

An AI sleuth claims to have finally unmasked the Zodiac murderer, one of America's most notorious serial killers



Did Marvin Merrill kill the Black Dahlia too?




Late one September evening in 2024, Alex Baber was running on dangerously little sleep. Sitting on the bed at his home in remote West Virginia, he sensed he was just a few keyboard strokes away from completing what could go down as one of the greatest pieces of detective work in history.

Using an artificial intelligence program he had developed, combined with recently released census data, Baber believed he had discovered the identity of the Zodiac Killer — America's most infamous undetected serial murderer. The self-styled Zodiac had terrorised northern California in the late 1960s, killing at least five people and taunting the authorities with letters and cryptograms sent to local newspapers.


WANTED

SAN FRANCISCO POLICE DEPARTMENT

NO. 90-69 WANTED FOR MURDER OCTOBER 18, 1969



ORIGINAL DRAWING



AMENDED DRAWING

Supplementing our Bulletin 87-69 of October 13, 1969. Additional information has developed the above amended drawing of murder suspect known as "ZODIAC".

WMA, 35-45 Years, approximately 5'8", Heavy Build, Short Brown Hair, possibly with Red Tint, Wears Glasses. Armed with 9 MM Automatic.

Available for comparison: Slugs, Casings, Latents, Handwriting.

ANY INFORMATION:
 Inspectors Armstrong & Toschi
 Homicide Detail
 CASE NO. 696314

THOMAS J. CANILL
 CHIEF OF POLICE

Police sketches of the Zodiac Killer circulated in October 1969

Baber, 50, who runs a small team of amateur investigators known as the Cold Case Consultants of America (CCCoA), had spent months trying to crack a clue written in a letter by the killer to the San Francisco Chronicle in April 1970. The note read:

My name is —

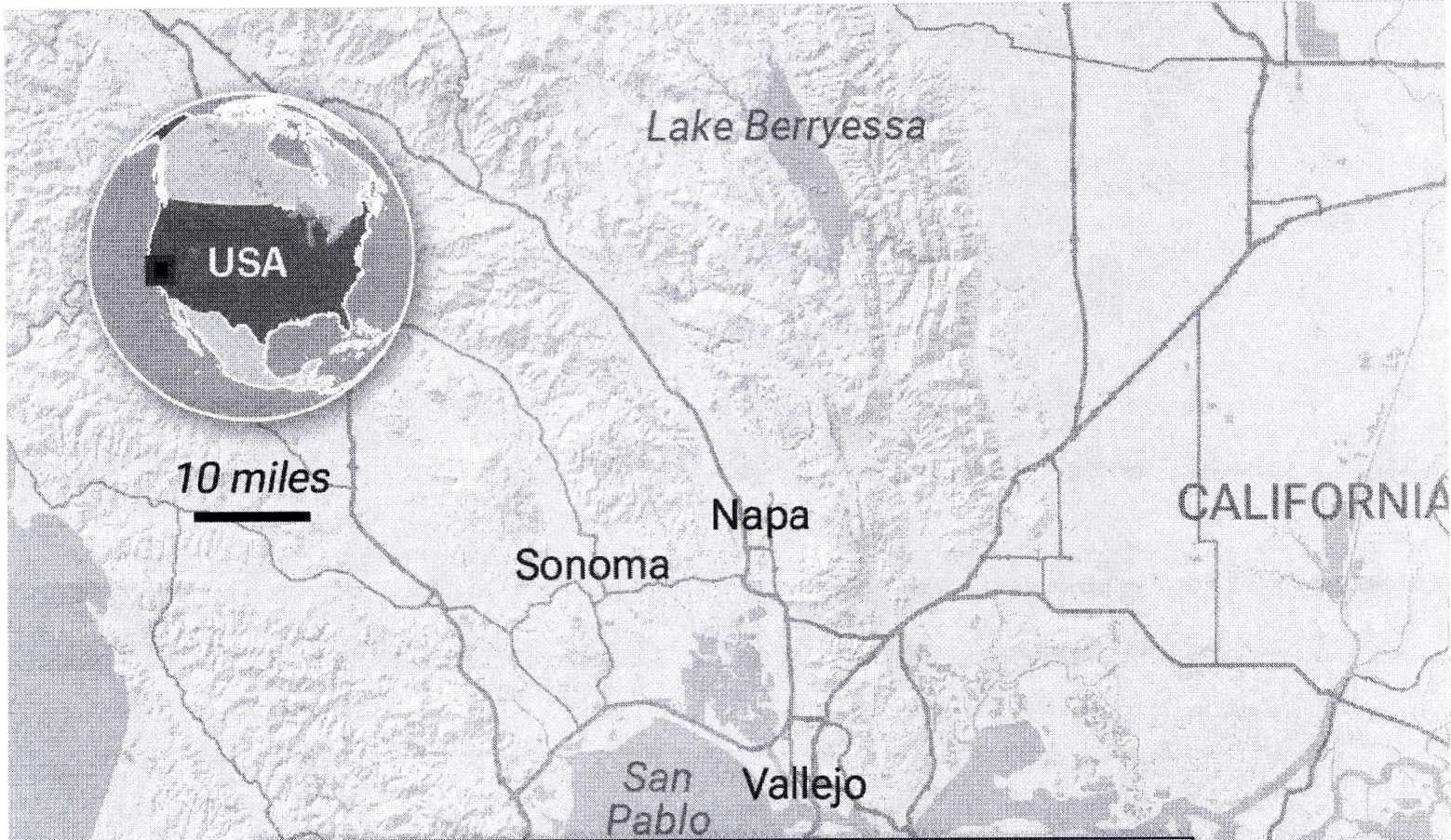
A E N ⊕ ⊗ K ⊗ M ⊗ J N A M

The mysterious 13-character string of letters and symbols at the end of the note has become known as the Z13 cipher and it has eluded the world's best codebreakers for more than half a century. Now Baber had seemingly solved it, whittling down the candidates to a single 13-letter name: "Marvin Merrill".

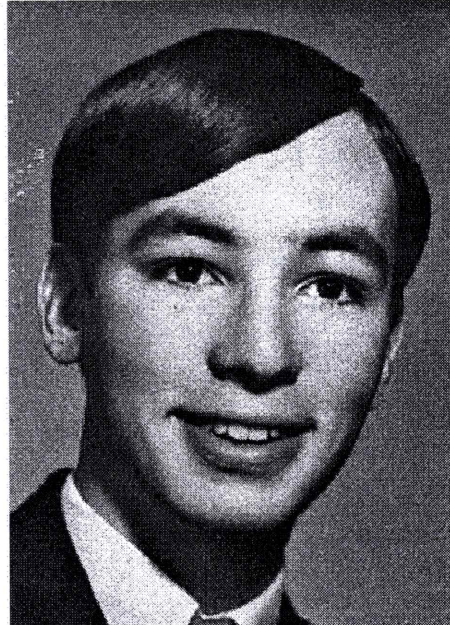
There was more. As his investigation progressed, Baber became certain that his suspect was also responsible for another infamous murder that had taken place two decades before the Zodiac killings — that of Elizabeth Short, an aspiring Hollywood actress whom the newspapers of the day would call "the Black Dahlia".

Two of America's most high-profile unsolved murder cases, each the subject of dozens of books and movies — and the possibility there was just one killer. "I jump up and I'm, like, 'Holy shit, I think we got him! This has to be the guy,'" Baber says. "Now we've got to prove it."

The Zodiac's reign of terror

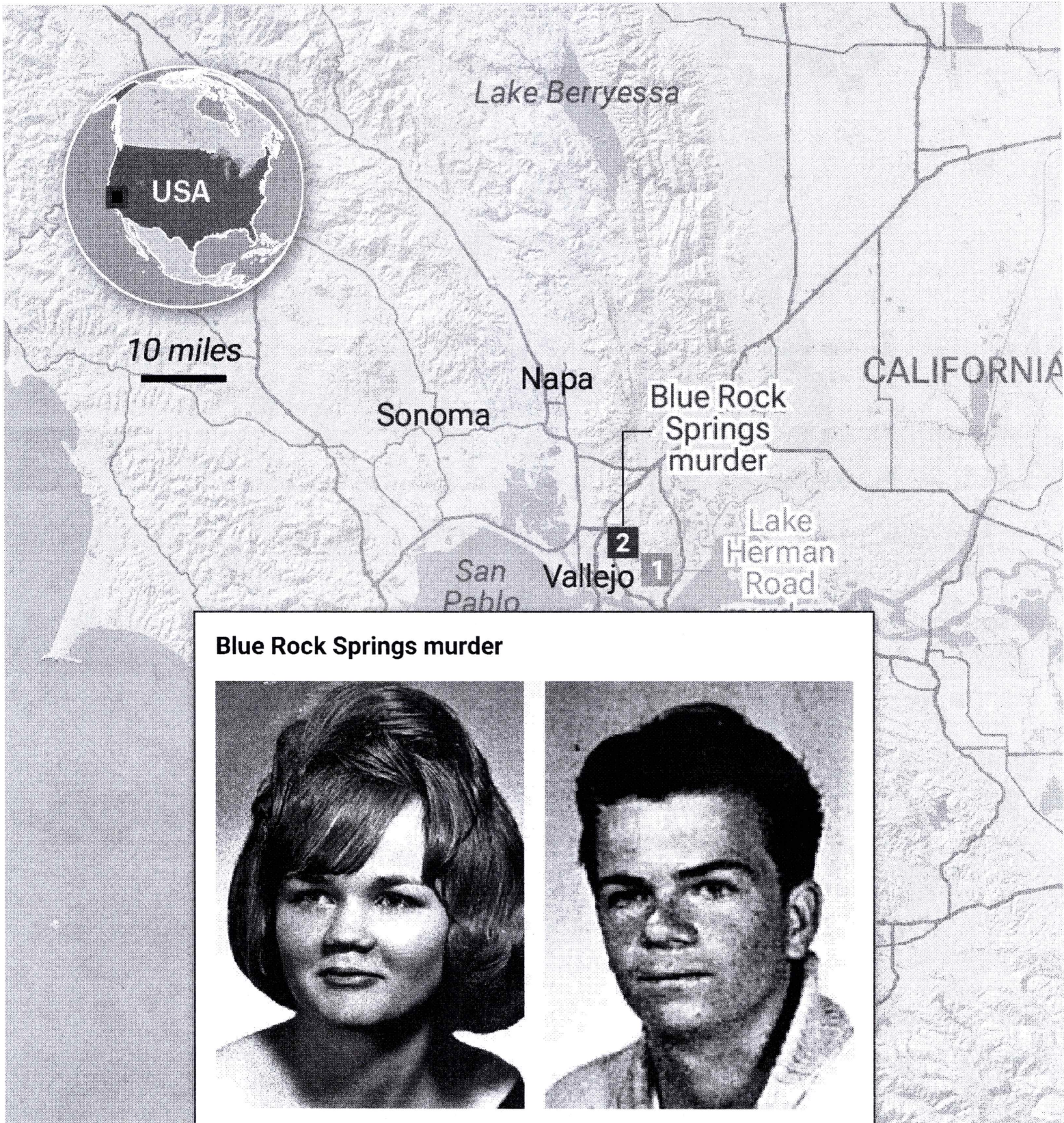


Lake Herman Road murders



The Zodiac's first known murders took place on December 20, 1968, when two high school students, Betty Lou Jensen, 16, and David Faraday, 17, were shot dead while parked near a beauty spot down a gravel road nicknamed



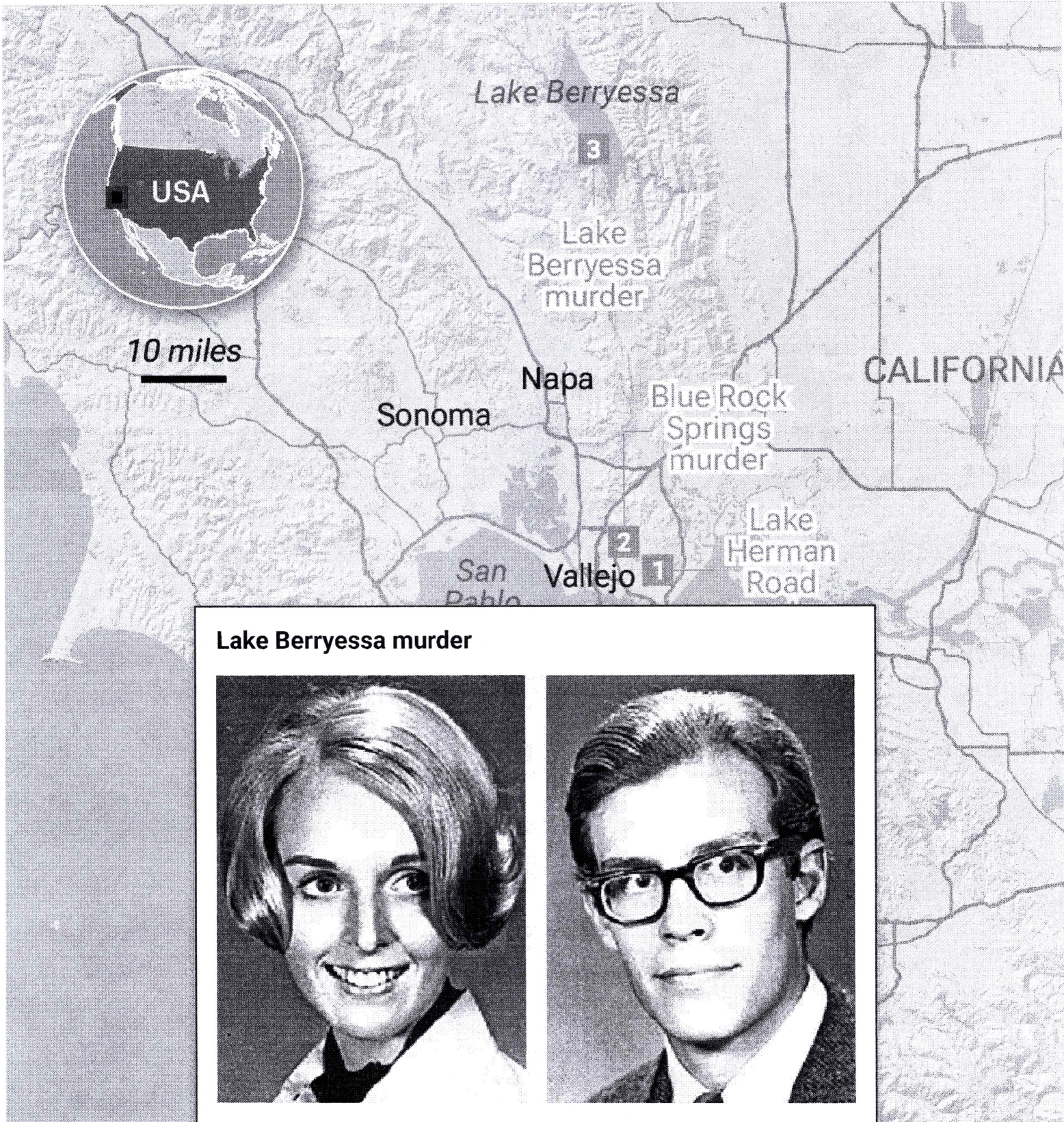


Blue Rock Springs murder

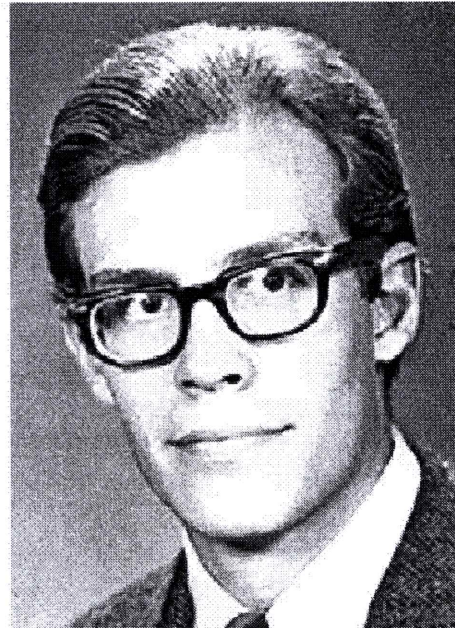
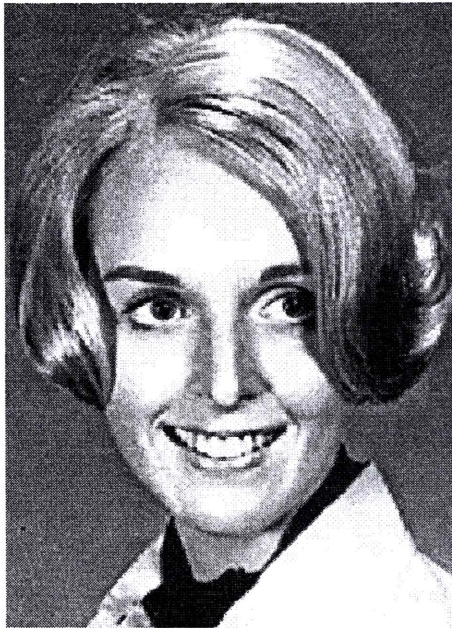


Early in the morning on July 5, 1969, he struck again, shooting Darlene Ferrin, 22, and Mike Mageau, 19, while they were parked at Blue Rock Springs Park in Vallejo, another popular spot among courting couples. Ferrin was killed but Mageau survived, despite being shot four times.





Lake Berryessa murder



Two months later, on September 27, another couple, Bryan Hartnell, 20, and Cecelia Shepard, 22, were having a picnic by the scenic Lake Berryessa in Napa County when they were tied up and stabbed by a man dressed in an executioner-style hood with a crosshair symbol on its



letters to newspapers were postmarked July 31, 1969, and carried a 408-character code. They warned that if the code didn't appear on the next day's front pages he would go on a "kill rampage". The editors had no reason to doubt this and published it — terrifying the public into participating in what appeared to be a life-or-death game.

Four of the letters sent to the press included ciphers. In one he threatened to shoot out the tyres of a school bus and "pick off the kiddies as they come bouncing out". Armed police rode the buses for weeks but there was no shooting.

The San Francisco police department determined from statements given by the surviving witnesses that the suspect was a white male aged between 35 and 45, 5ft 8in to 6ft tall and based in, or connected to, California at the time of the attacks.

Presidio Heights murder

One lead suspect was Arthur (Bert) Allen, a US navy veteran turned teacher who worked at Santa Rosa Elementary School, where his pupils said he taught them to mark codes and played them the folk song *Tom Dooley* about a murder. However, fingerprints from the crime scenes did not match those of Allen, who in 1974 was arrested on child molestation charges and institutionalised in a state hospital. He was never charged in relation to the Zodiac murders.



Several other shootings were attributed to the Zodiac, including the murder of Paul Stine, a 29-year-old taxi driver and PhD English student, on October 11, 1969. Fragments of Stine's bloodstained shirt were sent to the newspapers.



Arthur Leigh Allen, a lead suspect in the Zodiac murders

The police investigated 2,500 potential suspects in the decades that followed, with no arrests or convictions. “You have these detectives running around, everybody’s touching all the evidence, not storing it properly. Notes not being compared,” Baber says. “It was a case of too many cooks.”

A host of other suspects, including Gary Francis Poste, a US air force veteran turned painter and decorator, whose facial scars matched an early police sketch, were offered up by cold case investigators. There was no shortage of theories — a few of which proposed a link to another unsolved murder that had captured the public imagination several hundred miles away and almost two decades earlier.



On January 15, 1947, a mother pushing a pram saw what she thought was a shop mannequin lying in a weedy lot in south Los Angeles. What she had stumbled upon was the body of Elizabeth Short, a beautiful, if troubled, 22-year-old aspiring actress who had moved from Massachusetts looking for work. Her corpse had been neatly cut in half without damaging any major organs, washed clean, then macabrely arranged. Her nipples had been severed, the corners of her mouth had been slashed up to her ears and her legs spread. It appeared to be the work of someone with specialist medical knowledge.





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newspaper containing a cryptic letter and Short's birth certificate, slick with gasoline. The killer "knew how to evade identification", Baber says, "and would use gasoline so that the oil from his fingerprints would dissolve".

The Examiner and other newspapers began calling the dark-haired Short the "Black Dahlia" — a play on the 1946 film noir *The Blue Dahlia*. The killer played up to it, sending more letters and signing them "the Black Dahlia Avenger".



A poster for the 1946 film The Blue Dahlia

Such was the notoriety of Short's murder it spurred some 60 confessions — none considered to be genuine. A young man named



the murder or rule him out.

The Los Angeles police department (LAPD) interviewed more than 150 possible suspects, including several former suitors of Short. But nobody was charged.

Over the years the sensationalised reporting around the crime fed into popular culture. “It’s the great LA murder. And LA has had some doozies,” said the crime novelist James Ellroy, whose 1987 novel *The Black Dahlia* was adapted for a 2006 film starring Scarlett Johansson.

“It was a gruesome murder,” Baber says. “I think that’s why it stuck in the public’s imagination.”



Alex Baber's interest in true crime began at an early age, not least because his family may have had a serial killer of its own. In the 1970s young itinerant workers began to go missing at the farm of his maternal grandfather, Neil Eady, in the Tarpon Springs area of Tampa, Florida. After Eady died in the early 1980s, the family sold the land and tore down the barn.



Alex Baber, director of Cold Case Consultants of America

“They found human bones and remains underneath the furnace. It is just a crazy, crazy story,” Baber says. “So my grandfather was a

On Christmas Eve of 1969, Baber's uncle Jeremiah Eady shot his sister Vivian Eady-Londros and her husband point blank in the face with a shotgun.

After Baber's father left the family when he was six, his mother moved Baber and his two older brothers to northern Florida. She built a cabin on the Suwannee River. "It was in the middle of the woods," Baber says. "We were totally isolated."

School was difficult for Baber, who was bullied. "I had this bright red hair, freckles and was super-smart," he says. "I finished our work in, you know, half the time and then I would stare out the window. I had social anxiety, so I wouldn't speak."

Aged 12 he received a diagnosis of autism. It was around this time his interest in criminology was piqued. He read Sherlock Holmes and True Detective magazines. "I think part of my interest in it was that I just saw the pain that my mother suffered from the loss of her sister," Baber says. "I think I was always looking for answers."

He got high scores in his General Educational Development (GED) tests and enrolled in college, but "after two weeks I got up and walked out", he says.

In 2007 he saw the David Fincher film *Zodiac*, starring Jake Gyllenhaal as a political cartoonist for the San Francisco Chronicle who becomes obsessed with cracking the Zodiac's code. Baber was hooked.

He taught himself forensic science; from handwriting analysis and biometrics to cryptography — the science of creating and breaking



interact with people in a classroom.” He struggled to find paid work in the field, so he took a job as a bodyguard and worked night shifts at a warehouse doing data entry.

In 2021 he founded CCCoA with inheritance money and donations from a handful of victim-advocate organisations. In the beginning it was just Baber and J-Lynn, his wife at the time, plus three private detectives and a handful of forensic experts. He would pick the cases of greatest interest to him. “Maybe once a month I would get an inquiry or a phone call, most often from the families of missing people,” says Baber, who largely works pro bono. But the Zodiac case kept calling him.



“I knew we had to approach it from a new angle,” Baber says. He focused on the cryptograms the killer had sent. The first, Z408, had been solved by a married couple, Donald and Bettye Harden, days after it was published in August 1969. It consisted of 408 symbols and began, “I like killing people because it is so much fun ...” The second, Z340, sent in November 1969, had remained a mystery until December 2020, when it was decoded by an international team of cryptographers. It contained a taunting message: “I hope you are having lots of fun trying to catch me”.

Cipher X408 was solved in August 1969, a few days after it was published in local newspapers

S ϕ / Δ ■ B P O R A U ■ ♯ R J ρ E
 X Λ L M Z T ρ R \ 9 F H V W ε ▲ Y
 □ + ρ G D Δ K I ⊖ ⊙ ρ X ▲ ● ⊕ S ϕ
 R N ⊥ I Y E ⊥ O ▲ ρ G B T Q S ■ B
 L O / P ■ B □ X ρ E H M U Λ R R X
 ρ Z K ρ 9 I ⊖ W ρ I ▲ ● L M R Δ ■
 B P D R † τ π ⊙ \ N ϕ ε E U H X F
 Z ρ 9 O V W I ● + ⊥ L ⊖ ⊥ Λ R ⊙ H
 I Δ D R □ T Y R \ ρ ε / □ X J ⊙ ▲
 P ● M ▲ R U ⊥ □ L ⊖ N V E K H π ρ
 R I I J K ● Δ ▲ L M J N A ⊖ Z ϕ P
 ⊕ U ρ X A Δ ■ B V W \ + V T ⊥ O P
 Λ π S R J ♯ U ε ⊙ Δ ρ ⊕ G ■ □ I M
 N X ⊖ S ρ E / Δ ■ □ Z ♯ A P ■ B V
 ρ ε X ρ W ρ □ F ■ ▲ ρ + □ Δ A Δ B
 □ O T ● R U ρ + □ ρ Y ρ □ Λ S ρ W
 V Z ε G Y K E □ T Y A Δ ■ □ L ⊥ □
 H I F B X Δ ⊕ X A D ρ \ Δ L I π ρ
 □ ε ρ ■ ■ ⊙ ε ● P O R X ρ F ■ G ρ
 Z □ J T ⊥ ρ □ ▲ J I + R B P ρ W ⊙
 V E X R Δ W I ⊙ ρ E H M ⊖ π U I X



I L I K E K I L L I N G P E O P L E
B E C A U S E I T I S S O M U C H
H U N T I N G I S M O R E F U N T H A N
K I L L I N G W I L D G A M E S
I N T H E F O R R E S T B E C A U S E
M A N I S T H E M O S T D A N G E R
O U S A N I M A L O F A L L T O
K I L L S O M E T H I N G G I L D
V E S M E T H E M O S T T H R I L L I N
G E X P E R E N C E I T I S E V E N
B E T T E R T H A N G E T T I N G
Y O U R R O C K S O F F W I T H
A G I R L T H E B E S T P A R T
O F I T I S T H A T W H E N I
D I E I W I L L B E R E B O R N I N
P A R A D I S E A N D A L L T H E
I H A V E K I L L E D W I L L B E
C O M E M Y S L A V E S I W I L L
N O T G I V E Y O U M Y N A M E
B E C A U S E Y O U W I L L T R Y
T O S L O W D O W N O R S T O P M E
Y C O L L E C T I N G O F S L A V E
S F O R M Y A F T E R L I F E
B E O R I E T E M E T H H P I T I

cipher sent that June accompanied by a map of the San Francisco Bay Area. Baber homed in on Z13. “He’s telling us he’s giving us his name,” he says. “We should take him at his word.”

Baber first looked at the method used to solve Z340, known as “homophonic alphabetic substitution”, where common letters are assigned multiple symbols. In Z13, several characters repeat: a figure-eight symbol appears three times and the letters A, M and N feature twice. But because there were only 13 characters to go on, far shorter than Z340, it produced too many possible variations. It gave Baber the idea to then apply what is known in codebreaking as “columnar transposition”, where the order of letters is rearranged in columns.

Baber was still left with millions of possible arrangements of letters — most nonsensical in English. So he set about developing an AI program that could analyse military and marriage listings, as well as newly released social security numbers and birth records, and whittle the dataset down to real 13-letter names that fit the repeated characters in the cipher.

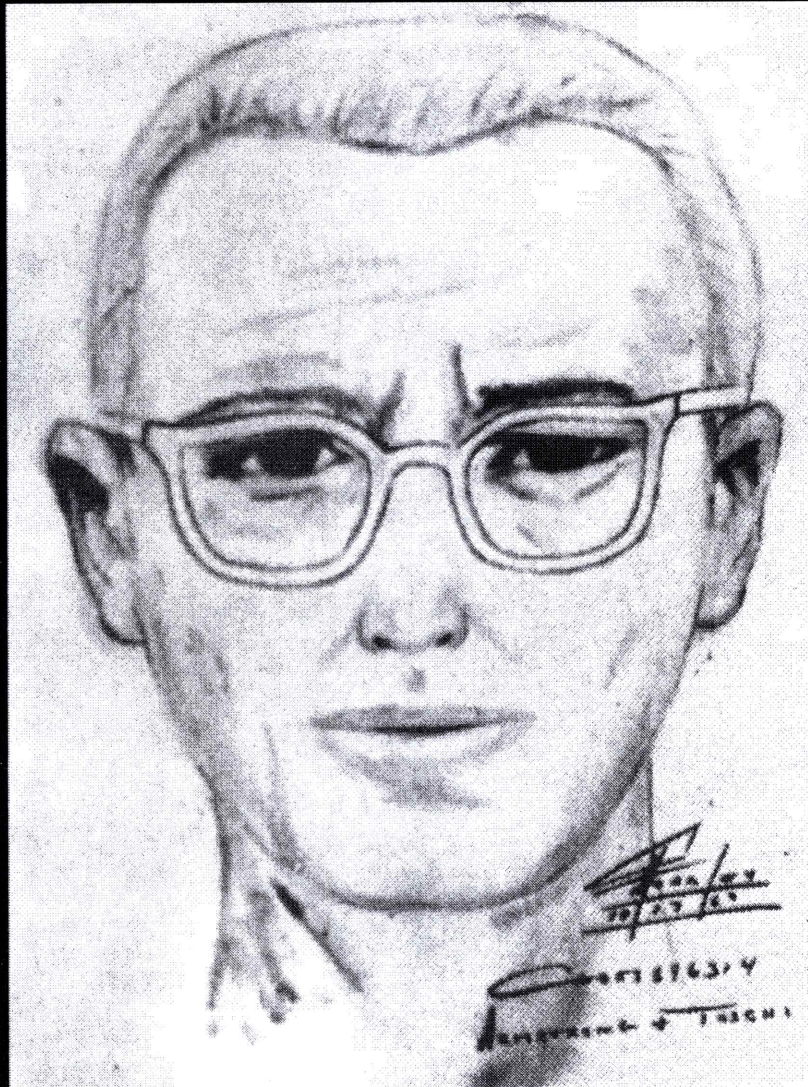
He then had to cross-reference these with the known characteristics of the Zodiac: white, middle-aged and 6ft tall, give or take a few inches, and most likely based in California. That eliminated 94 per cent of the candidates, Baber says. Height and weight details were documented on military records — about 50 million American men registered for the draft between 1940 and 1947. It took Baber nine months to process all of the names in the dataset, working 16 to 20-hour days.

“I’d work through the night. I usually operate on two, three hours of sleep as a chronic insomniac,” he says. He describes his current partner,



Baber consulted Ed Giorgio, a mathematician who served as chief codebreaker for the National Security Agency (NSA). Giorgio sent Baber's method to former NSA colleagues. One of them, Patrick Henry, attempted to reverse-engineer the transposition process and concluded that the columnar permutation could have been generated using the keyword "Elizabeth" — as in Elizabeth Short. They put this to Baber, who tested the proposed permutation himself and found it worked. It was "rock solid", he says.

Who was Marvin Merrill?



AMENDED DRAWING

13, 1969. Additional information has
c suspect known as "ZODIAC".



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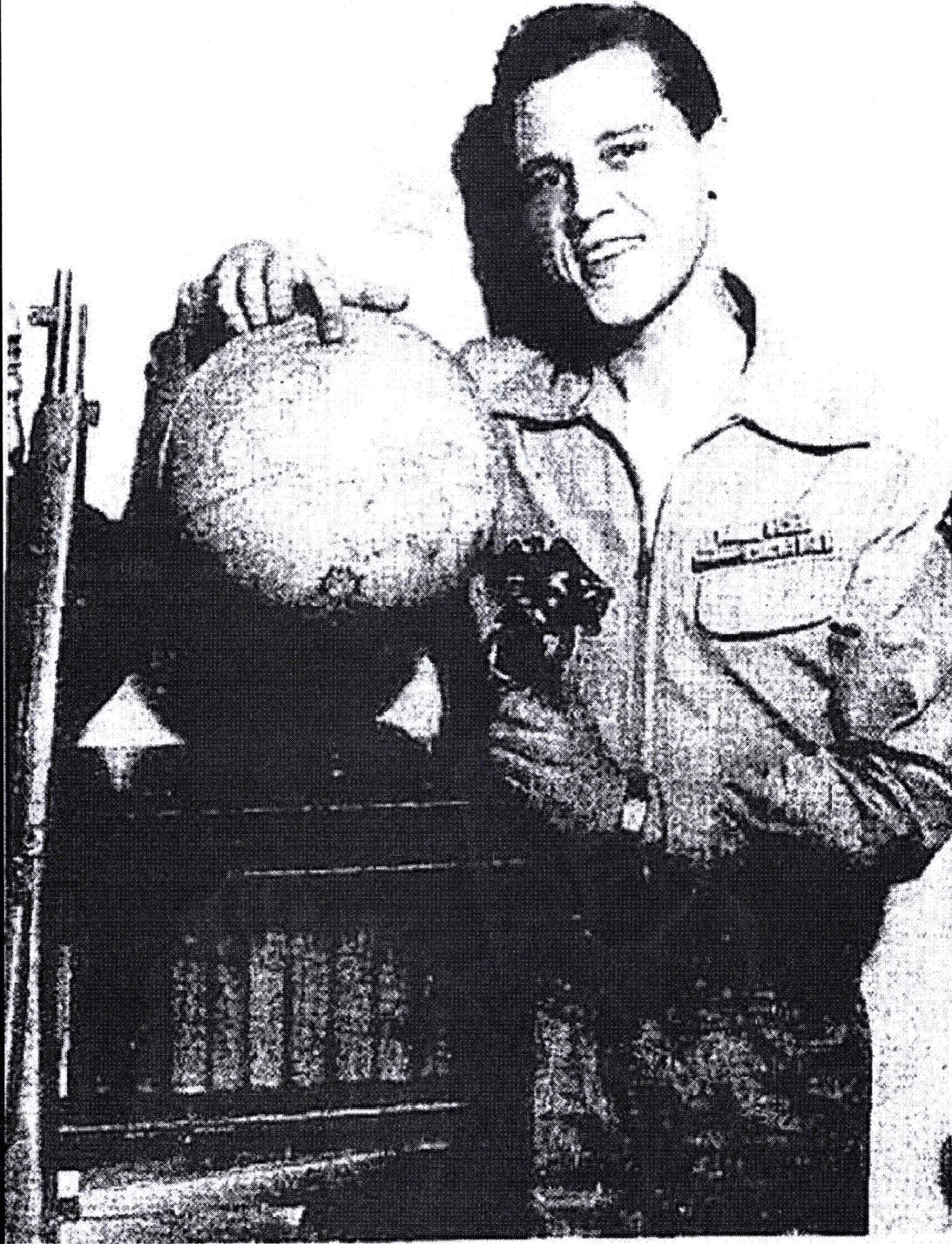




Baber could not find him in any documents prior to that. Through social security records, he learnt that “Marvin Merrill” was an alias adopted by none other than Marvin Skipton Margolis, the suspect in the Elizabeth Short killing, shortly after her murder.

“I was excited, of course,” Baber says. “But I’m thinking, OK, well, we know it’s him on paper, but is there anything out there that we can use to connect him to the killings?” So Baber dug into newspaper cuttings, police files and the unsealed Short grand jury indictment.

Margolis was born in Chicago, Illinois, on March 25, 1925, the eldest of three sons to Isadore and Lillian, immigrants from Russia and Poland. He had served as a US navy hospital corpsman during the first wave of the invasion of Okinawa before he was discharged with shellshock and PTSD, according to Veteran Affairs records.



PhM 2/c Marvin Margolis, son of Mr. and Mrs. Irving Margolis, 300 S. Hamlin, points to Okinawa where he was wounded in action. Also in the picture is a Japanese rifle which Margolis brought home to remind himself what he had to face at one time. Margolis was serving with the 1st marine division and was overseas 27 months. He wears the navy Presidential unit citation, American defense ribbon, Asiatic-Pacific ribbon with three battle stars and a ribbon presented by Admiral Halsep to a few men who were on the Okinawa beach for seven days. (Staff Photo)

California and had dissected a human cadaver. However, he dropped out after the first year. He then moved between several states, working as a builder, an architect and a portrait painter.

Shortly before the time of the Dahlia killing, Margolis shared a room with Bill Robinson, a former officer in the Signal Intelligence Service, the army's codebreaking division. He then met Short, with whom he had a brief romantic relationship. He had even lived with her for two weeks at an apartment on Hollywood Boulevard three months before her murder. He first lied to detectives about the connection before later admitting it under questioning.

Margolis, who married twice and had four children, bounced around during the Sixties, briefly moving back to Chicago and then Arizona and on to Kansas. His movements were tracked by Baber through the adverts he posted and interviews he gave to local newspapers about his projects and businesses. He seemed to relish attention. In an interview in 1961 with the Wellington Daily News in Kansas, he described himself as a "troubled artist" and made the unlikely claim he had studied under Salvador Dalí.

He would return to California later that decade, working as an engineer at Intel in Santa Clara before opening a vehicle repair shop.

"Marvin is the first suspect to check every single box: the knowledge of cryptography and engineering, his sidearm training in the military," Baber says. "Then there's the details like height, appearance, glasses, his widow's peak. And he knew Short. Plus everywhere this guy goes, there's a Zodiac crime committed. He's either the perpetrator or the



the Zodiac used to call police to tell them where to find two of his victims was within eyesight of a house in Vallejo in which Short had lived with her father before her death.

Investigators had theorised that Short may have been killed and then dissected and washed in a bathtub, as no blood was found on or around her body. Baber now hypothesises this is likely to have happened at a motel in Compton, 13 miles from where her body was found. On the night before the killing, local newspaper reports claimed that a nervous-seeming man had been driving between motels in the area, desperately seeking a room with a bathtub.

Baber was amazed to learn the name of one of the few establishments that did have a tub: the Zodiac Motel — a fact that had been lost, as it had changed its name not long afterwards and was later converted into flats. Baber made the discovery after using AI searches to comb through 1940s newspaper adverts for motel listings.

“Marvin was a diabolical genius. The guy had an IQ in the 160-plus range,” Baber says. “He left deliberate clues. He’s probably the smartest villain in history. We can’t just let him ride off into the sunset.”

Baber always had an interest in trying to solve both cold cases and had already introduced himself to Short's last-surviving sister, Muriel, over email, in late 2022. Baber says she was "extremely polite" but dismissive. He wasn't offended; after all, countless investigators had turned up at her family's door over the years and made promises they couldn't keep. Muriel died aged 94 in 2023 – before Baber reached his final conclusion.

Last year he contacted Roark Merrill, one of the sons of the suspected killer, under the pretence he was researching his father's Second World War service. Roark, 64, agreed to meet him at a diner near his home in Whitehall, upstate New York, where Baber revealed his real intentions.

"I told him I suspected his dad was the Zodiac Killer as well as a suspect in the Black Dahlia murder, so that was a lot to swallow," Baber says.

Roark, who was seven years old at the time of the Zodiac killings, was in disbelief. "I pulled out the binder of 22 examples of the Zodiac Killer's handwriting and showed it to him," Baber says. "He turns pale and confirms it matches his dad's. I told him about his father's involvement with Elizabeth Short and he pulled out his phone and showed me this 1992 sketch his dad had made titled 'Elizabeth' that he had hung on the wall of his office."

Baber asked if he could see it in person and Roark, a wealthy real estate developer, took him back to his house, a former naval armoury that Baber describes as "a castle". Roark showed him the portrait of a woman peering through a curtain of hair, naked from the waist up. Her lower half was not visible. To Baber's eye, one of the nipples appeared to have been severed. Baber asked if he could scan the picture.



picture depicted matched the wounds that are documented in the autopsy and crime scene photos of Elizabeth Short.” Uncensored photographs of Short’s body were not published in newspapers or archived online.

Baber made another discovery. Using the scanner’s colour and contrast filters, he found a single word hidden beneath some dark shading: “ZoDiac”. The sketch was made just months before Merrill died from cancer aged 68 in 1993. Baber sees it as a kind of deathbed confession.

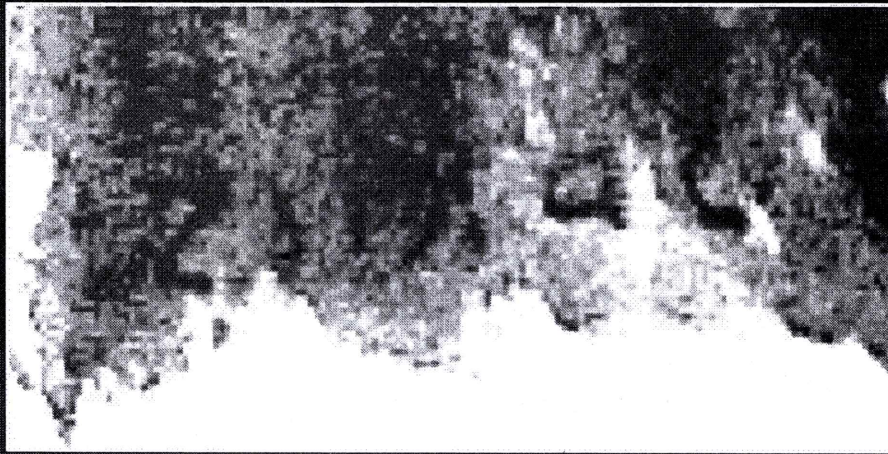
A 1992 sketch by Merrill, thought to depict the Black Dahlia





Hidden beneath the shading was the word "ZoDiac"





Baber's findings sent shockwaves through the forums of Zodiologists online, plenty of whom were sceptical. "Margolis was just his [Baber's] favourite suspect for Short's murder, and presumably he got tunnel vision and as a result is now proposing him as Zodiac," wrote one on Reddit. "I really don't see why so many people are buying this."

"Enough of this Margolis BS," commented another.

Much of the scepticism revolves around the modus operandi of the killer in each case: the Black Dahlia murder involved torture, dismemberment and elaborate staging. The Zodiac crimes were characterised by a cold detachment in the choice of weapon and victim selection.

More serious doubts have been raised by David Oranchak, a software developer who was one of the three people who cracked the Z340 code in 2020. In a video posted on YouTube last month, Oranchak asked whether Baber was "Sherlock or Charlatan?"

In the late 2000s Baber had posited another name for the Zodiac Killer: Lawrence Kane. Oranchak questioned the existence of forensic linguistic software Baber claimed to have developed to help identify Kane. Baber went on to concede he was wrong about Kane after new evidence came to light. "I ended up disproving myself and that's a difficult thing to own," Baber admits. "Revising conclusions with new evidence is a strength, not a weakness."

Baber says he welcomes scrutiny. "It used to bother me, but it doesn't any more," he says. "I've laid out my findings and I'm 100 per cent

Several seasoned cryptography experts and former detectives who worked on both cases support Baber's findings. He presented his conclusions to Rick Jackson, a California homicide detective for 36 years who worked on the Zodiac file, and Mitzi Roberts, an LAPD detective who was the custodian of the Black Dahlia case for about 15 years until she retired in 2024. Jackson said he had "no doubt" Merrill was the right man and said his conclusion was not based on the cipher alone. "There are too many links with both. There's overwhelming circumstantial evidence," he told the Los Angeles Times. "He left breadcrumbs all along."

Last month the LAPD said they were testing possible evidence recently unearthed by Jackson. He had in his files Margolis's government fingerprint card from 1943, taken at his military service intake — something police had not previously examined. Investigators have at least one sample to compare it with: a letter sent to authorities just over a week after Short's murder by a man claiming to be the killer.

"The combined weight of cryptographic, statistical, forensic and historical evidence strongly supports the conclusion that Marvin Merrill is the individual identified in the Zodiac Killer's Z13 cipher," Ed Giorgio, the former NSA chief codebreaker, tells me from his home in Cape Cod.

Giorgio had himself made attempts to crack the code before retiring from the NSA in 1997. "This was not just AI. What this is is a triumph of imagination. It's the greatest sleuth story ever told."

Baber credits his "unorthodox" methods to his unconventional



using technology that allows me to identify any similarities or correlations.”

What made him think he could succeed where countless others have failed? Baber says investigators made many errors and suppositions in both cases that only multiplied over the years. “Plus when you have murders like these where the media gets a hold of it and they plaster it on the front page every single day, it builds a lot of pressure,” Baber says. “And that kind of pressure can alter an investigation.”

Forensic science was also in relative infancy at the time of the crimes, and the most significant technological advancements in cold case work have been made in the past two decades.

Baber wishes he'd made his discovery in time to tell Short's sister Muriel before she died. “I'm not an emotional person but that part is tough for me. I wish I could have been able to tell her, ‘We got him. Don't worry, we got him,’” he says. “I know that would have given her some closure.”



H O W
T H E
Z O D I A C
C R E A T E D
7 1 0

Place the name into 2 x 7 matrix. A null character is used to complete the grid



M A R V I N
M E R R I L L

Assign character substitutions



1	2	3	4	5	6	7
M	A	R	_	V	I	N
M	E	R	R	I	L	L

Substitute them in the matrix



1	2	3	4	5	6	7
M	A	R	_	V	I	N
M	E	R	R	I	L	L

A E I L M N R V

⊕ J A M N K ⊗ E

Create a permutation using a keyword. Assign a number to the alphabetic sequence of the letters



1 2 3 4 5 6 7

N	⊕	⊗	_	E	A	K
N	J	⊗	⊗	A	M	M

A E I L M N R V
 = = = = = = = =
 ⊕ J A M N K ⊗ E

Reorder the columns using the permutation sequence



1	2	3	4	5	6	7
N	⊕	⊗	_	E	A	K
N	∩	⊗	⊗	A	M	M

6 5 1 2 3 7 4
ELIZABETH

Read out in alternative horizontals: left to right top row, right to left



6 5 1 2 3 7 4

A	E	N	⊕	⊗	K	_
M	A	N	J	⊗	M	⊗

6 5 1 2 3 7 4

ELIZABETH



A	E	N	⊕	⊗	K	_
M	A	N	J	⊗	M	⊗



A E N ⊕ ⊗ K ⊗ M ⊗ J N A M



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