

A Classic Case of Serial Murder: Forensics Meets Photonics

by

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Part I—Setting the Scene

“It’s a shame it took you six months to get here, Emily. Craig died last week, and for a month before that the morphine made it hard for him to focus on anything. He really wanted to meet you before the cancer finished him off.”

“You’re Jim O’Toole, aren’t you?” asked Dr. Emily Dawson, the new medical examiner for the Upper Peninsula counties. “Well, that was out of my control. I wasn’t officially hired until last week, and at that time I was still in my residency. Dr. Lockheed wrote me that your internship would extend for at least a year past my start date, and we talked quite a bit on the phone before he passed away.”

Emily was frustrated with herself for apologizing to her new intern, but had to admit that at six feet two, Jim, or Jimbo as he was called, towered over her five-foot-six frame and dominated the morgue—though his long shaggy red hair and straggly goatee detracted somewhat from his otherwise imposing figure. A large dog lounged at his feet. The food and water bowls in the corner indicated it was a regular visitor. Although Emily liked dogs, this was going too far.

“By the way, I would prefer if you called me Doctor Dawson,” said Emily. “And bringing a pet to work is not appropriate for the medical examiner’s office, okay?”

“Yeah, I guess so,” answered Jimbo. “He never bothers anything though, and he barks when I leave him alone in the apartment.”

“No pets.”

“Okay. But I still think that Dr. Lockheed would have liked to have shown you around. You know, he started here right out of medical school, just like you.”

“How old was he when he passed away?” asked Emily.

“Only 42. The doctors said that the cancer grew really quickly. He was healthy a year ago. We used to go cross country skiing together every winter and duck hunting in the fall.”

Emily had taken a quick inventory of the morgue the previous weekend and, given the state of the forensics lab, wasn’t surprised. While Craig Lockheed had been an adequate ME as far as she could tell, he clearly had not been up to date on laboratory safety standards. Given the long-term health hazards of many forensic chemicals, it was very likely that his sloppiness had killed him.

“What days are you here, Jimbo?” asked Emily. “And do you have a car?”

“I have classes on Monday, Wednesday, and Friday. So I am here Tuesday all day, and Thursday until three,” said Jimbo. “I drive a new truck—my old one died on me last year and my dad helped me finance this one. That’s one of the reasons I’m doing this internship.”

“Sounds good. I am going to have to completely reorganize the records and inventory all the equipment in the morgue and forensics lab. A lot of the files need to be collected from the county offices and brought to

a central location. On Tuesdays you can help clean up the lab, toss out old chemicals, and make a list of the new supplies we need to requisition from the state. On Thursdays I'll probably send you out to the county courthouses to collect records. I'll go myself on Fridays."

"Sounds good, Doctor Dawson. Do I get gas money? Craig used to pay me 15 cents a mile for running errands."

"We'll talk about that later." Emily had already run through the expense reports and knew that the reimbursement rate was only seven cents and that Jimbo had never applied for travel expenses.

The rest of the week Emily spent cleaning the lab and morgue and checking the equipment against the inventory. The Upper Peninsula had previously been under the jurisdiction of several medical examiners. As state budgets got tighter, the decision had been made to let retirement and attrition remove the local MEs until all counties in the Upper Peninsula region could be organized under a single ME. Dr. Craig Lockheed had been the last surviving county ME and had served as the interim regional ME until he died of stomach cancer. As the first official regional ME, Emily worked closely with law enforcement officers on the county and city level as well as with the state bureau of investigation. It was a lot of responsibility for a young woman right out of medical school, but Emily had always had a penchant for organization and been fascinated with forensics.

Now, in retrospect, she wasn't sure her new job was going to be all she had imagined. The forensics lab was primitive to say the least. Unlike the well-equipped labs on TV with their electron microscopes, gas chromatographs, and other cutting-edge forensics tools, the lab had only the most rudimentary photographic and chemical equipment. Updating the facilities would have to be a top priority.

She sent Jimbo out to collect medical records on Thursday as she wrapped up the inventory. There was a lot of equipment missing, not that there was much to begin with. When Jimbo didn't return by lunch, Emily started to fill out requisitions for the equipment she would need to bring the office up to date. Although Jimbo was gone all day, he only brought back about half the records that Emily had wanted. Also she had told him to keep an eye out for any equipment that Craig might have left in one of the other county offices, but Jimbo didn't, or couldn't, find any. On reflection Emily realized that, given the sorry state of the ME office, Jimbo probably hadn't been learning much during his internship and might not be able to recognize any of the missing equipment.

The next day Emily drove the 30 miles to the courthouse to collect the rest of the records, introduce herself to the county sheriffs, and search the station for missing equipment. As she had expected, Jimbo simply didn't have the training to collect the needed records. While he had gotten everything that was associated with the ME office simply by asking where Craig Lockheed's files were, he had not gotten the associated case files from the sheriff and prosecutors. The records for the last 10 years filled several large boxes, and a heavysset sergeant had to help Emily carry them to her car. She also asked permission to check the station for any equipment the former ME had left, but was informed that she'd have to return when the officer in charge of station inventory was present. Emily had a sneaking suspicion that when she did come back any useful equipment would be impossible to find.

Emily looked at her map of the area before starting back to see if she could find a different route home. She had vowed that she would drive as many roads as possible in an attempt to learn her way around before she was called out for a late night homicide or suicide. She decided on Drury Cove Road, which seemed only to add a few miles to the trip. It was obviously the old farm-to-market road that had been used before the present highway had gone in.

Five miles along Drury Cove Road Emily began to think she had made a mistake as she rummaged through the trunk of her car trying to find the handle for the jack. The spare tire was already propped against the right front fender, but without the jack handle, which also was used to remove the lug nuts, her purple Honda CRV was stuck. "I should have taken my state car," she thought, "at least then I could have used the radio to call the sheriff."

Drury Cove Road was scenic, but very rural. Emily did not look forward to the several mile walk it would take to reach the nearest farm. Just as she was about to set out, she heard the sound of an engine approaching. Turning to look, she saw the unmistakable, unrelieved white of a state car pulling up. "Need a hand?" asked the ruddy blonde man leaning out of the rolled down window.

"If you have a working jack, I could definitely use some help."

The car pulled to the side of the road and a man in his mid-thirties got out and rummaged in the trunk of the car, pulling out a jack and tire iron after searching for some time. "Hi, I'm Seth Daniels," he said, extending his hand after wiping it on his pants leg.

"Emily Dawson. I notice you're driving a state car. Do you work for the state around here, or was I just lucky you happened by?"

"A little bit of both. I'm the regional extension agent for the state Department of Agriculture. I get called to farms hereabouts for various and sundry reasons. I also teach a few classes at the university as an adjunct professor."

Seth's last sentence was nearly drowned out by a large brown pickup that was over-painted with a camouflage theme. The middle-aged driver gave Seth and Emily a suspicious look as he slowed down. Stopping just up the road he spoke into what looked like a portable tape recorder before gunning the engine. The spinning tires showered Seth and Emily with fine dust.

"Who was that?" asked Emily.

"Stan Brown, local survivalist. He's always on the look-out for plots, conspiracies, and wrongdoers. Not that there's much of that around here. Actually I am on the top of his list since I represent the government. You are obviously a government agent by association. I'm sure that he is taking careful notes about our clandestine meeting. Anyway, what do you do? I haven't seen you around here, are you a local?"

"Actually I'm a state employee, too," said Emily. "I just started as a medical examiner, taking over from Craig Lockheed."

"Oh, yeah, I heard about you from Jimbo. Too bad about old Craig, he really fit in around here. We're all going to miss him. Well, that should do it. All ready to go. I'll see you around, I'm sure," Seth said as he got back into his car. "Take it easy."

"What the heck was that all about?" wondered Emily as she checked to make sure the lug nuts were properly tightened and threw the flat tire into the back of her car. "What did he mean about hearing about me from Jimbo? Am I suddenly a local celebrity just because I am new?"

The rest of the drive back into town was uneventful. Although Emily had hoped that Jimbo would be at the ME's office to help her unload the files, she had to do it herself. On her way home she picked up a premixed salad for dinner and then spent the evening looking through the local real estate ads. Her plan was to buy a small house as soon as she was a bit more established. Twelve years of living in dormitories and apartments were starting to wear thin. Emily also considered what Seth had said about working part time at the

university and decided that even though she didn't need the money, it might be fun to teach a class or two on forensics.

Over the next two weeks Emily and Jimbo reached an uneasy working relationship. Most of the tension came from Jimbo's habit of not keeping a regular work schedule, a habit he had clearly picked up under his former boss. Once Emily made it clear that he was expected to stick to a schedule or lose his internship, Jimbo became a model employee and even began to restrain his obvious resentment, much to Emily's peace of mind. And he turned out to be a whiz at setting up the kind of computer database that Emily had envisioned for the regional autopsy reports and other records of forensic evidence.

A month later Emily felt the records were as up to date as possible given their long state of neglect. She was playing around with the data mining software^[1] Jimbo had installed, which found correlations between contents of many different files, when the program returned something interesting. Over the last six years there had been one drowning each fall, all of which were reported as accidental. Fiddling with the software settings, Emily found that the drownings had all occurred in the last two weeks of September, all had been female university students, and the deaths were evenly distributed over six different counties. This seemed extremely coincidental, almost too much so.

"Hey, Jimbo, I need you to call up some files for me," said Emily.

"Sure, boss, what do you need?"

"I'm going to e-mail you the names of six deceased, all co-eds. Could you pull up the incident reports, any info from the autopsies, and whatever else you can find on them? But I really need the reports and autopsies."

A few minutes later the files were all open on Emily's screen. Two of the autopsies had been performed by Craig Lockheed, while medical staff from other counties had performed the other four. The lack of central record keeping was probably the reason nobody had ever noticed the suspicious timing of the six deaths.

The autopsy reports were written as a transcript of the notes made during the autopsy, a format very familiar to Emily.

Autopsy Report

Shane County

Melissa D. Robertson, victim

Dr. C. Lockheed, M.E.

Clothing: The victim was wearing khaki shorts, cotton underwear, denim shirt, "Victoria's Secret" brand brassiere. Victim was found with one sandal, "flip-flop" type. Other shoe was not recovered. Victim was fully dressed with no evidence of tears or rends in clothing. Victim had red plastic beret in hair, fully clasped, indicating no struggle. Sunglasses were found in pocket of victim.

Body: The victim is a white female, early twenties, approximately five feet eight inches in height. Visible markings are faint scar over appendix consistent with appendectomy and heart shaped mole under right breast. Weight estimated at 52 kg before water uptake and bloating. The victim had been immersed in water for a period of three to five days before recovery of body. Weight at autopsy is 61 kg. Victim has shoulder length brown hair, hazel eyes. No missing teeth, three fillings in anterior upper and lower molars.

Evidence of Injury: No visible sign of injury to victim consistent with homicide or suicide. There are several lacerations on sole of right foot. Pattern and cuts are consistent with stepping on broken glass. This is also consistent with missing shoe. Victim had slight bruises to hands from grasping rocks on bottom of lake before death occurred, also consistent with drowning. No sign of choking or other asphyxiation around neck. No sign of bites or blunt force trauma. No trace of semen in vagina; sexual organs seem normal. Anal and oral swabs also negative. Internal injuries are nonexistent. Surprisingly victim did not have white frothy mucus in windpipe or lungs indicative of drowning. This could have occurred if victim had passed out while swimming or breathing had been arrested prior to drowning. This may also have occurred if cardiac arrest was the cause of death due to immersion in cold water. There is no external evidence in this case.^[2] See toxicological report.

Central Nervous System: Normal CNS. No sign of anything abnormal. Coronal mastoid incision made to remove brain. No sign of injury or disease.

Internal Examination: Again all normal. Contents of stomach consistent with victim eating several hours prior to death. Stomach contents showed signs of alcohol (hard liquor) indicating victim had been intoxicated prior to drowning. Abdominal cavity saturated with lake water consistent with victim being submerged for several days. Colon was evacuated by victim upon death as was bladder. No signs of feces or urine found on clothing, consistent with drowning. All other internal organs are normal without disease or injury. No sign of trauma to tongue.

Toxicological Examination: Victim has slight levels of THC in blood indicating use of marijuana several days to weeks prior to death. This was not a factor in death of victim. Blood alcohol content was 0.21 indicating extreme intoxication. Blood analysis was done on blood removed directly from heart. Similar results were found in urine and cerebrospinal fluid. The much larger BAC in blood relative to urine and cerebrospinal fluid indicates alcohol was consumed in short time period prior to death.

Opinion: It is my opinion that the cause of death is accidental drowning due to intoxication. Most likely victim stepped on glass, and waded into lake to wash off blood. Victim then slipped and could not swim or passed out due to effects of intoxication or suffered sudden cardiac arrest due to immersion in cold water. Due to the lack of evidence to the contrary I classify this death as an accidental drowning.

“Hey, I knew this girl,” said Jimbo. “Not well, but still it’s creepy reading this.”

“You knew this girl?”

“Yeah, she was in one of my classes.”

“Did this girl, uh, Melissa, seem like the kind of person who drank heavily?”

“No, I can’t really see her out alone swimming drunk or anything. She was pretty ordinary. It’s sort of surprising now that you mention it. There was an article about it in the school paper—I guess she worked on the paper as an editor or something. Let me see if I can call it up from the web site.... It says here she was in a sorority. They thought she had gone home for the weekend and never returned.”

“Thanks, Jimbo. This seems awfully coincidental to me. Six female victims all drown, one each year within days of the end of September. Also they are all in different counties. This is actually a little frightening....”

“Maybe it isn’t that coincidental, boss. I mean, the beginning of the semester is a big party time. You have rush week and football games. Plus a lot of people from around here go to the county fair.”

“What else goes on this time every fall, Jimbo?”

“I don’t know. School starting. A lot of the farmers are harvesting. They have that big leaf festival a lot of city people come to. I mean, pretty normal stuff.”

“So a lot of strangers are in town for the harvest and the fair?”

“Yeah, I guess so.”

Emily put her head in her hands for a minute. When she looked up, she said: “Jimbo, I need your solemn promise not to discuss your work here with anyone. Can you make that promise?”

Realizing his job was at stake, Jimbo mutely nodded.

“Okay. What I want you to do is look through all the evidence on these girls’ deaths. I am going to do the same thing. I want you to find anything at all, and I mean anything, that is even remotely similar between these deaths. Can you do that by tomorrow? I’ll write you a note to get you out of classes. Good. Be back here at 10 sharp tomorrow and we will compare notes.”

The next morning as they compared notes they found that there were definite correlations between some of the cases, but the sloppy record keeping made it difficult to track them down. Of the six cases, full autopsies had been performed only four times. In four of the cases for which reports were available, there were glass lacerations on one or both feet, although this was barely mentioned in three of the reports. In one of the cases the frothy white mucus so common in drowning victims was not found. In three incidences, rope fragments had been found at the crime scene. The ropes weren’t similar, however. Finally Emily noted that all victims were almost fully dressed, with no signs of a struggle. She would have thought at least one of the victims would have stripped to wash off the blood or to go swimming.

Emily sent Jimbo off with the necessary paperwork to collect the evidence from all the cases from the local or county police departments while she spent the rest of the morning writing a budget request to purchase replacements for the equipment missing when she started the job. She also requested funds for additional computers to further automate her office. Her mind was only half on the requisition. She was afraid she would need the new forensic equipment since the pattern of the deaths was indicative of a serial killer. And given that the deaths had occurred when there were a large number of transients attached to harvest crews or carnivals in the areas, it would be next to impossible to collect evidence by the standard technique of interviews. If there was a sinister pattern to these deaths, Emily would have to make the case on forensics.

Over the next few weeks, Emily put together a list of the people who had been interviewed by police in each of the six cases. Most were the victims’ friends or family, since all of the women had been alone when they drowned. Several locals who lived near the lakes where the bodies were found also had been interviewed. Emily noted with some interest that they included Stan Brown, the survivalist, as well as Seth Daniels. Seth had been interviewed in two of the cases because he was involved in some sort of hydrologic project on most of the local lakes. Also on the list was Chip Pigeon, the caretaker of a lake-side outdoor adventure camp run by the university. He lived in a small cabin at the camp.

During this time Emily also signed up to teach a course in criminology as an adjunct professor at the local university. There she had met and become friends with Tamara McNabb, a new assistant professor in the chemistry department. Tamara had been raised by her father on the south side of Chicago and she had strong opinions on almost everything. She had come back to the Upper Peninsula to spend her summers there with her mother, who had lived there all her life, and then had moved there after college to take her job at the local university. Her brash attitude was a perfect complement to the quieter, more reserved personality of Emily.

Late one afternoon Tamara showed up at the faculty gym and found Emily there early, already changed into her workout clothes and bench-pressing about 15 more pounds than Tamara had ever seen her lift before. After getting up from the bench press, Emily immediately started a set of tricep extensions, muttering something under her breath. "Are you ok, Emily?" Tamara asked. "You seem pretty mad about something."

"Those double blind fool idiots. It isn't like I stole anything. I just want to do my job. I mean, how long do you have to live here so people don't treat you like you're some sort of space alien."

"Whoa, hold on. You aren't making any sense at all. Finish your workout and let me get some time in, then we can have dinner at that new Italian place."

An hour later, Tamara got the full story from Emily. The request for new forensic equipment that Emily had submitted had been denied due to budget shortfalls within the state. "I can understand that they can't give me everything I need, but absolutely nothing? Not even a single computer?" Emily said. "And on top of that the letter they sent almost accused me of taking the old equipment myself just because Lockheed had never submitted a single report of lost, stolen, or broken equipment. I don't know why I ever wanted this job...."

"Come on, it isn't that bad. Sounds pretty typical for the state. You should hear some of the stuff I have to go through to get equipment for my chemistry lab. Don't worry—the budget will soon be back in the black and you'll be able to get whatever you want from the state."

"Yeah, I guess so," said Emily. "But I need it now. I shouldn't tell you this, can you keep a secret?"

"Of course, you don't have to ask that."

"No, I mean a real, honest to God secret. You have to promise not to tell anyone. Except Jimbo. He knows."

"Emily, if Jimbo knows then the other members of the four musketeers know too. He's pretty tight with them. But no one else will hear it from me."

"The four musketeers?"

"I'll tell you after you tell me this big secret."

"Okay. I think that there is a serial killer loose here."

"WHAT!"

"Keep your voice down! Really, there have been six girls killed in six years. The only reason you haven't heard about it is because the killings have been spread over too many jurisdictions. All the record consolidation I did when I first got here let me see this pattern." Emily went on to tell Tamara about the six drownings and the suspicious timing and glass cuts in all cases.

"I need that equipment to test whatever evidence my worthless predecessor didn't misplace. I have to make a more solid case before I can request that these deaths be reopened. I mean, imagine calling these girls' parents with news like this if I weren't absolutely sure."

“Whatever equipment you need that I can help you with you’re welcome to use.”

“Thanks, Tamara, you have turned out to be a real friend when I needed one.”

“Why don’t you come to the lab tomorrow afternoon and see what we have? You can also meet the four musketeers then and get them in on this—that way you’ll have free lab work, if you need it. For students, they’re pretty good.”

Seeing Emily’s look of discomfort, Tamara added, “You can ask Jimbo if he’s told the others or not, but I’ll bet he has.”

The next afternoon Emily had finished the autopsy of a suicide victim that she had been putting off for several days and decided she needed a break from being an ME. She drove over to the university to look at the lab facilities and meet the students that Jimbo was friends with. She had in fact verified that Jimbo had told his friends what he was working on and, despite his assurances that they would keep the secret, she warned him that any further breach of security would immediately end his internship.

It turned out that the equipment in Tamara’s lab was much better than Emily had used in college and more up to date than much of the equipment in her lab at the ME’s office. Emily told Jimbo’s friends, two women and a young man, her suspicions and then extracted from each a promise to keep the information confidential. Emily found herself quickly agreeing with Tamara’s opinion of Thelma, the brightest of the group, who would have made a much better intern than Jimbo.

“Where are you going to go with the investigation now?” asked Frederick, one of the students and obviously an athlete of some sort.

“I don’t know. This could still be a coincidence, but I don’t think so. Although I really would like to have a little more evidence, I have decided to formally request in writing that the state bureau of investigation open an investigation. This really should come from law enforcement, but I have talked with the sheriff and the chief of police, Captain Higgins. Both of them think this is just another case of college students doing stupid things. I have to admit that they are not the easiest people to work with—maybe it is just that I am so new....”

“Yeah, I have lived here my whole life,” spoke up Thelma. “Daph and I are college roommates and have been best friends since she moved here in the third grade, but I still think of her as an out-of-towner. And her dad gets a lot of grief for not being a local.”

“Well,” said Emily, “without the cooperation of law enforcement or more evidence it will be hard to make a case. It is especially tough since much of the physical evidence is missing and no one seems to know what happened to it. But it’s August already and that means that if this cycle holds true....”

The next day Emily called the state bureau to ask about the procedure to reopen the six cases. She was referred to the sergeant who handled public calls from the northern part of the state and then to one of the detectives after she assured the sergeant that she was in fact a state medical examiner.

“Steven Crawford, how can I help you?”

“I am Dr. Emily Dawson, the medical examiner for the peninsula area. I have recently taken over the forensics duty for a 16-county area from Craig Lockheed.”

“Yeah, I remember. Poor Craig. What can I do for you?”

“Well, I have recently computerized the files and have noticed an odd trend in a recent rash of drownings.” Emily went on to explain her suspicions and what evidence she had.

“Dr. Dawson, this sort of request usually is initiated with local law enforcement. Have you discussed this with Bob Higgins up there?”

After another 20 minutes on the phone, Emily had promised to fax the detective all the reports that she had and any other evidence. Steven Crawford didn't sound very positive about reopening the investigation without the support of either the county sheriff or the local police, but promised to run it by people in the state bureau just in case there were any other open cases it might impact.

“You'll hear from this office in a few days. Although I doubt we have the manpower or budget to open a case, I will see what I can do, Dr. Dawson. I'll also try to put some pressure on the local law enforcement up there to be a little more cooperative. I know you have a tough job in front of you. There was a lot of local opposition to centralizing the ME positions, but after that embarrassing fiasco down in Oklahoma several years ago, all the states have been looking carefully at how they collect their forensic evidence.”

Three days later Emily received a fax stating that it was impossible to open the six drowning cases without further evidence and to bring any further developments or suspicions to local law enforcement. Discussing this disappointing, but unsurprising, development with Tamara and several of the students later in the day, Emily expressed her frustration about the general state of disarray in the ME office when she took it over. “I understand that the local authorities wouldn't want to reopen any cases that had already been declared accidental deaths, but at least they could be more cooperative in helping me gather evidence to see if the cases should be reopened.”

“Why don't you talk to my uncle?” said Thelma. “He owns three funeral homes in the area and could let you talk with some of the people who prepared the bodies. Maybe they observed something strange and you could get witness reports or something.”

“Thelma, you're a genius. Can you call him tonight and find out if his funeral parlor handled any of the six cases? Just tell him the new medical examiner would appreciate talking with whoever does the embalming. I really don't want this to get around.”

The next week found Emily, sometimes accompanied by Jimbo or Thelma, driving to funeral homes in several counties. Thelma's uncle had tracked down the funeral parlors for all six of the victims and arranged access for Emily. The interviews with the funeral home workers only deepened Emily's suspicions that something very strange was going on. The people who had done the embalming had remembered the girls clearly since not many young women came through the funeral homes. Two of the people Emily talked to said that the bodies were almost too easy to prepare.

“Yeah, I remember her. A pretty girl. You know, usually it takes a piece of time to get all the fluids drained out before putting in the preservative, but in this case there wasn't much blood at all. Only water. Real strange. Most people wouldn't notice it though because the body was all puffed up. I mean we don't get too many floaters in here, which is a good thing considering the condition most of them are in, if you know what I mean. But floaters have real well preserved blood on account of the water being so cold hereabouts.”

A second mortuary worker reported the same thing for another of the girls, but figured the lack of blood wasn't anything unusual, not having much experience with drowning victims.

Emily had been able to collect several pieces of the victims' clothing which their families had left at the funeral homes. More “lost” evidence, including more clothing and rope samples, was delivered to Emily's

office, thanks to Detective Crawford, who was making calls to law enforcement officers in the surrounding counties. He let them know that any future help from the state bureau of investigation was strongly dependent on working closely with the state appointed medical examiner in their area, which included returning equipment and making evidence available if asked.

With the help of Jimbo, Emily compiled a summary of the evidence she had collected. Although the medical reports were incomplete due to the cost of doing complete blood work, the seemingly coincidental lacerations on the feet of the victims, the lack of frothy white mucus in the lungs (one of the most indicative signs of drowning), the amount of alcohol the victims had ingested prior to death, and the alleged lack of blood in two of the victims did not point to a series of coincidental accidental drownings. Emily talked to the police officers involved in the investigation and read the case reports. The reports shed some light on one of the things that bothered Emily most, why the girls had been in the woods alone. One girl, a biology student, had been collecting water samples for a class project. Two of the victims had been taking part in an outdoor survival course which required several days of isolation, and one of the victims had been in a fight with her boyfriend and demanded she be let out of the car to walk home.

Over the next week Emily invented an excuse to talk to some of the people the police had interviewed in the cases. Eliminating anyone obviously not connected to the deaths, Emily made a note to talk to Chip Pigeon, Seth Daniels, Stan Brown, and Jonathon Kraus, the boyfriend of the one girl, with the claim that she needed verification of their statements in order to complete centralization of the ME records.

Having had one run-in with Stan Brown, the survivalist, Emily decided to talk to him first. The road to his farm was deeply rutted and Emily was thankful she had decided to buy the CRV rather than the Accord her parents thought was a more sensible car. As she drove to his farm, she began to see hand-painted signs along the road with anti-government slogans which got thicker the closer she got to the farm. Emily stopped within sight of a collection of old school buses, trailers, and dilapidated outbuildings to try to open the gate blocking the road. It was padlocked. Just then Stan Brown stepped out from behind a pile of sandbags near the largest trailer.

“Hold it right there young lady. This is private property and you are about to trespass. What do you want?”

“Mr. Brown, I am the local medical examiner and would like to verify some statements you made to police following a drowning several years ago. It won't take up much of your time.”

“So, you're a government person. I told Higgins all I had to say and I told him who did it. If he wasn't in league with those state agency criminals, there wouldn't have been all the murders.”

“Mr. Brown, you seem to think that these deaths are murders and not accidental? And you are referring to more than one?”

“I'm not stupid Missy. I told Higgins there had been six murders and that it was government agents that done it. They want to set up farmers like me to take our land. It is part of the plot to slowly chip away at our freedoms. And it all started with that Franklin Delano Roosevelt and his New Deal program. Those old money families are driven by greed and want to enslave the American....”

“Mr. Brown! Who do you think was responsible for these deaths?”

“I told you I ain't stupid. You have the report right in front of you or you wouldn't be here. I told Higgins it was Seth Daniels. He is all buddy-buddy with everyone around here handing out state aid, but I know he really works for the National Security Agency and is planting electronic listening devices every time he

goes out to a field. You see him driving around all the time in that state car of his. Do you know how many radios he has in that car? How do you think the orbital mind control lasers know where to...”

“Thank you Mr. Brown, you have been quite helpful.”

Emily shook her head as she drove to her next stop. “I hope the rest of these people are more helpful than that crazed survivalist.” Next on her list was Chip Pigeon, who ran the outdoor adventure camp owned by the university. Since two of the girls had drowned while participating in a survival program at the camp, he had been heavily questioned by police.

At least the camp was more inviting than Stan Brown’s compound. Emily found Chip sitting in front of an old Airstream trailer behind an equipment shed full of ropes, carabiners, helmets, and similar climbing gear. He was dressed all in black with very nice black loafers, which seemed out of character for an outdoorsman.

“Mr. Pigeon, I am Emily Dawson, the medical examiner for this county. I’d like to ask you a few questions about some drownings that occurred at this camp a few years ago. I understand you’ve run this camp for several years and that you were questioned by police at the time of the drownings, I believe it was two and five years ago?”

“Yes, I had that great misfortune. The students think they all want to live in the wilderness. How boring. Most of them see it as a game and have never even heard of Thoreau. As if the noble savage is so noble. So, they come here for the week in their fraternity groups and drink a lot of beer. I let them. Man will always self-destruct given the chance—”

Emily interrupted him. “Mr. Pigeon, you were the camp director when the girls drowned and I am interested in trying to establish any connections between these deaths. Do you have any information that is not in the police reports? I have a copy here if you would like to read it.”

Emily handed the report to Chip, who took several minutes reading it. “No, I cannot add very much. The students are free to roam, and many do, though running is futile from the fate that confronts mankind. After the first drowning, the university made me enforce the rules on alcohol, but the students, they don’t listen.”

“Both girls drowned while on the survival part of this program. What can you tell me about that? Is there any required part of the survival course on the water?”

“Of course. We teach water survival and all students must swim. But those nights the students were on the final task. We drop them off along the road and they must spend the night alone with only a knife and a live chicken. Build a shelter, start a fire, choke the chicken. The students plan ahead and hide beer in the woods. It’s a joke, but the best we can do.”

“How far apart are the students during this?”

“About two kilometers. We drop them off along the roads in the woods, then they must find their way home in the morning, as man finds his way in the darkness of his life. They always come in together. The girls did not come back.”

“It was an accident, you think?”

“Yes. But our accident rate is very low, we have figures. Do you wish to see them?”

“No thank you. One last thing. Did you see anyone unusual in the area during the times of either of the drownings?”

“No. But people are free to come and go. There are many back roads around the lake, which the students use to sneak in the alcohol.”

“Thank you, Mr. Pigeon.”

Another waste of time, Emily thought dispiritedly as she got back into her car. Chip Pigeon’s angst and the futility of the day was getting to her. As she was leaving, she decided to take one of the back roads where the students were dropped off for their survival training. The road wound round the lake shore through woods that only gave the appearance of isolation. At several points Emily could see encroaching farm land, and at one point passed close to a paved highway. It wouldn’t be hard for someone to enter these woods unseen if the survival camps were as widely spaced as Chip had indicated.

Although Emily had intended to interview Jonathon Krauss, she had been unable to find a current address. A former professor had indicated that he might be living in a trailer his parents once owned on the outskirts of a nearby town, but when Emily drove by there was only a vacant lot.

Her last stop was Seth Daniels’ well kept log cabin located several miles from the university. The area was a maze of asphalt roads which had obviously been intended as a large subdivision that was never built. About one lot in five was occupied, and Seth’s home was surprisingly private for a location so near town. Emily made a note to herself to look at properties in this area when she got ready to buy a house. The state car Seth drove was in the driveway along with an older model pickup with a camper top that had seen better days. Emily parked and knocked on the door.

“What did I do to deserve the pleasure of this visit?” Seth said when he finally answered Emily’s repeated knocking.

“Actually it’s business Mr. Daniels,” Emily replied. “I am trying to update the medical examiner’s records and put them in a computerized database. You were interviewed by the police several years ago regarding a young woman who drowned. I am just trying to fill some holes in the record.”

“Come in, and call me Seth. I remember that. I think my name was given to police by that survival nut, Stan, who you had the pleasure of meeting several weeks ago when you had the flat tire. He said I was lurking around the area so the police talked to me. Please sit down. Can I get you coffee?”

“No thanks.” Emily sat gingerly on the edge of a sofa covered by an obviously hand-dyed slip cover. The place was dark, dominated by a predominately brown color scheme. “This is a nice location. Did you build the cabin yourself?”

“Yeah, from a kit. I had a lot of help on stuff though. I try to be pretty independent. Here, let me let some light in.” As Seth walked over and drew back the drapes, also hand-dyed in drab shades of brown, Emily got her first good look at the room. It was dominated by a big screen TV on one side next to a well stocked bar. There was a full wall of bookcases on the other side, which was only relieved by a very large crucifix. The bedroom was in a loft upstairs.

“Seth, is there anything you can tell me that isn’t in the police reports? I have a copy here if you would like to refresh your memory.”

Emily got up to hand Seth the report and walked around to get a better look at the room as Seth read his statements to police. Seth was obviously religious. Most of the books were on religious topics like exorcism and included several reproductions of medieval texts on the lives of the saints. An entire bookcase was filled with pseudoscientific works on the Shroud of Turin.^[3] The seven point trophy buck mounted over a gun

cabinet did nothing to add any color to the room. Emily thought that maybe working in agriculture made you appreciate subtle variations of the color of dirt.

“Gosh, Emily. I don’t really know what I can add. I was definitely in the location. We were running a hydrologic survey on some agricultural land out there. Kids are always parking along the back roads to neck and stuff. Didn’t the police talk to this girl’s boyfriend or something?”

“That was a different case. Nothing at all you remember?”

“Only that Stan Brown is always around when I am out taking data. He is a pretty likely suspect, if you ask me.”

“Thanks Seth. Do you hunt?” asked Emily, pointing to the buck.

“Not anymore. I got that when I was 17. I went with my dad and Bob O’Toole, Jimbo’s dad. It was my first kill. Real Faulkner-like. I gave up hunting a couple of years ago, but was really into it for awhile.”

“Well, thanks again, Seth. I won’t take up any more of your time.”

“Sure Emily. Feel free to stop by any time. Maybe we can go for coffee after class sometime. I hear you are an adjunct at the university next semester.”

“Yeah, maybe. See you.” Emily found Seth a little creepy, being agnostic herself and uncomfortable around religiously devout people. She just didn’t see how anyone could live like the three bachelors she had interviewed that day—in a fortified compound, a trailer in the woods, and a dark house with so little light or color.

Back at her apartment Emily called Tamara and asked her if she wanted to go for dinner. As they settled in at a table at the Genesee Lounge, Emily filled Tamara in on her day. “I talked to three of the only four possible suspects today and they all seem completely weird, but not serial killer like. Stan Brown is just a nut. He blames Seth because he works for the government. And Chip Pigeon, well....”

Tamara smiled. “Did you know I dated him one summer when I was younger and thought the universe was much more serious?”

“Get out of here, Tamara! He is so totally angst. Anyway, this Jonathon Krauss guy has fallen off the edge of the earth and Seth Daniels seems pretty normal though his house is real ugly and he appears to be a religious fanatic. He had hundreds of books on the Shroud of Turn. Plus he doesn’t seem to like Stan Brown much; he thought he might be our killer.”

“The Shroud of Turin?”

“You’ve probably seen some Discovery channel thing on the sheet Jesus was supposed to be buried in and how all kinds of scientists are trying to see if Jesus left a face print on it.”

“Oh yeah. I’ve never been in Seth’s house, how ugly is it?”

“Totally drab brown. Walking in there is like being dunked in a bowl of gravy. So I have six drunk and dead girls that someone or something seems to have drained the blood out of before they drowned. Plus I have no equipment, no suspects, and the state bureau of investigation won’t reopen the investigation without a call from the sheriff, who is no friend of mine.”

“You know, Emily, something bothers me about all of this. Why would anyone want to drain blood? I mean, does this person drink it or something like a vampire? What can you do with blood?”

“I don’t know. It’s a good question. If this person is a serial killer they usually keep some kind of trophy, or maybe he paints patterns on the victims as a calling card.”

“Yeah, like in the movies. And he could take pictures of the victims as souvenirs.”

“I think you’re right!” Emily exclaimed. “That could be why he drowns the victims, to help remove any blood stains. But the victims were all dressed, so there might be blood stains on the clothing.”

“If we are right, any blood stains would be on the inside of the clothes.”

The two spent some time discussing the best way to test for blood stains. This was a fairly standard forensic problem. One of the most widely used techniques was to use a fluorescein solution in conjunction with 10% hydrogen peroxide. Blood acted as a catalyst, turning fluorescein into fluorescein, which could easily be detected through a fluorescence measurement technique.^[4] Emily and Tamara decided the next week they would get started on testing as much of the victims’ clothing as Emily could track down.

The next week Emily and Tamara arranged to work in Tamara’s chemistry lab testing the victims’ clothing with the help of the four musketeers. Tamara met Emily at the door of the lab in an agitated state. “Emily, the spectrophotometer has been stolen! Someone came in last night and took it and the chromatograph. We have the fluorescein mixed up and the hydrogen peroxide, but unless there is enough blood to detect visually, we are going to have to come up with another way to test the blood stains.”

The group spent the afternoon trying to devise a plan. Both Daphne and Thelma, who were engineering and physics majors, respectively, thought that they could build a spectrophotometer with enough time and the aid of Jimbo and Frederick in calibrating the instrument to known blood concentrations. Thelma explained to the group that molecules have electronic structures similar to that of atoms. As every student of physics knows, every atom has a specific configuration of negatively charged electrons which surround the positively charged nucleus of protons and neutrons. Thelma was initially planning on using the techniques she had picked up in her quantum mechanics class to determine the precise energy of any electron given the particular state it was in.^[5,6,7] A state was the name given to the particular orbit an electron was in and each state had a given potential energy. Tamara realized though that this would be a futile task. While in principle quantum mechanics permitted the calculation of these energy states for a given molecule, practically speaking these calculations were extraordinarily difficult for a complex molecule like fluorescein.

Nevertheless, quantum mechanics did play an important role in the task facing the students since electrons changing state was at the heart of the forensic technique they planned to use. For an electron to change from a lower energy state to a higher energy state, some input of energy was required. Similarly, if an electron moved from a higher energy state to a lower energy one, the electron had to lose some energy; this was simply conservation of energy. And it was the key point. Some device was needed to give energy to the dye molecules, taking them from a lower energy state to a higher energy state. When the molecules eventually returned to the lower energy state, they lost energy in the form of light, which was easy to detect.

Both Daphne and Thelma believed that the system they built would work at least as well as the commercial instrument that had been stolen. Emily impressed upon them the need to be careful with the fluorescein and hydrogen peroxide they would use to detect the blood stains. While the chemicals were relatively harmless, she did not want any of the students ending up like Craig Lockheed.

Emily agreed to write a final letter to the state bureau of investigation to try to get some necessary equipment. Tamara agreed to guide the students’ work in chemistry, but would have to rely on the students’ understanding of the inner workings of spectrophotometers.

Over the next several weeks, the four musketeers drew up a working plan for an instrument. Emily had agreed to fund it from her limited budget if it were inexpensive enough. Although she had hoped to get more funding from the state, her latest request had been denied. The same afternoon that the letter came in refusing her request, a fisherman hooked the 175-pound dead body of a young woman.

Questions

1. Do you feel that Dr. Emily Dawson has collected enough evidence to justify her suspicions about a serial killer?
2. Why does she find her colleagues in law enforcement so uncooperative?
3. How does the fluorescein test for blood work?
4. How can you find out about the hazards of these chemicals?
5. What should be detected in this test and what is the best way to detect it?

Assignment

You will play the role of the students. You must design a device to measure small quantities of blood.

1. Submit a block diagram of what you feel the parts needed for such a system are.
2. List at least three concepts you need to explore in more depth to design such a system.

References

- [1] The Datamining Administrators Newsletter: <http://www.tdan.com/i010ht01.htm>
WWW Virtual Library of Knowledge Management Tools: <http://www.brint.com/km/>
- [2] F.A. Jaffe, M.D. 1983. A Guide to Pathological Evidence. Toronto: Carswell Co.
- [3] There are a vast number of web sites dedicated to the Shroud of Turin. These often contain links to print bibliographies. Due to the public interest, “paranormal” subject matter, and the simple fact that web-based information is not peer reviewed, students are advised to not believe all of the material found on these sites.
<http://www.shroudofturin.com/>
<http://www.duke.edu/~adw2/shroud/>
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- [4] R. Cheeseman., and L.A. DiMeo. 1995. Fluorescein as a field-worthy latent bloodstain detection system. J. Forensic Ident. 45:631.
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- [6] D.L. Pavia. 1979. Introduction to Spectroscopy: A Guide for Students of Organic Chemistry. Philadelphia: W.B. Saunders.
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Part II—Collecting Evidence

With Jimbo assisting her in the morgue, Emily was performing the autopsy of the young woman whose body had been recovered from the lake. She had obviously been in the water several days before being fished out.

The police had found the spot where the girl had apparently entered the water. As before, there were no signs of a struggle, but the police had found a half empty bottle of rum and several discarded Coke® cans. As Emily began to examine the victim's feet for any cuts, Thelma and the other students came in.

“To conclude initial inspection, there are no signs of struggle. Fingernails are clean and no bruises to face or neck. No external signs of sexual assault. As indicated in reports of the four previous drowning victims, there are glass lacerations on feet. No mention of broken glass found at supposed drowning site in police report. Note to self: Have local sheriff reexamine lake shoreline for glass.”

Thelma watched as Emily got out a thin metal rod with markings on it like a ruler.

“Laceration is approximately three inches deep and appears to meet dorsalis pedis artery.^[1] Laceration is approximately four inches in length. Stop tape.”

“Jimbo,” Emily said, looking up, “would you please hand me that bag of broken glass, the leather gloves over there, and the piece of chuck roast?”

Emily had mentioned that she was going to do some tests on glass lacerations and Thelma was interested in the procedure she would follow. Emily put on the gloves, and then taking a large shard of broken glass, tried to slowly push it into the roast. She got no more than about an inch deep before the glass broke. Taking a second piece of glass, Emily jammed it as hard as she could into the roast, again penetrating only about an inch. She tried a variety of techniques, including dropping the roast on a broken bottle from several feet up, but was not able to reproduce a cut even half the depth of the one in the cadaver's foot. Finally, by taking a piece of glass and sawing at the meat, she made a large cut.

After recording her observations, Emily probed the wound in the foot, removing several very small fragments of clear glass, which she carefully filed in plastic evidence bags. Next she examined the foot wound with a magnifying glass and took several pictures. Emily also took several pictures of the cuts made in the chuck roast.

“Well,” Emily said, “from what I can tell, this wound was not made by stepping on glass. The cuts on the foot seem to match those made by sawing rather than a simple puncture. Let's see how much blood the victim lost prior to death. My guess is it is going to be quite a lot, judging from the fact the foot wound hit an artery.”

Thelma wasn't the only one who had to look away as Emily inserted a long needle directly into the victim's heart and drew a sample of blood, which she then proceeded to put in a labeled vial. Emily next drew a sample directly from the bladder. “If any of you are feeling queasy, please step outside at any point. Autopsies can take awhile to get used to. Jimbo, I am going to need some help cracking the chest. We need to examine the victim's lungs.”

Hearing this, Thelma made a quick exit, with Frederick and Daphne following close behind. Once out in the hallway, Thelma risked a peek through the window of the morgue and then wished she hadn't. Emily was cutting around the lungs to remove any supporting tissue.

“Hey, Daph, how are you coming on the signal processing part of the project?” Thelma asked to take her mind off the autopsy being performed in the next room.

“I’m having some problems with the electronics actually. We learned about filtering techniques in my classes, but all we really did was do calculations for how a filter would work. The only filters we ever built were just inductors and capacitors, and it’s really hard to design a narrow bandpass filter using passive components. I tried a low-pass and high-pass filter, but still too many frequencies get through and the noise level is pretty high. I started looking into some op-amp based filters, but they’re pretty expensive and hard to build. I wish I could find more information about super narrow band-pass filters, but all my web searches just turn up lots of technical datasheets that are really hard to understand. How are you coming with the optical system?”

“Pretty good,” said Thelma. “I borrowed a couple of optical detectors from one of my physics professors and got good signals out of them. The real problem is the same one you’re facing. I need to filter out all the light that isn’t at the right wavelength, otherwise I get too much signal. I put a light-tight enclosure around the measurement system, and that helped a lot. The real problem is finding filters that only let a narrow band of light through. I’m getting a lot of light from the source I am using to excite the fluorescein dye. It took me a while to track down the absorption spectrum, but once I got that and the fluorescence nailed down I knew what wavelengths I was working at. But it is tough finding a filter that blocks light at the absorption wavelength but transmits at the fluorescence wavelength since they are pretty close together.”

“Weird how the physics problem and the electrical engineering problem really come down to the same thing. How are you coming with that lens thing you were telling me about last week?” asked Daphne.

“Huh, oh, you mean light collection. I went back and read up on geometrical optics and figured it out. It was just a matter of realizing that fluorescence went out in all directions and I had to be careful in designing a system to collect as much light as possible”

The conversation slowly died out as they waited for Emily and Jimbo to finish the autopsy. Several hours later Emily came out of the morgue bearing several Ziploc bags. “Well, I am almost ready to officially call this one a murder. Although it is hard to tell in drowning cases, there were none of the classic signs of drowning which indicates the victim wasn’t breathing when she was submerged. The wound on the foot was done by glass, but the depth of the incision and the ragged edges show that someone did this on purpose. Also, the relative levels of alcohol in the victim’s blood, stomach, and urine indicate that a large amount of alcohol was consumed just prior to death. Most telling is that it almost seems like the victim bled to death, but that would have taken a long time through the foot. It looks like someone is killing these women and trying to make it look like an accident. The odd thing is that outside of the cuts to the feet I can’t find any signs of how death occurred. This isn’t unheard of, but limits the cause of death to certain types of strangulation, poisoning, carbon monoxide, or even exposure. I’m sending a blood sample to be analyzed for poisons. If the victim was poisoned, which I think is unlikely, then it is murder.”

“What is in the bag, Dr. Dawson?” asked Thelma.

“I have some samples for you to run for blood stains. I found some unusual stains in the victim’s navel and other external cavities, so I have some swabs which are labeled. Also, I’ve included some clothing to test on both sides. You know about Tamar’s theory that the killer takes photographs as souvenirs of the victims after painting them with their own blood. I know it seems like something out of the movies, but serial killers are often driven by a desire for power over their victims. There is also a vial of blood so you can calibrate your instrument. If you can show that there is blood on these samples, then I will also declare this a murder.”

Frederick spoke up, “What do you mean by calibrate? I mean, we either detect blood or not, right?”

Emily patiently explained that it was necessary to know the limits of sensitivity of the device so that if the case went to trial any expert witnesses called by the defense couldn’t ask for the forensic evidence to be

thrown out due to lack of proper scientific procedure.^[2] “You may have heard about that case in Oklahoma with the forensic chemist Joyce Gilchrest. A lot of cases had to be retried because she either was not careful or simply falsified her results.”

Thelma whispered to Daphne, “Do you know how to do this calibration stuff? I have a vague idea, but this is sounding pretty serious.”

Daphne shook her head no, “Should we ask Dr. Dawson?”

“Let’s ask Dr. McNabb first. She is a chemistry professor and probably is familiar with this stuff.” Turning from Daphne, Thelma asked, “Uh, Dr. Dawson, can we get more samples if we use these up in testing them? We think our device is going to work okay but we won’t know for sure until we test it.”

“Absolutely, Thelma. However you shouldn’t need much blood. One of the first tests you need to do is find out what sensitivity the instrumentation has to blood. In other words, following the procedure for the fluorescein test we already discussed, what level of blood can you detect in say, parts per million. That is just diluting this blood sample. Oh, I need to warn you to be extremely careful with this blood. Since it is human blood, there are certain precautions you need to take. We don’t know this girl’s medical history or how active she was sexually. If you get a finger stick or even get blood on your skin, we may need to test you for HIV, hepatitis, or any other number of blood-borne diseases. Wear gloves and make sure you let me or a doctor know if there are any accidents.”

“Uh, you said something about preparing for a court case,” said Daphne. “I really don’t think I’d feel comfortable getting up in front of a court room to present this project or anything. Do you think that will happen?”

“I don’t think so, Daphne. Your role is to build a system to perform these tests. I will need to be involved in any tests that are used for evidence since any evidence collected by students would definitely come under attack by the defense. That is assuming we even find this killer. We may not if the murderer is a transient, as I think. You get your machine working and I will help with the analysis.”

A subdued Jimbo came out of the morgue and joined them.

Emily continued: “I want all of you to know exactly what is going to happen next. I am going to report all the evidence we have at this point to the state bureau. They can decide to rule it a murder. I don’t have enough evidence yet to make that ruling myself, but if you can find any evidence of blood on these samples, I will. Once either I or the state officially declares this a murder, it will force local law enforcement to act. Due to the earlier drowning cases I expect an investigator from the state bureau of investigation to come up here and review the evidence we have. If they think that the previous drownings are part of a pattern and that there may be a serial murderer loose, the FBI may even be called in. At that point, your part and maybe my part in this will be over since they will bring in their own team with more experience and equipment than we have. Your job right now is to verify your device can detect blood and then analyze this evidence. I wish I could help you with that part of things, but I have no expertise in how these machines work.”

“Okay, Dr. Dawson. Both Daphne and I think we almost have our device working. We need to check some things with Dr. McNabb and then we should be ready for the evidence analysis. Would it help to also have Dr. McNabb there when we are doing the analysis? That way she could be the witness in court.”

“Yes. Please ask if she would be willing. If she has any doubts, I can talk to her.”

Questions

1. What are some of the procedures that the students should follow in analyzing the evidence they have been given?
2. Why must the students' device be calibrated? Devise a procedure for such a calibration.
3. The students are going to be handling potentially hazardous chemicals. What safety precautions need to be taken?
4. Come up with several questions you might ask the students if they did appear in court to defend their handling of the evidence. Devise questions from the perspective of both the prosecution and the defense.

References

- ^[1] Good website on the anatomy of the human foot:
<http://www.med.nagasaki-u.ac.jp/radiolgy/MRI%20of%20the%20FOOT/MRI-CDNUH/nf-sole.html>
- ^[2] “The Why Files” website discusses science in the news. This article discusses forensic labs and how accurate the results really are:
http://whyfiles.org/133crime_lab/

Part III—Jimbo’s Revelation

Steven Crawford looked up crossly as his immediate supervisor came into the large office he shared with about 10 other detectives. His mood didn’t improve when he saw the lieutenant make straight for his desk, a case file in his hand. “That better not be for me,” Steven thought. “I’m already overloaded with the kidnapping case they put me on last month.”

“Did you talk to an Emily Dawson, the new ME up in the peninsula region a few weeks ago?” asked the lieutenant.

“Yes, I did. She called with some theory about a serial killer....”

“Well, then, this folder is for you.”

Steven groaned as he reached resignedly for the folder. Didn’t people realize that he was engaged now and he simply couldn’t work the hours that he used to? “Maybe I’ll get a break when I finally get married,” he thought. “Why do people have to turn an accidental death into murder. People watched entirely too much TV these days. You’d think serial killers came round more than once every couple of years....” The more he read, however, the more impressed he was with the background work that Dr. Dawson had done. The local sheriff who had submitted the report obviously didn’t want any outside interference in the case, but it looked like they were going to get some. Going out to the duty officer, Steven cleared his schedule for the next week and arranged for a car.

Early the next week found Steven knocking on the door that the custodian assured him was Dr. Dawson’s office despite the fact that it said “Craig Lockheed, Medical Examiner.” It was opened by a slender, five-foot-six woman with short blonde hair, not at all what Steven had expected. “Uh, I’m Steve Crawford, a detective with the state bureau of investigation. I’ve been assigned to the homicide that you reported to Chief Higgins. Are you Dr. Dawson?”

“Emily, please. I am so relieved you’re here. I’ve been having a hard time getting the local police to take this seriously. You are here because you’re going to investigate this, aren’t you?”

Steven was taken aback by the passion in Dr. Dawson’s voice, not something he usually encountered in a job where emotional distance was the only way to keep sane at a crime scene. It must have shown in his face.

“I’m sorry. I didn’t mean to be accusatory. Please come in and make yourself comfortable. Would you like some coffee? This whole thing has me on edge. Doing any sort of field work is not my strong suit, but I seem to be one of the few people who believes these drownings aren’t accidents.”

“Coffee would be nice, thanks. I’ve read your report on the forensic evidence and it makes a very strong case. In my opinion, you’ve done a good job. You have obviously kept professional detachment, difficult in a small town like this. At any rate, I am here to follow up on the work you have done and to command the local law enforcement to cooperate—a lot of my job is simply getting other people to do theirs. Oh, you stated you were waiting to do a fluorescein test for blood. Do you have the results back yet?”

The look of relief on Emily’s face was almost worth the four-hour drive. “Thank goodness you’re taking this seriously. I’ve been really worried. And no on the fluorecin, I expect results any day now though.”

The longer Steven talked with Emily the more convinced he was that the drownings were related, and that they were not the work of a vagrant or migrant worker. “In cases like these,” said Steven, “there is always some external motive, often quasi-religious. Notice the similarities between all of these, the ritualistic elements that repeat—the same time of year, the almost sacred role water plays, as if the killer is giving the

victim back to the waters in atonement for some past sin. No, I would bet that the person responsible for these killings lives within a hundred-mile radius. Has Chief Higgins talked to any of the people who were interviewed initially?”

“No, but I went to visit several of them—Stan Brown and Chip Pigeon and Seth Daniels. They all seem, well, sort of unbalanced actually, each in his own way.”

“Well, I’ll see about going to talk to them tomorrow and get statements on where they were during that time. Right now I need to check in to my motel. My per-diem is so lousy I’m staying at the Super 8 out by the freeway.”

“Why don’t you stay at the campus hotel? It’s a lot nicer and there is a good cafeteria nearby. You would be closer to where things are happening. Plus, since you’re here on state business, you’d get a big discount. Would you like me to see if there are any rooms?”

“Sure, but I only have a \$45-per-day hotel reimbursement.”

As Emily called the hotel, Steve reviewed his notes and the files Emily had copied for him.

“Well, you’re all set. The hotel is marked on this campus map. You’re pretty close.”

“Um, Dr. Dawson, I don’t want to sound ungrateful, but when someone goes out of their way to do a detective a favor it’s usually because they are feeling guilty about something.”

“Well, now that you mention it, there is something I’ve been worrying about. It all started innocently....” Steven listened to Emily’s explanation of Jimbo’s involvement in the investigation from the beginning and how that somehow led to the other students becoming involved. She went on to describe how they were helping her analyze some of the evidence using the fluorescein technique.

“While this is an unusual situation, we do get evidence from people outside the bureau all the time. As long as you’re present to supervise, there shouldn’t be any problems. Just make sure that this Jimbo person is involved in all the work the students do since he will be classified as a state employee. That will be critical if this case ever goes before a judge. Also make sure that these students stay in the lab and don’t get in the way of the field investigation. While they sound qualified to help you analyze evidence, they aren’t qualified to collect it.”

“Thanks Steven. That is a huge weight off my mind. I feel a lot better about this. I was going crazy trying to do work I am not trained for.”

The next day Steven spent the morning in a small coffee shop reading the evidence folders of the drowning cases that he had collected from Emily Dawson and the local sheriff. He also did a bit of eavesdropping on the conversations of the other patrons. He had found that learning some of the local gossip was the best way to begin an investigation. He learned that Stan Brown, the crackpot survivalist who had been interviewed several times, was something of a local celebrity. The guy certainly sounded like quite a character.

Steven spent much of his time in the coffee shop putting together a profile of the killer based on the available information.^[1] First there were the ritualistic aspects he had discussed with Emily the day before—giving the body to the water, the suspected draining of the blood from the foot, the lack of any external physical signs of violence. Based on this, Steven had formed a working hypothesis that the victims knew the murderer, or at least did not find him threatening. For this reason as well, Steven thought the killer was probably under the age of 40. The killer was also probably well educated. The care taken to make

the murders look like accidents indicated either a well read amateur or someone who had some exposure to forensics or police work.

During the afternoon Steven decided to try to track down Jonathon Krauss, the boyfriend of one of the earlier drowning victims who Emily had not been able to locate. After several false leads, he learned that Jonathon had left the state and was living in Arizona serving as a fire observer in a national forest. Obviously he was the antisocial type, but his supervisor confirmed he had been working during the time the latest murder had occurred. Steven also paid visits to Chip Pigeon, Seth Daniels, and Stan Brown. The worst visit was with Stan Brown, who nearly took a shot at him once he learned he was with the state bureau of investigation. Before he refused to talk anymore, Stan again claimed to have seen Seth Daniels out on the night the latest drowning occurred. Although Stan Brown refused to provide any type of alibi for himself, Steven mentally crossed him off his list of suspects. Maybe he had watched too many Scooby Doo cartoons as a kid, but someone who was so openly and so obviously a crackpot probably wasn't the type to win a girl's trust enough to get her drunk before killing her.

Neither Chip Pigeon nor Seth Daniels could provide an alibi; both claimed they were at home alone the night Dr. Dawson had concluded the murder occurred. Neither was very forthcoming about the drownings, both saying they had spoken to people numerous times and had nothing more to say. Seth Daniels did say that he thought Stan Brown was involved, from which Steven concluded the two men had a deep dislike for each other. Returning to the campus hotel in the evening, he was surprised to find a message at the desk inviting him to dinner at a nearby restaurant. He assumed it was from Emily Dawson since he didn't know anyone else in town.

When he walked in to the restaurant, a place called the Genesee Lounge, and gave the maître d' his name, he was shown to an isolated table near the back of the restaurant at which an attractive woman in her mid thirties and an older woman who looked to be her mother were seated. "Mr. Crawford? I'm Tamara McNabb, and this is my mother Eunice. Emily Dawson said that you were in town trying to get some background information. I thought if you had time we could talk over dinner and maybe I could shed some light on any questions you had."

"Uh, Miss McNabb..."

"Tamara please."

"Tamara, this is very unusual. Emily has told me how you have been assisting in analyzing some forensic evidence, but that is quite different from the field work I am here to do. While I appreciate the dinner invitation, I don't really see how you can aid this investigation. You must realize that I need to remain unbiased at this stage, and honestly any forensic evidence you have I would probably not be qualified to judge."

"Ah, you misunderstand me Mr. Crawford..."

"Steven or Steve, if we aren't standing on formality."

"Okay, Steve, you misunderstand me. Emily told me that you thought the killer was probably someone local. My mother knows everyone and everything that goes on around here, isn't that right?"

"Yes, I do. I call the bingo games regularly at the Moose Lodge and am involved with the Daughters of the American Revolution. Our family goes back a long way in this country, though most people wouldn't guess it. My great grandmother moved here after the Civil War when they were freed and some of her ancestors fought in the revolutionary war. She was an independent woman and didn't want to work in the fields

during the reconstruction when she could get a factory job here. Well, that didn't work out and she was in the fields anyway, but proud, proud..."

"Mother, the waiter is here."

The group ordered, with Mrs. McNabb only ordering a small appetizer. After the waiter left and their corner of the restaurant was private again, Eunice McNabb continued: "Yes, well just ask if you have questions. I do talk to a lot of people in my volunteer work and have lived here my whole life. Know everyone, I do."

"Thank you Mrs. McNabb. I really don't know what to ask. The only people whose names I have are Seth Daniels, Chip Pigeon, and Stan Brown. One other name, a student by the name of Jonathon Krauss, has a pretty tight alibi."

"Jonathon Krauss, the poor soul. His father died soon after the poor boy's girlfriend drowned. The boy turned to drugs. Elsie Thackow worked in the hospital and would see him going to those seven step programs for drugs. He never got better and finally moved away. I don't know where."

"Arizona. I tracked him down today. He is working for the forestry service out there."

"Good to know, good to know. Who else did you say you talked to?"

"Seth Daniels, Chip Pigeon, and Stan Brown."

"Ha, well, I can tell you that they all have their own stories and their own secrets, like most folks do, I suppose."

"Mother, what do you know?"

"Tamara, Mrs. McNabb. Do you mind if I record this conversation so I can review it later? I promise that I will only use it for this investigation."

"No, Mr. Crawford, we don't mind at all, do we Tamara. Let's see, where to begin? Stan Brown everyone knows. He was a farmer who lost a lot of land to the state when they protected that watershed. He was well paid for it, but still holds a grudge. Lois down at the county clerk's office has to listen to him run on about it every year when he comes in to pay his taxes. Well, if he had invested that money wisely, he would be a rich man, but he threw it away, Lord knows where."

"Now, Mr. Pigeon is an interesting bird. Did you know he has fathered at least three illegitimate children with college girls at that camp of his? He dropped out of the college and became camp director right after that. There was some rumor that the chancellor's daughter was involved in that... Anyway, it was years back. They really need to find a good Christian man to take that job. He just sits out there with his drugs and drink and crazy ideas. You know Zeke Moore, Tamara? He does some tree work out there with that lawn service of his and knows all about this Mr. Pigeon. Zeke says that the bird man has calmed down though, after spending some time behind bars."

"Chip Pigeon was in jail?"

"Yes, I mean no, sort of. He was convicted of selling drugs to college kids and pleaded guilty to avoid a long jail sentence. But according to Judge Redhart there wasn't really much evidence, it could have gone either way. Anyway, he only served a couple of months, but it scared him something bad."

"What do you know about Seth Daniels?"

“You remember Seth, Tamara. He used to mow our lawn as a kid, then came back after college. He was away for quite some time too, maybe I heard he was in the army or navy. I don’t remember. Anyway, he has been back for about 10 years. Believe it or not, Stan Brown and Seth were good friends not so long ago, when Stan was doing more farming—before he was forced to sell all that land.”

“Let me guess, Seth was the one who did the study that led to Stan having to sell his land for the watershed?”

“You’re right, Seth did do that. It’s his job you know. But they were friends for a couple of years after that. I don’t know why they stopped being friends, but it was about six years ago. That’s when Stan got all weird and said the government was out to get him and he built that fort of his out in the country.”

“So, Stan went crazy and he and Seth had a falling out. Are they about the same age? Stan seems quite a bit older.”

“I think that Stan is older, but not more than a year or two. He looks older because he never seems to sleep. He is always driving around the back roads in that truck of his at all hours of the night.”

The group continued to talk over their dinner, with Mrs. McNabb more than holding up her end of the conversation. After several hours Tamara saw Steven trying to unsuccessfully stifle a yawn and asked the waiter for the check. Steven won the argument over who would pay. “No Tamara, I insist. You and Mrs. McNabb have provided me with some invaluable information tonight, and I need to apologize if I was suspicious at the beginning. Again, thank you so much Mrs. McNabb. If there is ever anything I can do, please let me know.”

Steven stayed up late that night adding the information on his recorder to his suspect profile. The damnable thing was that neither Seth nor Chip sounded like the asocial type that would fit his profile. He was beginning to think that the killer might not be someone local after all, or it was someone whose name hadn’t yet come up in the course of any of the investigations to date. Mrs. McNabb had mentioned several other people after Steve had described his preliminary profile and Steve was planning to widen the investigation in the morning. It was well after one o’clock in the morning when Steven finally got to bed. As he fell asleep, he thought to himself, “What was it that made a person go crazy like Stan Brown?”

Steven woke up at six. After showering he called Emily Dawson to schedule a meeting in her office for eight. Although he had obviously woken her up, she promised that she could make it by that hour. Arriving at the medical examiner’s office he found Emily brewing a fresh pot of coffee with the remains of a large cinnamon roll on her desk. A second cinnamon roll was resting on the end table next to the chair he had used the last time he visited.

“I brought some breakfast if you’re hungry. I assume that there’s been some sort of break in the case since this obviously couldn’t wait until a reasonable hour in the morning.”

“Yeah, sorry about this. I tend to become very single-minded when I am working a case. I had a very interesting conversation last night with a Tamara McNabb and her mother. I wanted to run some thoughts by you while they were still fresh in my mind and get your feedback. You talked with all three of our suspects recently at length and are the most qualified to judge what is a good direction to pursue and which is a dead end.”

Steven told Emily about the dinner conversation of the night before, outlining some of the comments from Mrs. McNabb that tied in to the case. “The real reason I’m here is there’s something bothering me and I can’t seem to figure out what it is exactly, something about the relationship between Stan Brown and Seth Daniels.”

“I can’t really make sense of those two either. I don’t like either of them, but that pales in comparison to their dislike of one another. Maybe they are locked in some kind of weird contest. Stan told me to my face that Seth was the murderer, and Seth told me I should look at Stan. It’s hard to believe they were ever friends.”

Steven and Emily discussed the case for another hour, but could make no more progress. Finally Steven got up to leave. “Thanks for letting me bounce ideas off you Emily. It has really helped clear up some of my thinking. Eunice McNabb really put me into information overload. I’m not sure where to go next. Maybe having a talk with Chief Higgins this morning will help.

Jimbo arrived at work around lunchtime to find Dr. Dawson gone. A note on her desk said she was called out to photograph the scene of a car wreck and she would be back after lunch. More to Jimbo’s interest were some neatly written notes on a yellow legal pad with the statement “Stan Brown vs. Seth Daniels!” underlined several times. Jimbo was sitting behind Dr. Dawson’s desk when the door opened and Dr. Dawson walked in. She gave a start when she noticed him.

“Criminy Jimbo! You gave me a scare. What are you doing rifling through my desk?”

“I’m not going through your stuff. I just saw these notes and they looked interesting and they were out in plain view and all...”

“You don’t really have any sense of personal space or privacy, do you Jimbo?”

“Yeah. Uh, sorry Dr. Dawson.”

“It’s okay Jimbo. Maybe you can make some sense out of what is going on. You’ve lived here a long time. Do you know either Seth Daniels or Stan Brown very well?”

“Yeah, they used to go hunting with my brothers once in awhile, usually on Stan’s land. They were both really into it before Stan went crazy. Nobody wanted to hunt with him then—and Seth sort of gave it up after that. Don’t tell me this detective guy has proven one of them did it?”

Emily told him about the profile of the killer that Detective Crawford had put together and outlined some of the conversation of that morning as well as Steven’s suspicion that the killer might be someone local.

“Wow, Dr. Dawson. It’s really freaky that I probably know the killer.”

Later that evening Jimbo arrived late at the chemistry lab to meet Frederick, Thelma, and Daphne. “Hey. How’s it going? You get this thing to work yet?”

“Yeah, they have,” said Frederick. “And it’s pretty cool. You want us to bleed you so you can see your blood glow?”

“Shut up you two. Either get serious or get out of here,” said Thelma. “Daph and I are trying to get this thing calibrated, and we want to get it done tonight.”

“We’ll never finish up with them around,” said Daphne. Turning to Jimbo and Frederick, she added, “Out. Out with both of you. You’re more trouble than you’re worth right now.”

Jimbo and Fred sat outside the chemistry lab while the girls finished trying to calibrate the fluorometer. Jimbo told Frederick about the latest suspicions in the case. “So they think it’s someone local. Weird.”

“It’s that Stan Brown. I mean he like totally flipped out six years ago right? And the first drowning case was six years ago. That’s just too much of a coincidence.”

“No, Fred. I just can’t see Stan doing it. He is like total militia and survivalist, but that is sort of, uh, I don’t know, admirable. He is doing his own thing and to hell with what anyone thinks about him.”

“Well, I think he’s crazy, like that Chip Pigeon guy with the black clothes and all the death talk.”

“Nah, Chip isn’t crazy either, Fred. That death stuff is all an act to pick up girls. They’re okay guys, both of them.” Jimbo was thinking of how as a kid he would hang on every word of the hunting stories his brothers and their buddies told after a weekend out hunting on Stan’s land when suddenly it came to him that Stan Brown wasn’t crazy at all. “Stan Brown isn’t crazy.”

“Yeah, you said that, Jimbo.”

“No, I mean what if Stan isn’t crazy and he has been right all along. All this time Dr. Dawson and this detective guy have ignored what Stan has been saying because they think he is crazy, but what if he is right?”

“Don’t tell me you’re starting to believe in orbital mind control lasers now too. Of course he’s crazy. And what would he be right about?”

“Look Fred, Stan Brown started acting crazy about six years ago, around the time of the first drowning. That’s the same time he and Seth Daniels started their private war, which nobody around here understands. This detective guy and a lot of other people think it’s because of that court case which took away Stan’s land. It was Seth’s runoff data on pollutants in the lake or something that made the state take that watershed, remember? But I know they were still friends after that. So what would cause Stan to get all suspicious?”

“According to Dr. Dawson, all this time Stan and Seth have been pointing fingers at each other about these drownings. We always thought it was because of this private feud and the fact that each was in the vicinity—Seth for work and Stan because he spies on people. What if Stan is right and Seth has been committing the murders? The time fits—Stan and Seth became enemies around the time the first murder was committed. It would explain Stan’s actions. He patrols the back roads to prevent crimes by the government—in this case the government in the form of Seth Daniels. Stan sees himself like a superhero or vigilante, not a crackpot. Maybe Stan Brown does know who the murderer is.”

“Now that’s crazy!” exclaimed Frederick. “Just because Stan told Dr. Dawson that Seth Daniels is the killer, doesn’t mean it’s true. And if Stan did see something, why didn’t he report it to the police?”

“What would Higgins do if you went to him and accused one of his hunting buddies of murder?”

“Yeah, you’ve got a point. Dr. Dawson said that the cuts in the feet weren’t accidents. Don’t you drain the blood out of game when you field dress them or something?”

“Yeah, Seth stopped hunting six years ago, but he was really into it before then. But you have to hang up game to field dress them and we would have seen some rope marks on the bodies. Dr. Dawson knows her stuff; she’d have looked for something like that. Though you know if the killer was worried about leaving any external marks all he’d have had to do was wrap a towel around the rope. So, what if Seth picks up these girls and takes them home. He could give them a few drinks, and then strangle them, drain the blood, and then drive the body out and throw it in the lake.”

“Dude, that’s sick. Do you think we should go to Dr. Dawson?”

“Do you think she will believe us without any proof? Some evidence would really help make this case, and if Seth Daniels is the killer, I know where we can get some...”

Half an hour later Frederick let Jimbo into the university motor pool where he earned money for school as a work-study student. “Don’t turn on the lights. This place is usually abandoned at this time, but someone may be turning in a car late or something. Seth’s car is back here. I know he brought it in for some maintenance a couple of days ago.”

Jimbo and Frederick found the keys hanging behind the service desk and opened the state car driven by Seth Daniels when he made his rounds as an agricultural extension agent. The trunk was full of the usual junk accumulated by people who rarely cleaned their cars. The students quickly filled a box with carpet fragments, bits of wood and cloth, and other trash from the trunk of the car. On their way out, Jimbo suggested they stop at the dumpster behind the garage to get some “control” samples. “That way if the girls’ blood detector works and there is blood on the junk from the car and not on this stuff, we know for sure it was Seth.”

Back at the lab Thelma and Daphne were cleaning up when Jimbo and Frederick returned. The women were initially skeptical, but soon became convinced.

“But how are we going to test this stuff,” asked Daphne. “We can’t fit it in a cuvette. Are we supposed to soak it and then use the water to test or something?”

“Didn’t the paper say something about spraying it?” said Thelma.

“Let me look... Yeah, we’re supposed to spray it. Remember there is sodium hydroxide in this solution so we had better put something down to catch the drips or it will eat the heck out of the table top. This hydrogen peroxide is pretty bad too.”

“Okay, we’ll do it over the sink, then bring the stuff back to look at. Hand me one of those samples, Jimbo.”

The students carefully exposed the first piece of evidence to the fluorescein solution and then to a light spray of hydrogen peroxide. Turning on the blue excitation source they saw no greenish color which would mark blood. Their detector detected no fluorescence either.

“Bummer, lets try another piece of evidence.”

“Well, that one was from the dumpster anyway.”

Repeating the procedure with a fragment of cardboard removed from Seth Daniels car gave a very clear pattern of glowing green.

“Uh, Jimbo, do you think we should call Dr. Dawson?”

“I don’t know Thelma, it is after eleven. I would hate for her to be mad at me for waking her up.

“Jimbo, go call Dr. Dawson now! And have her call that detective.”

Questions

1. Do you think that Seth Daniels is the guilty party, or is there some twist to this case that might result in another suspect?
2. What else might cause a positive reading from the evidence in Seth Daniel’s car?
3. Steven Crawford has developed a profile of the killer. What is a profile and how does it help police?

4. What are some of the legal, social, and moral consequences of profiling? For example, would it be acceptable to include the race of potential suspects in a profile?
5. Why do you think the local police have been so uncooperative in declaring these murders and helping Emily Dawson? Do they have any reason for this attitude, or does it reflect incompetence?

References

- ^[1] Robert K. Ressler, Ann W. Burgess, John E. Douglas. 1988. *Sexual Homicide: Patterns and Motives*. Lexington, MA: Lexington Books.

Part IV—A Day in Court

By the time Emily arrived to meet the students at the chemistry lab it was well after midnight. The lab was littered with bits of cloth, fabric, and cardboard. “Hi Daphne, Thelma. What is going on that is so urgent?”

“We have our blood detector working! First we just looked at liquid blood and could see really small amounts. Then Jimbo and Fred came in with some trash from a dumpster and from Seth Daniels’ state car. All the stuff from the car has some evidence of blood, but none of the stuff from the dumpster did. Then Tamara got here and we did measurements on that evidence you gave us from the girl’s body and it showed very faint bloodstains, but only on the inside of the clothing! Tamara helped us repeat on another piece of evidence, and we got the same thing.”

“Wait a minute, Thelma. Did you say there was blood inside Seth’s car? And only on the inside of the clothing?”

“Yeah, Jimbo had this idea that Stan Brown wasn’t crazy.”

The four students explained how Jimbo has started thinking that Stan Brown might not be so crazy after all and how all the evidence collected from the car at least showed some evidence of blood.

Emily immediately called Steven Crawford on his cell phone and gave him directions to the university chemistry lab. “I’ll be back soon after you get here, Steven. I want to run back to the ME office and get some of the other clothing samples to check for blood stains. Remember how Tamara had the idea that the victims were painted with some sort of symbols in blood... Yeah, it does fit in with your profile of a religious motive... Anyway, if we can see the patterns maybe there is a clear trail to the killer... Yeah, about half an hour.”

When Emily returned with several other pieces of clothing, the students were explaining the night’s events to Detective Crawford. Tamara and Emily assisted Thelma and Daphne in preparing the clothing for blood stain detection and Emily prepared to take some pictures if there was any evidence of a pattern of any type. The team worked late into the night, but while the clothing consistently showed blood on the inside, there was no evidence of any pattern. Rather the blood seemed to be fairly evenly distributed.

“I don’t know Tamara. I was sure you were right,” said Emily. “I’m too tired to even think about this right now. It’s after four in the morning. Should we break and continue this tomorrow afternoon?”

“Yeah, although at this point your part of the case is pretty much over,” said Steven. “I am going to call up a team to go over this state car with a fine tooth comb and we’ll repeat the fluorescein measurement with professional equipment as soon as I get permission from the manager of the motor pool. It’s a good thing it’s a state car rather than a personal car so we won’t need to get a search warrant. It will take half the day for the team to get up here. How about if I treat you all to dinner tomorrow night and let you know what we find?”

“Thanks Steven. Can you all make it?” asked Emily. There was a chorus of assents from the students and Tamara. “Okay tomorrow night it is. The Genesee Lounge at seven?”

“Lets make it eight. Going over the car may take quite some time tomorrow.”

The next evening Emily pulled her CRV into the parking lot at the Genesee Lounge about 15 minutes early to reserve a large table and found Steven already at the bar, a pint glass of Guinness in front of him.

“Hi Steve! Good day today?”

“You might say so. I’ll tell the whole story when the rest of the crew gets here, but the judge is going to rule on a search warrant by 10 tomorrow morning so we can search Seth Daniel’s house.”

Steven and Emily made small talk until Tamara and the students arrived. After being seated at their table, Steven brought them up to date on the forensic investigation. It had been no problem to get the motor pool manager to give permission to investigate the car. The forensic team had arrived just after noon and quickly established that there were bloodstains inside the car. None were clearly defined, just like the blood evidence on the clothing they had examined the previous night. However it was clear that some body, either human or animal, had been stored in the trunk. The techs were examining the evidence to see if the blood collected was human and would try to match the DNA with that of the latest victim. Steven told them that there was enough evidence at this point, both circumstantial as well as what was found in the car, to get an arrest warrant issued. He cautioned the group about mentioning this to anyone, however.

“Did you find any blood patterns or anything?” asked Frederick.

“I really can’t comment on the investigation in detail at this point. But no, there weren’t any patterns like Ms. McNabb had hypothesized. It was a good theory though, and fit the profile I had developed of a person with a religious mania.”

“Well, Seth Daniels certainly fits that profile,” said Emily. “Did I tell you about the inside of his house? He had some hunting trophies on the wall even though he said he gave up hunting. And bookshelves everywhere. About half of them were filled with books on the Shroud of Turin.”

“What is the Shroud of Turin?” asked Frederick.

“You know, there was that program on TV last month that we watched,” said Thelma. “It was the sheet they buried Jesus in and you can see some sort of image imprinted on the cloth still. Sort of creepy.”

Suddenly the blood drained out of Emily’s face. “Oh no. Seth’s curtains. They were hand dyed. I didn’t think anything of it at the time since he seemed to like that stuff. He built his log cabin and was into hunting. They were hand dyed in brown patterns...”

Seeing confusion on the faces around the table, Emily continued, “Drab brown, like dried blood. He is into the Shroud of Turin and the bodies were drained and there were blood stains on the inside of all the clothes.”

“My God, it all makes sense. That is why there were the cuts in the feet! He painted the bodies and wrapped them up in sheets,” said Tamara. “He was collecting souvenirs.”

“Now hold on. Let’s not get carried away with speculation,” said Steven Crawford. “It could be that he simply found a wounded animal on the road and took it into the vet. We won’t know anything until tomorrow. So, let’s eat our dinners and change the subject to something more pleasant.”

Four months later Jimbo received his summons to court. He was being called as a witness by Seth Daniels’ defense attorney in a case of capital murder. Emily Dawson had been called the week before. Seth’s arrest had sent shockwaves through the town, and Jimbo found himself in the center of the controversy. Although many were quick to believe the worst, Jimbo’s brothers and father, long-standing friends of Seth, couldn’t believe he was a serial killer.

The town's attention was riveted on the court case, which had been moved to an adjoining county because of the publicity. Although it was hard for most people to believe that Seth Daniels was a murderer, the case against him was very strong. After obtaining a warrant to search Seth's cabin, Steven Crawford and the team of forensic investigators performed fluorescein tests on the curtains and sofa covers, both of which tested positive for blood, providing them with sufficient evidence to make an arrest. After Seth's arrest further circumstantial evidence made his guilt seem more likely. Police interviewing people living near where the latest victim's body had been found learned that Seth had been seen in the area the night of the murder. Tire imprints found near the crime scene matched those of the state car Seth drove. Police investigation also eventually determined that Seth knew all the young women who were killed in some capacity, most by having them as students in class.

Although Seth denied the charges against him, evidence found in his cabin also pointed to the fact he had killed at least some of the girls. Perhaps the most damning evidence Steven Crawford had found was a collection of broken bottles in separate wooden boxes. Although the bottles had been carefully washed to remove any fingerprints or blood stains, one glass type matched the glass fragments Emily had found in the foot of the last victim. Also telling were books on field dressing game with passages circled and a complete collection of newspaper clippings about each of the six drowning victims.

Jimbo put down his own scrapbook of newspaper articles about the trial and the students' role in it and put on the suit Dr. Dawson had purchased for him for his court appearance. Frederick, Thelma, and Daphne came by to pick him up about an hour before they were supposed to appear in court—all four of the students had received summonses.

Arriving at the courthouse they ran in to Dr. Dawson and Detective Crawford outside the courtroom. "You've been called by the defense," said Steven, "which means you are a hostile witness. Just answer the questions honestly and don't get flustered. And don't say anything more than what you are asked for," he added, looking right at Jimbo.

"Yes sir. Answer questions, go home. That is our plan."

The day's proceedings had dragged on for several hours before one of the students, Thelma, was called to the stand. The defense attorney questioned her on her role in the case, probing her technical knowledge of the fluorescein blood detection method. Although he clearly hoped to discredit this evidence, it soon became clear Thelma knew quite a bit more than the defense attorney about the measurement technique and he stopped questioning her. After the defense attorney finished, the prosecuting attorney, impressed by the knowledge of the witness, questioned her in detail on what the students had found and recalled to the jury that their conclusions had been corroborated by the state lab down in the capital. After Thelma sat down, she was congratulated in whispers by the other three students.

"Masterful job, Thelma. You really showed him up. I bet none of the rest of us are going to be called at all," said Daphne, echoed by Jimbo and Frederick. She was soon proven wrong, however, when the defense next called James O'Toole to the stand.

After taking the oath, Jimbo was asked several questions by the defense attorney to verify that he was who he claimed he was and that he had been present on the night the evidence was analyzed.

"You are an employee of the state, Mr. O'Toole, are you not? I believe you intern with Dr. Dawson."

"Yes."

"And you were there in your official capacity the night the evidence was analyzed?"

“Yes, I mean no. I was just hanging out with my friends. I wasn’t working if that is what you mean.”

“But you are a state employee?”

“Yes, I guess so.”

“Could you please explain to the court how you suspected my client...”

“Objection! Any response by Mr. O’Toole would be speculation and thus not admissible as evidence.”

“I withdraw my question. Mr. O’Toole, could you please describe the events of that night, beginning with when you arrived at the chemistry lab.”

Jimbo went on to describe how he and Fred sat outside discussing the case and how in the course of the conversation the possibility of Seth Daniels being the killer had occurred to him. Acting on his hunch, they had collected some evidence from Seth’s car and brought it back to the lab to be analyzed. Jimbo was very clear on the evidence analysis including collection of the control samples from the dumpster, having been coached in preparation for this moment.

“So you could state that this hypothesis of yours, backed up by the evidence you collected and your friends analyzed, resulted in my client being considered as a suspect in this case?”

“Yeah, I hadn’t thought of it that way, but I guess I did crack the case.”

“Was Mr. Daniels’ car locked?”

“Huh, what does that have to do with anything?”

“Answer the question please.”

“Yeah, Frederick got the key from the service desk. He works in the motor pool 10 hours a week so was authorized to be there I guess.”

“After 10 o’clock in the evening? Your Honor, I would like to submit as evidence a statement from the manager of the motor pool stating that Mr. Frederick Price has never been permitted in the motor pool unsupervised. As a work study student, he is not a state employee and could not authorize entry to a state vehicle. In effect, the evidence which led both to the search of my client’s vehicle and the warrant to search his home were obtained based on evidence the state obtained illegally through these students. I would like to submit a motion to have all evidence obtained from my client’s car and home thrown out.”

Jimbo looked up into the gallery, a stunned expression on his face, to see Dr. Dawson slowly lower her head onto her hands, covering her eyes.

Questions

1. What problems did you encounter analyzing the forensic evidence? How accurate do you believe your analysis is?
2. Assume you were on trial for murder and a fluorescein test was used as part of the case against you. What arguments against this test might you devise to present in your trial?
3. Search the internet for references to other cases where forensic evidence has been mistaken. How can such mistakes be avoided?

4. What pressures are there for those who work at analyzing forensic evidence that might lead to abuses? Should they be funded and hired by police departments or be a separate branch of law enforcement?
5. Investigate what options the defense has to such laboratory facilities and forensic evaluation of evidence.