





CASE NUMBER: 2001-209 // "The River Thames Killing"

VICTIM: Unknown

COVER STORY:

>> by Audrey R. Browka

CASE_NUMBER: 2001-209 //

"The River Thames Killing"

VICTIM: Unknown

GENDER: M

AGE: Five years

CRIME_SCENE: London's River Thames

PHYSICAL_EVIDENCE:

- >> Dismembered body of boy is found in the River Thames
- >> Victim's identity is unknown
- >> Country/region of origin is unknown
- >> Cause of death appears consistent with a ritual killing practiced in Africa

ANALYSIS/LAB WORK:

- >> FORENSIC ANALYSIS of mitochondrial DNA pulled from the victim's stomach indicates he is of Afro-Caribbean descent; most likely from West Africa.
- >> FORENSIC TESTING on sand granules found in victim's stomach; grass pollen left on victim's skin; and various mineral and chemical levels in victim's bones suggests he comes from a remote West African village; within a 100 square mile radius of Nigeria.



Making the case for >> FORENSIC SCIENCE >>

at Canisius College

Forensics on TV >> Television programs about forensic science are featured on virtually every network and cable channel these days. Among them are NBC | "CSI" (Las Vegas, Miami, New York) – CBS | "Forensic Files" – Court TV | "Navy NCIS" – CBS | "The New Detectives" – Discovery Channel

fo·ren·sic (fə ren'sik), *adj.* Public; to the forum or public discussion; argumentative



The case of the 'River Thames Killing' may read like a storyline from one of many high-drama crime shows popping up on prime-time TV these days but it is not. Rather, it was a real-life drama that baffled Scotland Yard Police in September 2001. Initially, authorities referred to it as their "black hole investigation." But the mystery of the dismembered boy was eventually unraveled through the use of sophisticated scientific techniques known as **forensics**.

The American Academy of Forensic Sciences (AAFS) defines forensics as any science used for the purpose of the law (in public, in a court or in the justice system). Derived from the Latin word *forensis*, which means public, the application of forensics can be dated back to 1887, around the same time Sir Arthur Conan Doyle first introduced the great detective Sherlock Holmes.

>> To learn more about forensic science, visit the American Academy of Forensic Sciences (AAFS) on the Web: www.aafs.org

>> To learn more about the science programs at Canisius visit: www.canisius.edu/academics/arts_sciences.asp

KENNETH F. JONMAIRE '72
Lecturer >> Buffalo State College

Among the most popular: "American Justice" – A&E | "Crossing Jordan" –
Every Channel | "Secrets of Forensic Science" – The Learning Channel (TLC)

entative, rhetorical, belonging to debate or discussion.



"Forensic science was developed from need," explains Kenneth F. Jonmaire '72, a lecturer at Buffalo State College and retired 30-year veteran of the Niagara County Sheriff's Department where he served as chief forensic investigator. "In other words, authorities would find a victim but wouldn't know how or why he died. Maybe there was something that appeared to be a blood stain on the victim but they would have to determine first if it was blood, and if so, was it human blood."



It wasn't until the early 1900s, when investigators began to use microscopes to examine trace evidence, such as hair and fibers, that forensics actually began to emerge as a discipline. By the late 1920s, crime labs were developed. In subsequent years, forensic science progressed along with the evolution of new scientific discoveries; the most significant so far is the sequencing of human DNA (*Canisius Magazine*, spring 2004), which took place over the past decade and virtually reversed the way in which criminal investigations are approached. Until this breakthrough, evidence found in connection with a crime would only be useful if a suspect was known. Now, physical evidence (i.e. DNA) found at crime scenes routinely leads investigators to their suspect.

To see this modern-day crime fighting tool in action, simply tune in to any one of TV's new crime dramas, such as "CSI" (Crime Scene Investigators), "Crossing Jordan" or "Navy NCIS" (Naval Criminal Investigative Service). These shows are propelling forensic science to

the forefront of pop culture and in the process, rousing a new class of college students to consider forensic science as a career.

"Anything that has the word 'forensic' in front of it seems to catch the attention of the potential students we interact with these days," explains Ann Marie C. Moscovic, co-director of admissions. "We haven't measured this heightened interest in terms of numbers yet but it's safe to say the Office of Admissions is receiving more questions and phone calls from students about what the college offers in forensic science studies."

The same holds true for the college's Biology, Chemistry and Bio-chemistry departments.

"Ever since shows like "CSI" hit the air, more and more students are becoming excited about pursuing science-related fields, other than medicine – fields like forensics," adds Paula F. Dehn, PhD, chair of the Biology Department.

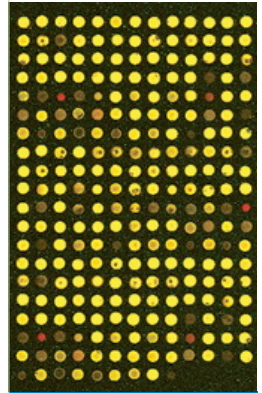
Canisius does not currently offer a specific program or major in forensics. Nor does it offer specific programs or majors in marine biology, biotechnology or genetics. But it does educate its students to become leaders in all of these fields.

"What we have here, within the science departments, is a flexible enough degree program and advisement system that enables professors to work with students individually and tailor a curriculum for whatever science-related career path they choose," says Dehn.

"So when students ask if it's possible to study forensics at Canisius, we tell them, 'Yes, of course it is.'"



PAULA F. DEHN, PhD
Chair of the Biology Department >>
Canisius College



JAMES M. DiFRANCESCO '00
DNA Analyst >> Armed Forces DNA
Identification Laboratory, Rockville, MD



Such was the case for James M. DiFrancesco '00. The biology major first became interested in forensic science during high school, when the O.J. Simpson trial was broadcast on TV. A brief internship at a local crime lab cemented his interest in the study of forensics. When he told his Canisius advisor, Sara R. Morris, PhD, associate professor of biology, about his plans, she made certain he enrolled in the necessary classes.

"Once I knew I wanted to do forensics, everyone else in the Biology Department knew," says DiFrancesco. "For example, when it came time to take Dr. Dehn's environmental toxicology class, she made sure I worked on the GC mass spectrometer, as part of our group project, because that was a piece of equipment used in the field. I was also encouraged to do my honors thesis on a forensic-related topic. My advisor and the other professors really tried to make every opportunity available to work forensic science into my coursework."

Those opportunities resulted in DiFrancesco earning a master's degree in forensic science from George Washington University. Today, he is a DNA analyst for the Armed Forces DNA Identification Laboratory in Rockville, MD, where his case work includes the identification of military men and women killed in Operations Enduring Freedom and Iraqi Freedom.

"Across the board, we've found that our students don't have any trouble getting accepted into the graduate schools or other professional programs of their choice and that's because the science program at Canisius is so strong," states Dehn.

Part of what makes the college's science program so strong is its focus on interdisciplinary study; a necessity for any student considering forensics as a career. This interdisciplinary

background is so critical to the field that the U.S. Department of Justice (DOJ) emphasizes in its June 2004 manual *Education and Training in Forensic Science: A Guide for Forensic Science Laboratories, Educational Institutions and Students*:

"Regardless of the area of forensic science pursued, (the course of study) should be interdisciplinary, combining a strong foundation in the natural sciences with extensive laboratory experience ... (and) ... problem-solving skills."

A comparison of the DOJ core course requirements with those already mandated for students in Canisius' biology, chemistry or bio-chemistry programs, demonstrates that the prerequisites are virtually identical. Both require students to take general chemistry I and II (and a lab); organic chemistry I and II (and a lab); biology I and II (lab preferable); physics I and II (and a lab); calculus; and statistics. Additionally, the DOJ encourages students on the forensic science track to enroll in specialized science courses, such as bio-chemistry, molecular biology, genetics, inorganic chemistry, analytical/quantitative chemistry and cell biology – all offered within the college's science departments. And because forensics is considered an applied science, the DOJ underscores the importance of proficient critical thinking and problem-solving skills, which are skills Canisius has emphasized since its foundation in 1870.

"They want students to have a lot of laboratory-based instruction, in other words hands-on activities, which is really the hallmark of all our science programs at Canisius; learn science by doing science," explains Dehn.

Gone are the days of the traditional cookbook laboratories, where students were given

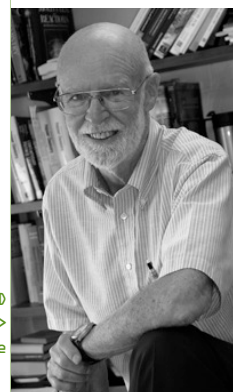
step-by-step instructions to achieve a certain end result. Today's science majors at Canisius are often engaged through a series of case studies: stories with teaching messages.

"Typically, we hear about case studies being used in law or sometimes business. They are not normally done in science," explains Frank J. Dinan, PhD, professor of chemistry/bio-chemistry.

Dinan was one of the first professors at Canisius to introduce case study work into his general chemistry and organic chemistry courses. His newest course, chemistry by the case, is popular with non-science majors. In each of these courses, students are presented with a real-life set of circumstances from which they must draw conclusions through investigative lab work. **The story of the 'River Thames Killing' is one example of a case study used in Dinan's class.**

"Students are given various bone samples, which are manipulated to appear as if they are from different areas of West Africa. They are then told to analyze those bones and figure out the victim's region of origin," explains Dinan. "The idea is to guide students through the process but not tell them how to reach the conclusion."

FRANK J. DINAN, PhD
Professor of chemistry/bio-chemistry >>
Canisius College



GC Mass Spectrometer (Gas Chromatograph Mass Spectrometer), an instrument that allows for the separation of organic compounds.

STEVEN H. SZCZEPANKIEWICZ '96, PhD
assistant professor of chemistry/bio-chemistry >>
Canisius College



As the students play detective, they experience the freedom to make mistakes and the opportunity to make corrections. They are learning science by doing science and the benefits are many.

“What we hope to impress upon them is longevity of memory,” adds Steven H. Szczepankiewicz '96, PhD, an assistant professor of chemistry/bio-chemistry who works with Dinan to formulate case studies for students. “By fully engaging students via case studies, the lab processes are less likely to be compartmentalized in their brain and forgotten. Instead, when they see a similar problem in the real world, they will know the best way in which it should be approached.”

An added advantage of the case study classroom is that students work in teams.

“We find that students work better in this type of environment,” notes Dinan. “It’s more interactive and cooperative, and that’s the way the world works now. People very seldom work alone. They interact with other people.”

While these interpersonal, problem-solving and critical thinking skills are all deemed essential to students’ effectiveness as forensic science professionals, so too are their written,

public speaking and oral communication abilities; areas that are often overlooked.

“When you become a forensic scientist, at some point, you will testify about what you found,” explains Daniel V. Reinhardt '83, PhD. As senior forensic chemist with the U.S. Army Criminal Investigation Laboratory at Ft. Gillem, GA, Reinhardt is primarily responsible for the examination of solid dosage units of controlled substances (drugs) and prescription drugs, thought to be sold, bought or imported by members of the military. “Forensic scientists need to be able to communicate their findings to a jury in a simplified fashion. So when we say ‘we used a particular instrument and derived this data from it,’ a jury has a general idea of what we’re talking about.”

Canisius science students get plenty of practice in this area. Each semester culminates in a series of poster presentations, during which students must present their findings from a selected research project to the entire science faculty. Students are questioned about their conclusions and then graded on how well they defended their presentations.

“This is another reason why our kids have no trouble getting into graduate programs, for forensic studies or otherwise,” says Dehn.

“When they write their applications, they can say ‘I didn’t just inject a sample into a GC mass spectrometer for a semester. I had to do all the sample preparations. I ran the instruments. I did the analysis. I analyzed the data. And finally, I had to present and defend the data!’ ”

These experiences give students a competitive edge when they apply to graduate school or for work in the professional world. And considering the fluctuation of today’s job market, any advantage can help. The field of forensic science is no exception.

“While some growth is expected, I do not expect it to be dramatic, certainly not enough to keep up with the number of people seeking jobs in the field,” states Ronald L. Singer, MS, president of the American Academy of Forensic Sciences. “There is no question there is a need for additional scientists in crime labs throughout the country. Increases in crime, advances in technology and emerging specialties such as computer forensics are a few of the reasons for the increase. However, the vast majority of crime laboratories are in the public sector (i.e. part of a law enforcement agency). The financial outlook for agencies of this type is not great and resources have to be allocated to what each agency perceives as the greatest-need areas. Generally crime labs, which are usually considered ‘support,’ are at the bottom of funding ladders.”

Despite the draw, crime labs are not the only place forensic experts are needed. Careers outside the traditional forensic science laboratory span far and wide, and can include forensic anthropologists, those who generate biological profiles (i.e. sex, age, height, etc.) for unidentified human skeletal remains; forensic entomologists, those who use insect evidence to help reconstruct the circumstances that surround human death (i.e. time of death, movement of the body); forensic odontologists, dentists and oral pathologists who identify people from dental structures and analysis/comparisons of bite marks; forensic pathologists, medical doctors who serve as medical examiners or coroners and determine a person’s cause of death through autopsies; forensic toxicologists, scientists who provide services to determine and interpret drugs and their metabolites in biological fluids; and forensic computer specialists, computer and information scientists



SHANNON M. RUMINSKI '96
Evidence Request Coordinator >>
FBI Laboratory, Quantico, VA



involved in the recovery and examination of information from digital evidence. Canisius offers courses in all of these areas. A minor in forensic psychology is also available through the college's Criminal Justice Department.

With so many disciplines from which to choose, future forensic specialists are encouraged to enroll in at least one internship program, during their undergraduate years. Shannon M. Ruminski '96 did and says it made all the difference for her.

"I came to Canisius as a biology/pre-med major. I thought I would either go on to medical school or do medical research," recalls Ruminski who, like DiFrancesco, turned her focus to forensics during the O.J. Simpson trial. "The portion of the trial that involved scientific evidence really generated my interest in the field of forensic science. I thought about doing DNA analysis so I did an internship at the Erie County Crime Laboratory. That really opened my eyes to all the other forensic fields that I wasn't even aware existed."

Following graduate school at Marshall University, Ruminski was hired in the Trace Evidence Unit at the FBI Laboratory in Quantico, VA, where she performed microscopic exams on such evidence as hairs, fibers, fabric, ropes and wood. Today, she is an evidence request coordinator at the FBI Lab in Quantico and responsible for the distribution of all evidence submitted for examination from the 56 FBI field offices across the country, and any evidence that might arrive from federal agencies around the world. That equates to about 500 cases a month.

"I would strongly recommend an internship to students," adds Ruminski. "At the very least, a tour of a working crime lab will give someone a feel for the real experience."

It will also dispel some of the misconceptions portrayed on those popular TV crime shows. Unlike the dimly lit laboratories that appear adorned with the latest high-tech gadgetry, most working forensic laboratories are brightly lit and equipped with less elaborate gear. That is not the only disparity, says AAFS President Ron Singer.

"The most obvious difference is that forensic scientists do not interview witnesses," he explains. "Many do not ever go to crime scenes and we certainly do not 'do it all.' We don't solve crimes in 40 minutes. In fact, we (forensic scientists) rarely solve anything. What we do is add our piece of information to the overall puzzle."

Oftentimes, however, it is that piece of scientific information that proves most crucial to completing the puzzle. **In the case of the River Thames killing, it was a forensic scientist who, through a battery of forensic tests, managed to isolate the victim's region of origin to within a 100-square mile radius of Nigeria, West Africa.**

That was all authorities needed. Soon after, Scotland Yard Police made direct contact with the Nigerian government and offered a \$72,000 reward for information leading to the conviction of the young boy's killer. **Someone came forward and in July 2003, authorities arrested 21 people in connection with the boy's death, which was determined to be a ritual killing.**

When Canisius science students solve the case of the River Thames killing, there is no monetary reward. Instead, they receive something greater: the gratification that their Canisius education will provide them with the knowledge, skills and experience necessary to successfully pursue post-graduate studies or professions in whatever areas they choose.

