Case introduction
A dead woman’s body was found rolled in a carpet along I-95 in Greenwich, Connecticut, around 4 p.m. on September 21, 1986. The investigator called on Dr. William Krinsky at the Yale University Medical School on September 22, and asked him to examine the insect evidence from the carpet and to help determine approximate time of death (postmortem interval, PMI) of the woman.

Gathering evidence
Dr. Krinsky started his work on the case on the afternoon of September 22 and visited the Westport State Police Barracks around 1:20 PM to examine the materials left on the carpet from the victim’s body. He collected a large maggot mass, a number of puparia (insects in a non-feeding stage between the larva and adult form where their last larval skin hardens), and few damaged adult blow flies (Diptera-order, Calliphoridae-family) identified as black blow flies (Phormia regina-species). He found neither eggs nor empty puparia. Only a small number of puparia (approximately 1%) were collected compared to the maggots (99%). He also noted that most of the maggots were large 3rd instar larvae (the last of the 3 larva stages).

On the afternoon of September 24, Dr. Krinsky visited the site where the body was found with one of the police detectives working on the case. At the site, Dr. Krinsky collected additional insect evidence as well as made other environmental observations including the vegetation where the body was placed, the direction of the sunlight, etc. Dr. Krinsky noted his observations and took the insect evidence to the laboratory for detailed examination and analysis.

Asking other important questions
In determining the postmortem interval (PMI, time since death) of the victim, Dr. Krinsky needed more than entomological information. He developed the following questions and sought the answers to them in order to verify, adjust, and support his analysis:

1. Question: How tightly was the body rolled in the carpet? Was it bound with anything? Answer: Quite tightly; the carpet was rolled, folded at both ends, and tied with a rope.

2. Question: How was the carpet handled after it was opened? Answer: The carpet was opened in the presence of a medical examiner, then was placed in plastic bags and kept in a car.

3. Question: Did the vegetation or any staining of the ground indicate how long the body was on the ground where it was found? Answer: During the site visit on September 24, Dr. Krinsky found the vegetation where the body was found damp, darkened and depressed. He also noted the odor still remaining at the site. Making this observation, he estimated that the body might have been there approximately 7 days.

4. Question: Where was the body placed in relationship to the environment—e.g., direct sunlight, shade, blockage etc.? Answer: The site of the body was damper than its surroundings. He noted heavy mite infestation on the site as well as sunlight dappling on the right side of where the rug had been found in the late afternoon.

5. Question: Were any of the roaches found alive? Answer: No

6. Question: What were the weather conditions during the month of September? Answer: Dr. Krinsky requested and received a record of local weather data in order to calculate the accumulated degree hour, ADH—see section 3 in the Laboratory Work Section below).

7. Question: What were the autopsy findings?
Dr. Krinsky spoke with the medical examiner prior to receiving the requested final autopsy report which stated the cause of death and noted the presence of many maggots in the various openings of the victim’s body.

**Laboratory Work**

At the laboratory, Dr. Krinsky processed the collected insects differently. Some were pinned or preserved in ethanol as examples; some were made into slides to study the biological structures; and others were reared—i.e., kept in a set environment to further develop into adults. The following laboratory work was done to identify and calculate the accumulated degree hour (ADH, see item 3 below) in order to estimate the postmortem interval:

1. **Rearing and identifying the insects:** Dr. Krinsky needed to know when the adult flies would emerge from the puparia in order to identify the insects and to estimate the postmortem interval (time since death) by calculating earliest possible time of oviposition (depositing of eggs, esp. by insects). He processed the collected maggots and puparia from the carpet on September 22, in the following manner:
   a) Small larvae of about 2nd and young 3rd instars were preserved in 70% ethanol liquid after killing them in a hot water.
   b) Some larvae were transferred from hot water to 10% ethanol liquid for microscope slide preparation in order to help identify the insect species.
   c) About 10 large larvae were reared by placing them in 25 C (=77 F) environment for further development.
   d) All collected puparia—66 dark, 7 pale brown and 7 intermediate reddish brown—were reared at 25 C (=77 F) environment for further development.

2. **Emerging flies:** Dr. Krinsky observed the following adult fly emergences from the puparia being reared at 25 C (=77 F):
   a) 2 flies emerged at 1:30 PM on September 25
   b) 6 flies emerged in the morning of September 26
   c) 2 flies emerged around 4 PM on September 26
   d) 25 flies emerged at 4 PM on September 27
   e) 10 flies emerged at 3:30 PM on September 28
   f) 6 flies were in the process of emerging at 5:25 PM on September 29
   g) Among the large larvae placed in the chamber on September 22, 2 flies were in the process of emerging on September 30.
   h) Among the reared larval group, 2 flies were in the process of emerging on October 1.

3. **Calculating accumulated degree hour (ADH):** Studies of insects have provided evidence that an insect requires a given amount of thermal energy (heat) to develop from one stage to the next in its life cycle. The total thermal energy (ambient temperature multiplied by hour or day) is called the accumulated degree hour (ADH). Forensic entomologists calculate ADH in order to count back and estimate the age of the insect or the time when the eggs were first deposited. Dr. Krinsky combined his laboratory data and the weather data to calculate ADH of the reared puparia and large larvae, then counted backwards to estimate the first possible time of egg deposits on the body.

**Conclusion & Outcome**

On February 2, 1987, Dr. Krinsky sent a letter to Dr. Henry Lee, Director of State Police Forensic Laboratory in Connecticut, stating his conclusion of the most likely date and time of oviposition and outlining his forensic entomological analysis. Dr. Krinsky testified for the prosecution as an expert witness on August 1990, which corroborated other evidence and witness statements against the suspect on trial. The case resulted in a guilty verdict and the defendant was sentenced to 60 years in jail, equivalent to the life sentence in Connecticut.
Climatological Data, Sylvia Hunt case, 1986

STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC SAFETY
DIVISION OF STATE POLICE
WESTERN DISTRICT HEADQUARTERS

September 24, 1986

Dr. William Krinsky
Yale University
Dept. of Epidemiology and Public Health
68 College Street
New Haven, CT

Dear Dr. Krinsky:

I would like to take this opportunity to thank you for adding your expertise to the investigative effort concerning the homicide investigation into the death of Sylvia Hunt, whose body was found on the highway right of way along I-95 in Greenwich, Connecticut.

Enclosed please find a copy of climatological data concerning the lower Fairfield County area from September 1st to the 23rd inclusive. This information was obtained from the U.S. Weather Service office in Bridgeport.

I hope this information will assist you with your calculations in this matter.

Yours very truly,
Lt. James D. Hiltz
Commanding Officer
Major Crimes Squad-West

[signature]

Credit: Courtesy of William L. Krinsky, M.D., Ph.D.

The ADVOCATE
SERVING THE COMMUNITY SINCE 1829 • STAMFORD, CONNECTICUT • SATURDAY, AUGUST 4, 1990

Jurors shown result of stabbing

By Denise Bufia

Two jurors held hands to their faces yesterday when they were shown pictures of the body of a prostitute found rolled in a rug along Interstate 95 in Greenwich nearly four years ago.

The 12 jurors at state Superior Court in Stamford are to determine whether Yuni Hernandez, 29, is guilty of fatally stabbing 26-year-old SylviaAnn Hunt in this Halloween Boulevard apartment in Stamford.

Hernandez sat quietly for most of the first day of testimony and listened to the help of a Spanish interpreter.

Hernandez has pleaded not guilty to murder, which carries a maximum penalty of 60 years. He is being held in lieu of $500,000 at

Murder trial opens in prostitute’s death

the Bridgeport Correctional Center.

Hernandez allegedly told a friend about one month before Hunt died that he planned to dedicate himself to killing women because he was disillusioned with them. Court documents said that Hernandez allegedly went to a nightclub two nights after the killing, leaving Hunt’s body between his mattress and boxspring.

Hernandez’s mother sat behind him in the front row of the gallery with her graying hair pulled back in a long ponytail. The two spoke briefly during intervals in the proceedings.

Aftewards, she did not comment. The jurors were shown the photographs of Hunt’s body while state Associate Medical Examiner Dr. Arkady Katsnelson testified that Hunt died of multiple stab wounds to the chest. He said she was stabbed 13 times.

Hunt was dead for approximately five to seven days before she was found by passers-by on Sept. 21, 1986, just west of the Mianus River bridge. She was stabbed with a sharp instrument, possibly a knife, Katsnelson said.

Dr. William Krinsky of Yale University Medical School, who wore a navy blue tie with white Five on it, corroborated the medical examiner’s testimony by saying that maggots, or common fly larvae, found on Hunt’s body indicated that she had been dead for about a week.

Credit: Courtesy of William L. Krinsky, M.D., Ph.D.

edit: New Haven Advocate
1. What task was Dr. Krinsky asked to help with in the 1986 murder case?

2. What types of evidence and information did Dr. Krinsky gather?

3. What kind of observations did Dr. Krinsky make about the collected insect evidence?

4. How did Dr. Krinsky process the blow fly puparia collected from the carpet on September 22, 1986? Why?

5. What are some factors (variables) that affect the insect life cycle?

6. Describe in your own words how insect life cycle is applied in estimating the time of death.

7. What type of source (primary or secondary) is the state of Connecticut thank-you letter? Explain your answer.

8. What type of source is Dr. Krinsky’s notes? Explain your answer.

9. What type of source is the newspaper article? Explain your answer.

10. What roll did Dr. Krinsky play in the trial and what was the trial’s outcome?

11. Why did Dr. Krinsky want to know the weather data?

12. Besides the life-cycles of flies, explain what role weather can play in determining time of death using temperature. Give an example.