One stain showed some ridge detail, but it was faint, barely visible to even the trained eye. In general, crimes with such little existing evidence are rarely solved.

The pillow case was taken to Henrico's Forensic Unit. There, the primary focus was on blood stain pattern analysis. As photographs were taken and stains were studied significant information began to be revealed. First, it was confirmed that several stains were consistent with a contact transfer of blood deposited by a knife blade. No knife was found at the murder scene. Second, and more important, the fingerprint detail appeared to have at least some potential for identification. It was a long shot, but the decision was made to attempt some type of processing. The evidence was taken to the Virginia Division of Forensic Science in Richmond. There, it was processed with a relatively new chemical similar to Ninhydrin, 1,8-Diazafluoren-9-one (DFO). DFO is fluorescent when subjected to a laser type forensic light source. The processed ridge detail was then photographed. After processing, an improved ridge detail photograph was produced. Still, the ridge detail was tenuous, displaying poor general continuity and fabric weave background noise. All traditional photographic techniques fell short. The latent was not identifiable.

During the spring of 1989, while attending the Virginia State Fingerprint Examiner's Conference, the technique of image enhancement had been demonstrated. Faced with a dead end capital murder investigation it was decided to employ this technique. On March 27, 1990, the best DFO photograph was taken to Hunter Graphic Information Systems in Charlotte, NC. Processing with the image enhancement equipment took about four hours. During this period the process was constantly monitored for accuracy, and photographic documentation was taken during each step. Image enhancement proved to be extremely successful and from it an identifiable fingerprint was obtained.

During the case investigation many suspects were checked. All were good, but consistently the County Prosecutor felt that not enough evidence existed for a warrant of arrest. The primary suspect was the victim's next door neighbor. Inked prints of this suspect, taken at a prior arrest were examined, unfortunately, none of the prints were rolled far enough to record the ridge detail needed for comparison. The latent area appeared to be the side of the finger or even a fragment of a palm print. Lacking evidence, no arrest was made.

During the postmortem examination seminal fluid had been recovered from the leg of Dawn Bruce. The preliminary serological report proved consistent with the prime suspect. The blood type placed him in less than 5% of the general population. DNA analysis was initiated, but results would potentially take months to complete. At this point, the County Prosecutor made the decision to issue a warrant based solely on the serology results.

The focus of attention now shifted to the latent print. The latent appeared to be the right side of a large loop or whorl type print. At arrest, the fingerprint technician was advised to roll from nail to nail. From an observation area, this process was closely monitored. This would strengthen fingerprint testimony allowing direct testimony as to the identity of the suspect's inked prints.

On July 10, 1990, for the first time, a comparable set of inked prints was available. Due to the nature of the case and latent print, extreme care was taken with the comparison. This entailed weeks of evaluation, comparison, re-comparison, and verification. Finally on August 7, 1990, a positive identification with the left thumb of Robert Knight was effected and reported. Ironically, less than a week later, the results on DNA analysis were received. The DNA found in the seminal fluid was consistent with the suspect and placed him as 1 in 30 million in the population.

With hard evidence against the suspect, defense attorneys launched an attack on what they felt to be the most vulnerable area, the scientific acceptance of image processing. A suppression hearing was held January 17, 1991, in Henrico County Circuit Court. Ms. Pamela Ringer, with a full complement of image enhancement equipment, took the court through a step by step demonstration of the procedure used at Hunter Graphic Information Systems. Supporting testimony was offered by Bill Watling of the IRS Laboratory in Chicago. Watling is one of the most experienced image processor operators in the country. Ultimately, the Judge ruled the enhanced print admissible, stating that the process did not alter the print pattern. The evidence, a computer

enhanced print had passed the test. To our knowledge this is the first such documented case where image enhancement technology has withstood the challenges of a Frye Hearing.

As final trial preparation began one final bit of evidence emerged. Maintenance men working on plumbing in the defendant's vacant apartment discovered a military survival knife hidden in a pipe chase. The knife was consistent with the victim's chest wound. Serological examination revealed traces of human blood, however, no further typing was possible. The shape, and size configuration of the sawtooth blade was consistent with several of the blood stains on the pillow case. To depict these similarities to the court, a large transparent overlay type display was prepared. This display had a high visual impact on all who viewed it because the knife and stain conformed to one image.

On April 15, 1991, faced with the overwhelming physical evidence of the image enhanced fingerprint identification in the victim's blood, the matching DNA of the body fluid found on the victim's body, and the knife found in the suspect's apartment, defense attorneys entered four guilty pleas, one of which was for capital murder. On June 18, 1991, Robert Knight was sentenced to four life sentences for the murder of Dawn Bruce and related offenses. If these crimes had occurred just five years ago, Robert Knight would have most likely been a free man. Against overwhelming odds, through persistence, knowledge, and the application of modern technology this case was brought to a successful conclusion.

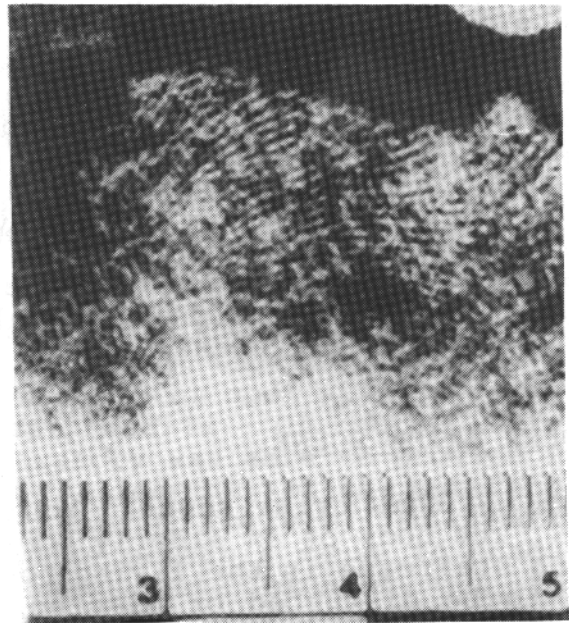
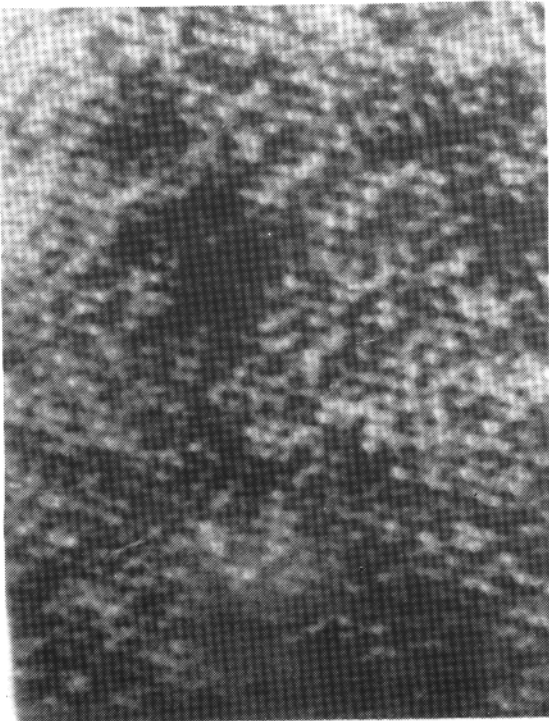


Image enhanced ridge detail identified to suspect

Ridge detail prior to image enhancement.