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IN THE COURT OF APPEAL OF THE STATE OF CALIFORNIA

FIRST APPELLATE DISTRICT

DIVISION FIVE

THE PEOPLE,

Plaintiff and Respondent,

v.

ROBERT NAWI,

Defendant and Appellant.

A096635

**(San Francisco County
Super. Ct. No. 176527)**

Defendant was convicted of first degree murder and sentenced to 26 years to life in state prison. The most significant evidence connecting defendant to the homicide consisted of DNA material on the victim's fingernails that matched defendant's own DNA profile. Not surprisingly, defendant raises, along with other claims of error, numerous challenges to the admissibility of the DNA evidence. We find no prejudicial error, and we affirm the judgment of conviction.

I. FACTS

A. THE 1987 MURDER

On Thursday, October 29, 1987, the police responded to an anonymous telephone report of a robbery and possible murder at 966 Brussels Street in San Francisco. The caller was an older male with an undistinguished voice. The police discovered the body of Virginia Lowery on the floor of the garage of her home. She had been stabbed 34 times with an ice pick in the head, neck, and upper body and had been killed at least a day or more earlier, possibly as early as Sunday, October 25. There were no signs of a

struggle, and the medical examiner concluded Virginia Lowery may have been knocked out and then stabbed.

The police met with Virginia Lowery's sisters and brother at the Brussels Street house to see if anything seemed out of place. The rooms did not appear to be ransacked or disturbed. Virginia Lowery's curio cabinet containing art pieces and collectibles was intact. Her purse with money inside was on the sofa. Her jewelry boxes were undisturbed. And jewelry worth hundreds of thousands of dollars was still in the safe. Her Cadillac was in the garage.

There were no signs of forced entry. The front door was locked. Virginia Lowery often left the sliding glass door from the living room to the deck partially open to let in fresh air, and that door was found slightly ajar. The screen door was locked, but the screen was slightly pulled away from the frame beside the lock. Virginia Lowery's back neighbor later reported that a portion of her adjoining fence was broken as if someone jumped over the fence into Virginia Lowery's backyard.

Virginia Lowery had apparently been ironing clothes when she was attacked. An ironing board was set up in the garage and an iron was found on the floor with its cord cut. The cord from the iron was wrapped around Virginia Lowery's neck.

Virginia Lowery's sister talked to her on Sunday evening, October 25, and invited her to dinner. Virginia declined the invitation and said she was ironing. She did not answer her telephone after that. She did not show up on Monday, October 26, to volunteer at her grandniece's school.

Virginia Lowery was married to William Lowery, who was a convicted robber and an admitted heroin dealer living in Mexico. He had moved there in 1984 in order to avoid drug enforcement authorities. Virginia Lowery was about two years away from retirement and planned to move eventually to Mexico to join her husband. After being notified of his wife's death, William Lowery returned to San Francisco on Friday, October 30, 1987. During interviews with the police, he reported that his wife's jewelry box was missing along with a gun. The police did not believe that there had been a theft.

By all accounts, Virginia Lowery was fastidious and kept herself and her house immaculate. The police found the garage to be inordinately clean. The car and the water heater had only a very fine layer of dust on them. However, the police located latent fingerprints on the left rear and right rear bumper of Virginia Lowery's car near the body. More fingerprints were found on the side of the water heater, even closer to the body. The identity of the fingerprints could not be determined at the time, but the latent prints were stored in a computer database for unsolved crimes. Over 10 years after the murder, in April 1998, a San Francisco police technician discovered that the latent prints lifted from Virginia Lowery's water heater matched the fingerprints of defendant, who had been arrested that month in San Francisco at the request of a bartender.

1. The 1988 Drug Investigation

In 1988—within a year after Virginia Lowery's murder—defendant was arrested on federal drug charges under the name Robert Wells, aka Sam Zanca. He pled guilty, and was sentenced to 10 years in federal prison. The San Francisco homicide investigators were unaware at the time of the investigation by the federal Drug Enforcement Administration (DEA), but the connections to the murder of Virginia Lowery later came to light.

The events leading to defendant's drug conviction are as follows: On August 13, 1988, defendant's wife was stopped for erratic driving. She identified herself as Wendy Dietzel and said her husband was Sam Zanca. She was driving Virginia Lowery's brown Cadillac and had a pink slip showing transfer of ownership to Rosanna Girona (Wendy Dietzel's alias) and Sam Zanca. In the car were identification papers, including passport applications, for a man with several aliases, including Sam Zanca, Timothy Vahanian, and John Ronck. Also found in the car were several safe deposit keys. Two days later, with Dietzel's consent, a DEA agent opened one safe deposit box at the Bank of America in San Francisco and found 650 grams of uncut heroin. That safe deposit box had been rented in 1988 to Rosanna Girona and Sam Zanca with a residence address on Rausch Street in San Francisco.

A month later, in September 1988, defendant was stopped by a customs official at the Vancouver airport, because he had two airline tickets in his possession, one in the name of David Johnson and another in the name of S. Zanca. Defendant also had fresh-looking scars on his face and did not look like his passport photo. Canadian authorities brought defendant to the United States and turned him over to DEA agents, who arrested him on federal drug charges. Further investigation showed that Sam Zanca had a second Bank of America safe deposit box and that on the morning of October 26, 1987, (three days before Virginia Lowery's body was found) Sam Zanca signed an entrance ticket for that box.

The safe deposit box rental application by Sam Zanca, a passport application by Sam Zanca, and a check to Itel Travel signed by Sam Zanca all gave the same address on Rausch Street in San Francisco. A notebook seized from defendant contained a telephone number for David Lowery as well as a phone number for "Bill" in Mexico.

2. The 1998 Renewed Murder Investigation

In May 1998, after the discovery that defendant's fingerprints matched the fingerprints in Virginia Lowery's garage, San Francisco homicide inspectors Gordon and Cashen met with defendant at his apartment on Van Ness Avenue in San Francisco and surreptitiously tape recorded an interview with him. Defendant denied knowing anyone named Bill or being in Virginia Lowery's home. He claimed he had been living in Thailand from 1987 or 1988 until just a few months before the interview. He acknowledged owning a house on Rausch Street in San Francisco that he sold in 1988. He admitted that he had used over 20 aliases and that he had been a heroin dealer.

As part of their renewed investigation, Inspectors Gordon and Cashen requested a DNA analysis of the fingernails of Virginia Lowery, which had been clipped during the autopsy and preserved as evidence. After learning that foreign DNA was present on the fingernails, the police obtained a warrant to retrieve a sample of defendant's DNA. But when they attempted to serve the warrant they found that defendant had quit his job and moved from his San Francisco apartment. A few weeks later, the police learned that

defendant was in custody in Florida, and they arranged to have defendant's DNA samples retrieved there and sent to San Francisco for testing.

Two independent forensic examiners conducted DNA testing of Virginia Lowery's fingernails and discovered that at least three people had contributed to the fingernail sample. Both examiners concluded that the major contributor to the mixture was male, and both examiners derived the same DNA profile for that major contributor. That DNA profile matched the DNA profile from defendant's sample, and the chances of finding someone with that DNA profile was 1 in 567 billion or less.

Defendant's address book, obtained by Florida authorities, showed an entry for David Lowery and for Jack Colevris at 966 Brussels Street.¹ The police also obtained telephone records showing calls in 1998 from defendant's mother's phone in Massachusetts to William Lowery's son, David Lowery, and to William Lowery's number in Mexico. The police tried to contact William Lowery, then age 70, but they were informed by Lowery's attorney that he had had a stroke and would not be returning to San Francisco. A few days later, however, William Lowery voluntarily appeared at the police department for an interview. He denied knowing defendant and gave the police the names of several drug dealers he believed could have killed his wife. Later, in 2000, William Lowery underwent a conditional examination in his home in Mexico—in the presence of a district attorney and defendant's counsel. He then admitted knowing defendant.

A forensic document examiner compared the signature of Sam Zanca that appeared on the safe deposit box entrance ticket for October 26, 1987, with the signatures of Sam Zanca that appeared on four other documents: two separate passport applications from 1987 (with the applicant's photograph), a statement from 1987 for a lost passport, and the 1988 safe deposit box rental agreement. The expert concluded that the same person "very probably" signed the documents.

¹ Jack Colevris moved into the house after Virginia Lowery's death to serve as a caretaker.

3. Alibi Defense

William Lowery in his conditional examination provided an alibi for defendant, asserting that defendant had been visiting him in Mexico until one or two days before Lowery got the phone call about his wife's death. Lowery denied any personal involvement in his wife's murder. He testified that defendant (known to him as Sam Zanca) had come to Mexico in October 1987 to buy drugs. Lowery introduced defendant to Salvador Ramos-Padilla, a Mexican police officer who also worked as a bodyguard for a drug dealer. Lowery recalled that defendant and Ramos-Padilla played a memorable game of pool.

Ramos-Padilla also underwent a conditional examination in Mexico. He died before trial, and the transcript of his examination was admitted into evidence. Ramos-Padilla recalled a memorable game of pool with defendant that occurred in October 1987. Ramos-Padilla also recalled that defendant left William Lowery's house before the other houseguests.

Harry Banis, a friend of William Lowery and Jack Colevris, also recalled being in William Lowery's house in Mexico in October 1987. He remembered a game of pool between a Mexican police officer and one of the other houseguests. He did not remember defendant.

Jack Colevris testified that he and Harry Banis and defendant (known then as Sam) flew together to Mexico in mid-October 1987 to stay with William Lowery. Defendant played pool with a Mexican police officer and won the officer's gun in the game. Defendant left Lowery's house about a day or two before William Lowery got the telephone call about his wife's death.

William Lowery had a room in the basement off the garage at 966 Brussels Street where he socialized with his friends and transacted business involving drugs and stolen goods. His wife Virginia was not aware of what was transpiring in the basement room. Lowery testified that defendant had never been in the Brussels Street house before the murder, though he did help Lowery load his car when Lowery returned to Mexico three months after the murder. Jack Colevris, however, testified that defendant had been in

Lowery's house before the murder a few times to have drinks and as recently as two weeks before the murder.²

Lowery further testified that his son David dealt drugs with defendant. Jack Colevris gave similar testimony. Lowery testified that in 1998 defendant came to Mexico and stayed with him. Defendant told Lowery at that visit that he was wanted on a murder charge. Defendant stayed about a month with Lowery and then left for Florida to get a boat to Thailand.

As part of his defense, defendant presented expert witnesses to refute the prosecution's experts on DNA, fingerprints, and handwriting evidence.

II. DISCUSSION

A. ADMISSIBILITY OF DNA EVIDENCE

Under the rule of admissibility announced in *People v. Kelly* (1976) 17 Cal.3d 24 (*Kelly*), expert testimony based upon a new scientific technique requires a three-pronged preliminary showing by the proponent of the evidence : (1) the reliability of the method (the general acceptance of the method in the scientific community); (2) the qualifications of the expert to give an opinion on the subject; and (3) the correct use of scientific procedures in the particular case.³

In the present case, after defendant raised a pretrial objection to the admissibility of the DNA evidence, the trial court held an extensive 48-day hearing (spanning the months from June 2000 to April 2001) focusing on "prong three" of the *Kelly* rule. The

² Virginia Lowery's niece was married on October 10, 1987, and William Lowery came from Mexico to attend the wedding. He returned to Mexico on October 13 (12 days prior to the probable date of the murder, October 25). William Lowery and Jack Colevris both testified that defendant accompanied them back to Mexico.

³ The *Kelly* court relied upon *Frye v. United States* (D.C. Cir. 1923) 293 F. 1013 (*Frye*), but the United States Supreme Court has since determined that the general acceptance test used in that case does not apply in federal trials as it is not a part of the Federal Rules of Evidence. (*Daubert v. Merrell Dow Pharmaceuticals, Inc.* (1993) 509 U.S. 579 (*Daubert*)). The California rule of *Kelly* is unaffected by *Daubert*. (*People v. Leahy* (1994) 8 Cal.4th 587, 591; *People v. Venegas* (1998) 18 Cal.4th 47, 76, fn. 30 (*Venegas*)).

court denied defendant’s request for a hearing under “prong one,” and no challenge is raised on appeal to that ruling. Indeed, the case law has established the scientific acceptance and reliability of the two methodologies widely employed in DNA typing. (*Venegas, supra*, 18 Cal.4th at p. 79 [RFLP]; *People v. Morganti* (1996) 43 Cal.App.4th 643, 671 [PCR-DQ-Alpha] (*Morganti*); *People v. Wright* (1998) 62 Cal.App.4th 31, 41 [PCR-Polymarker] (*Wright*); *People v. Allen* (1999) 72 Cal.App.4th 1093, 1099 [PCR-STR].)

In cases following *Kelly*, the courts have clarified two important aspects of prong three. First, the courts have explained that the foundational showing required under prong three is substantially less than what is required under prong one. “The *Kelly* test’s third prong does not apply the *Frye* requirement of general scientific acceptance—it assumes the methodology and technique in question has [*sic*] already met that requirement. Instead, it inquires into the matter of whether *the procedures actually utilized in the case* were in compliance with that methodology and technique” (*Venegas, supra*, 18 Cal.4th at p. 78, italics in original.) “[T]he ‘third-prong hearing’ . . . will not approach the ‘complexity of a full-blown’ *Kelly* hearing. [Citation.] ‘All that is necessary in the limited third-prong hearing is a foundational showing that correct scientific procedures were used.’” (*Morganti, supra*, 43 Cal.App.4th at pp. 661-662; *People v. Barney* (1992) 8 Cal.App.4th 798, 825 (*Barney*)). “Where the prosecution shows that the correct procedures were followed, criticisms of the techniques go to the weight of the evidence, not its admissibility.” (*People v. Brown* (2001) 91 Cal.App.4th 623, 647.)

The second aspect of prong three clarified by the courts is that the correctness of the procedures used is not the same as the quality of the performance of those procedures. Only the former is at issue under the third prong for admissibility of scientific evidence. Whether the accepted scientific procedures were used properly is a question for the jury. “[T]he *Kelly/Frye* rule tests the fundamental validity of a new scientific methodology, not the degree of professionalism with which it is applied. [Citation.] Careless testing affects the weight of the evidence and not its admissibility, and must be attacked on

cross-examination or by other expert testimony.”” (Wright, supra, 62 Cal.App.4th at p. 42; People v. Axell (1991) 235 Cal.App.3d 836, 862.) “The Kelly test’s third prong does not, of course, cover all derelictions in following the prescribed scientific procedures. Shortcomings such as mislabeling, mixing the wrong ingredients, or failing to follow routine precautions against contamination may well be amenable to evaluation by jurors without the assistance of expert testimony. Such readily apparent missteps involve ‘the degree of professionalism’ with which otherwise scientifically accepted methodologies are applied in a given case, and so amount only to ‘[c]areless testing affect[ing] the weight of the evidence and not its admissibility.’ [citations].” (Venegas, supra, 18 Cal.4th at p. 81.)

Defendant’s objections to the DNA evidence in this case centered on the prong three requirement that correct scientific procedures be used in the DNA testing. The trial court concluded that the correct procedures were used and that defendant’s multiple and inventive challenges to the DNA testing affected the weight, not the admissibility, of the evidence. On appeal, defendant purports to focus again on prong three and whether correct scientific procedures were actually utilized in this case.⁴ We begin our review with some necessary background on the science that underlies DNA testing.

1. The Science of DNA Testing

DNA is the genetic material found in the nucleus of virtually every human cell. (Nat. Research Council, The Evaluation of Forensic DNA Evidence (1996) pp. 60-61 [hereafter, “NRC II”].) It is organized into 23 pairs of chromosomes, one chromosome in each pair being inherited from the mother and one from the father. Each chromosome is a long, double-stranded thread of DNA surrounded by other materials, mainly protein, that is shaped like a twisted rope ladder with stiff wooden steps (a double helix). The two parallel sides are composed of phosphate and sugar while the connecting rungs consist of a pair of chemical components called bases. There are four types of bases: adenine (A),

⁴ Defendant makes no argument that the DNA evidence was insufficient to support his conviction. The issue before us is whether the DNA evidence should have been presented to the jury.

cytosine (C), guanine (G), and thymine (T). Because of their size and complementary shape, A will pair only with T, and C will pair only with G. This pairing rule is a key to DNA typing. Once the sequence of bases on one strand is known, the sequence on the other strand is automatically known. (NRC II, pp. 12, 60-62.)

The chemical bonds that hold the two bases together on a DNA molecule are weak, and the two members of a base pair easily come apart when heated, separating the DNA ladder into two single strands. Once a single strand is free and the temperature is lowered, the single strand will then pair up only with its complement (A with T, C with G). E.g., a short single-strand segment of TAGC will rejoin only with ATCG. These properties allow DNA molecules to be manipulated and identified in the laboratory. (NRC II, p. 62.)

It is the sequencing of base pairs that determines the genetic differences between one person and another. There are over 3 billion base pairs in a person's DNA, but most human DNA is very similar, accounting for common traits such as two arms, a circulation system, etc. Still, any two people (except identical twins) differ in several million base pairs, and it is those differences that give rise to DNA identification. (NRC II, pp. 62-63.) Forensic scientists look at particular segments of a DNA strand at particular chromosomal sites known to be polymorphic (i.e., widely varying among individuals) in order to identify the base-pair sequence. The examined segment is called an "allele," and the chromosomal site of the examined segment is called its "locus." Each person has two alleles at any given locus—one on each of the paired chromosomes, one inherited from the mother and the other from the father. The two alleles together comprise the "genotype" for that locus.⁵ (NRC II, pp. 13, 14, 65.)

⁵ A "gene" is a DNA segment with a variation in base pairs that provides the code for some particular trait or function such as eye color. However, much of human DNA has no known function, and the segments most often used in forensic analysis are segments with no known genetic code. Nevertheless, the segments are sometimes referred to as genes. (NRC II, pp. 13, 62-63, 65.)

DNA analysis requires that the DNA first be processed to produce a DNA profile. The profile is a determination of which alleles exist at particular loci. If the DNA profile of the evidence sample (found at the crime scene) and the DNA profile of the suspect differ by even one allele, the suspect is excluded. But if the profiles match, the next step is a statistical analysis to determine how common the DNA profile is within the population. (See generally *Venegas, supra*, 18 Cal.4th at p. 60.)

The process used in the present case is called polymerase chain reaction (PCR)—a methodology by which short segments of DNA are greatly duplicated (or “amplified”) to make the particular target segment more discernible.⁶ (NRC II, pp. 21-23, 69-73.) After the DNA is extracted from cells in the sample, the DNA is heated to separate the DNA ladder into single strands. Then the strands are mixed with a chemical primer containing short, single-stranded DNA segments that complement and join up with particular segments of interest on the original DNA. The targeted DNA segments thereby become double-stranded. Next the enzyme TAQ polymerase is added, which recognizes and cuts off the targeted segments and causes each targeted segment to duplicate itself. This process is done in an instrument called a thermal cycler, which repeats the duplication over and over (usually through 20-35 cycles) until billions of copies of the targeted DNA segments are made. (NRC II, pp. 15-18, 66, 69-70.)

Chemical kits have been developed that provide the chemical reagents to target particular DNA segments. One kit targets the DQ-Alpha marker, which is a known segment on the HLA gene on Chromosome 6. Another kit, called the Polymarker kit,

⁶ PCR testing is one of two recognized methodologies. The other—restriction fragment length polymorphism (RFLP)—measures long segments of DNA called VNTR’s (variable number of tandem repeats) and requires decay of radioactive materials. The PCR method allows very small samples to be analyzed in a shorter period of time. RFLP testing has been used for a longer period and was accepted earlier by the courts. (E.g., *Venegas, supra*, 18 Cal.4th at pp. 76-79; *Barney, supra*, 8 Cal.App.4th at pp. 811-814; see generally NRC II, pp. 14-18, 65.)

tests for five genes or loci simultaneously.⁷ (NRC II, pp. 23, 71-72.) Both the DQ-Alpha and the Polymarker tests examine short DNA segments that are approximately the same length (about 240 bases, or rungs of the DNA ladder) but are distinguished by the sequence of bases.

Another type of DNA testing kit examines DNA segments that contain short, repeating sequences and vary by length (the number of repeats). The DNA segments examined by these kits are called STR's (short tandem repeats). (NRC II, pp. 23, 70.) One such kit is called the Green One and tests for STR's at 4 loci. The latest kit, at least by the time of the casework here, is called the Profiler Plus, and it tests for STR's at 9 loci. Both kits detect the sex gene. All the kits used in DNA analysis employ the same amplification process but differ in the design or sequencing of the chemical primers and in the temperature to which the DNA is subjected. (See *People v. Hill* (2001) 89 Cal.App.4th 48, 58 [each new PCR/STR kit need not be subjected to prong one inquiry].)

Once the targeted DNA segments have been amplified, the amplified segments are then isolated and “visualized” to identify the specific alleles contained in the evidence sample and thereby to create a DNA profile. For example, there are seven different possible alleles (variations in sequence of bases) for the DQ-Alpha marker, each variation identified for convenience by number—1.1, 1.2, 1.3, 2, 3, 4.1, and 4.2. Each person has two alleles at every locus, one inherited from each parent. A person could have two different alleles at the DQ-Alpha marker (e.g., 1.1 and 1.2) or could have two of the same, if both parents contributed the same (e.g., 1.1 and 1.1).

The process of visualizing or identifying the specific alleles present in the sample is complicated because the differences in the alleles cannot actually be seen, even microscopically. For the DQ-Alpha and Polymarker tests, the visualization comes in the form of blue dots lit up on a testing strip. The double strands in the amplified DNA

⁷ The five tested sites are: the Low-Density Lipoprotein Receptor, the Glycophorin A gene, the Hemoglobin Gamma Globin gene, D7S8—a “junk” gene on Chromosome 7—and the Group-Specific Component. (NRC II, p. 72.) There are two or three different alleles possible at each locus. (NRC II, p. 72.)

sample are separated into single strands again, and then the amplified DNA sample is bathed onto a testing strip. The testing strip has affixed to it DNA “probes” (complementary base pair segments) for all possible alleles for each gene. A DNA strand present in the sample will join with its complement on the testing strip, and once the two strands are joined, the testing strip lights up as a blue dot to announce the presence of an allele. The labeling on the testing strip identifies by reference number the lighted allele (1.1., 1.2, etc.).

For the Green One and Profile Plus kits, which test for length of sequences, the analyst uses capillary electrophoresis in an ABI 310 Genetic Analyzer to determine which alleles are present. A small quantity of the amplified DNA is placed in a thin, hollow tube that is electrically charged to stimulate the molecules to travel to the far end of the tube. Also added to the tube is a chemical that attaches a fluorescent tag to each DNA fragment. The speed at which the molecules travel demonstrates their size, as the smaller molecules travel faster. As the DNA fragments pass a “window” in the tube they are hit by a laser beam that measures and takes a picture of their fluorescence. A computer program then interprets the laser reading to give a profile of the amplified DNA based on the color of the fluorescence and the travel time. The laser reading is converted to a conventional numbering system for ease of reference, e.g., 16, 17.⁸ (See generally *People v. Henderson* (2003) 107 Cal.App.4th 769 [capillary electrophoresis meets prong one] (*Henderson*).)

If the DNA profile derived from the DNA analysis is a common DNA profile in the population, then a match between the crime scene DNA profile and the suspect’s DNA profile has little significance; the crime scene DNA could just as well have come from someone else. But if the DNA profile is rare, the match in DNA profiles makes it

⁸ Sometimes the computer will detect fluorescence even though no DNA allele is actually present. Such a reading—called an “artifact”—is recognized by the absence of true alleles at other loci. Distinguishing an artifact from a genuine allele requires repeating the electrophoresis. Sometimes, too, the computer will disregard as “stutter” alleles that in fact are present, and those alleles will not be printed on the electropherogram.

more likely that the crime scene DNA came from the suspect. Thus the frequency of the DNA profile within the population is a necessary component of DNA evidence. (NRC II, pp. 31, 89, 117-119, 127.)

2. Techniques Used Here

a. Extraction.

The DNA on Virginia Lowery's fingernail clippings was extracted by Alan Keel, the criminalist at the San Francisco Crime Laboratory. He first swabbed all the fingernails and pooled the swabs into a single sample. The sample was then treated with chemicals designed to rupture any cells present and release the DNA into the liquid. The swab material was then separated from the liquid under high speed centrifugation, and organic solvents were added to remove all cellular matter except the DNA. Alan Keel testified that the procedures he followed were in accordance with the procedures set forth in the laboratory manual.

b. Quantitation.

Next, Keel determined how much DNA was present in the liquid evidence sample.

c. Amplification.

In June 1998, when Keel began his DNA analysis of the fingernails, the San Francisco Crime Lab had four test kits available for casework, and Keel used three of them for concurrent analyses of the DNA from the fingernails and from a bloodstain known to be from Virginia Lowery. He began with the combined DQ-Alpha and Polymarker kit and followed the procedures set out in the kit's user's guide as well as the procedures in the laboratory's manual. He also used the Green One kit, which tests for the sex gene plus four genes beyond those tested in the DQ-Alpha and Polymarker kits.

d. Interpretation.

Because each person has only two alleles at each locus, the presence of more than two alleles for a particular locus indicates a mixed sample. Based on the number of different alleles found at particular loci (as many as five different alleles), Keel determined that at least three persons had contributed to the DNA on the fingernails.

Keel also concluded that there were no more than three contributors, because a fourth would have been revealed through the various loci that were tested.

Keel determined that some alleles were present in the fingernail sample in far greater quantities than others. Keel derived a profile for the major contributor, and the Green One test showed that major contributor to be male. Using the profile of the male major contributor plus the profile derived from Virginia Lowery's own blood sample, Keel "subtracted" out the genotypes for Virginia Lowery and the male major contributor to arrive at the genotypes for a minor third contributor.

Keel completed his DNA profile of the fingernail evidence on July 8, 1998—before he obtained a sample of defendant's DNA. Not until September 1998 did Keel undertake a DNA analysis of defendant's oral swabs. Using the same kits he had used for the fingernails, Keel created a profile from the DQ-Alpha, the Polymarker, and the Green One tests. Keel found that the DNA profile on the oral swabs matched the DNA profile of the major male contributor to the fingernails.

In February 1999 a new kit became available called the Profiler Plus, which tests for nine genetic markers. Keel first used that test on the fingernail specimen, before testing defendant's DNA. He took a portion of the original DNA extraction and amplified it for the Profiler Plus genetic markers. He followed the procedures set out in the laboratory manual. He then used capillary electrophoresis to visualize and identify the genotypes present in the fingernail sample. After deriving a DNA profile, Keel repeated the same steps using defendant's DNA sample. Again Keel found that defendant's DNA profile matched the profile of the major male contributor to the fingernails.

A year later, in June 2000 Thomas Fedor, a forensic serologist at the Serological Research Institute (SERI) in Richmond, performed an independent DNA analysis. He examined the DNA extract from the fingernails, the blood sample from Virginia Lowery, and the oral swabs from defendant. He did not know the results of any previous testing, nor did he know the sources of the fingernail DNA, the blood, or the oral swab.

Of the 400 picograms of DNA from the fingernails that Fedor received, Fedor used half for his analysis using the Profiler Plus kit. He amplified it with the chemical reagents from the Profiler Plus kit and tested a portion of the amplified DNA on the 310 Genetic Analyzer. The test results indicated a mixture of DNA contributors, with one major contributor who was male. Fedor also performed the Profiler Plus test for Virginia Lowery's blood sample and for defendant's oral swabs, creating a DNA profile for each. Fedor concluded defendant's DNA matched the DNA of the male major contributor to the fingernail sample and that Virginia Lowery's DNA matched one minor contributor to the fingernail sample.

e. Statistical Analysis.

The accepted method for determining the likelihood that a particular DNA profile would appear in the population is the "product rule," by which the probability factor for each identified genotype is multiplied seriatum to arrive at a cumulative probability for the entire DNA profile. (*People v. Reeves* (2001) 91 Cal.App.4th 14, 38-42 (*Reeves*); NRC II, pp. 38, 122.)⁹

Alan Keel, using 14 of the 18 genotypes he had tested, concluded the probability of finding the profile of the major DNA contributor was 1 in 19,000 trillion—i.e., so rare that it was unlikely more than one person could have the same profile.¹⁰ Thomas Fedor, who had used only the Profiler Plus kit to test for nine genetic markers, calculated the probability as 1 in 567 billion. Both experts used the product rule.

⁹ As the NRC II points out, the statistical significance is often misstated. The probability that is determined in DNA analysis is the probability that a derived profile will appear in the general population—i.e., the probability that the evidence DNA will match the suspect's DNA. What is *not* determined by the statistical analysis is the probability that the evidence DNA came from someone other than the defendant. (NRC II, pp. 31, 133, 198.)

¹⁰ Keel did not use three of the genotypes because they did not provide enough information to eliminate any potential sources. He did not use a fourth genotype cause it was potentially linked to one of the genes he was using.

3. Defendant's Objections

As we will discuss below, many of defendant's challenges to the DNA evidence pertain not to the correctness of the scientific procedures used but to the quality of the performance of those procedures. Such challenges do not affect the admissibility of the DNA evidence. (*Venegas, supra*, 18 Cal.4th at p. 81.) Insofar as defendant's arguments do pertain to the scientific correctness of the procedures used, we must give deference to the determinations of the trial court. (*Id.* at p. 91.) The trial court's foundational decision under prong three of the *Kelly* test will be overturned only for an abuse of discretion. (*Id.* at p. 93.) On appeal, we must accept the trial court's assessments of credibility, choices of reasonable inferences, and resolutions of conflicting substantial evidence. (*Id.* at p. 91.) If there is no substantial evidence to support a finding that correct procedures were followed, an abuse of discretion is shown. (*Id.* at p. 93.) Conversely, when substantial evidence supports the foundational finding, there is no abuse of discretion in admitting the evidence. (*Henderson, supra*, 107 Cal.App.4th at pp. 787-788; *Reeves, supra*, 91 Cal.App.4th at pp. 47, 49.)

a. Pairing Alleles to Identify Major Contributor

Producing a DNA profile from the fingernail sample was complicated because the DNA came from more than one person. The forensic examiners had to pair up the multiple alleles at each of the targeted loci to form a genotype. Both Keel and Fedor derived a DNA profile from the alleles that appeared in the greatest proportion, concluding that those alleles belonged to one major male contributor.

The relative proportion of the alleles appearing in a sample is determined by the *intensity* of the visualized alleles. For the DQ-Alpha and Polymarker kits, the pairing up of alleles in a mixed sample involves comparing the intensity of the blue dots that appear on the testing strip. Dots are paired with dots of like intensity (strong with strong, weak with weak). For the Green One and Profiler Plus tests, a graphical printout (an electropherogram) is made during capillary electrophoresis showing the amount of fluorescence of the DNA fragments. The image appears as a peak above the baseline, and the peak height is used to identify the intensity or relative proportion of an allele.

Defendant challenges the experts' creation of a DNA profile for the major contributor to the mixed-source fingernail sample. As we have already said, defendant's challenge is limited to the *Kelly* prong three inquiry of whether the accepted scientific procedures were actually followed in this case. Both Keel and Fedor testified that in conducting the DNA tests they followed the procedures set out in the laboratory manual and in each kit manufacturer's user's guide. Defendant's objections to the experts' pairing of alleles to produce the DNA profile do not pertain to the testing procedures for identifying which alleles were present in the fingernail sample. Rather, defendant's arguments center on the experts' *interpretation* of the data derived from the PCR process.

Dot Blot Intensity

Defendant complains that Keel had no written guidelines or internal validation studies for measuring the intensity of the blue dots and pairing the identified alleles in the DQ-Alpha test. Indeed, Keel acknowledged that judging the intensity of the blue dots is one for the individual examiner.

Peak Height Ratios

The standard protocol for interpreting electropherograms calls for pairing alleles when the peak heights are balanced—i.e., within 70 to 90 percent of each other. Defendant complains that Keel and Fedor did not follow the protocol for pairing alleles on the basis of peak heights. Both Keel and Fedor paired up some alleles with peak height ratios far less than 70 percent, some as low as 58 percent. Yet, both experts explained that the standard protocol pertains to a single-source sample, not a mixed-source sample. Peak height ratios below 70 percent indicate a mixed source, and the pairing of alleles then becomes an exercise of judgment by the examiner.

Subjective Judgment

Defendant's main objection is that interpreting data from a mixed-source sample is a subjective process, not a scientific one. Keel testified that in sorting out the genotypes in the mixed-source fingernail sample he relied upon principles set forth in the laboratory manual, in the kit manufacturers' user's guides, and in guidelines issued by the DNA

Advisory Board (DAB).¹¹ The DAB guidelines recognize that the analyst must examine the number of alleles at each locus, the peak height ratios, and/or the band intensities to determine whether the DNA sample comes from more than one contributor. A distinct contrast in signal intensities among the alleles indicates the DNA sample is mixed. The contrast differences must then be evaluated “on a case-by-case context.” The users’ guide for the DQ-Alpha kit states that variations in the intensity of the dots indicate the sample is mixed or contaminated. Mixtures with “widely varying” dot intensities may be assessed for major and minor contributors based on relative intensities. The standard used by the FBI laboratory requires a “distinct” contrast in peak height ratios for distinguishing between a major and a minor contributor to a mixed sample. The obvious implication is that the individual examiner must make an expert assessment on the contrasts in signal intensity. Even Dr. Riley, one of defendant’s expert witnesses, acknowledged that a major contributor to a mixed sample can be identified by large and consistent differences in peak heights.

The NRC II advises that when analysis of the test results involves subjective judgment, safeguards are needed to prevent bias toward the suspect’s DNA profile, i.e., interpreting a faint signal as an allele that matches the suspect’s profile. Such safeguards include documenting potential ambiguities, explaining overrides of computer-assisted measurements, and conducting internal review. (NRC II, p. 85.) Again the obvious implication from the NRC II is that analysis of DNA testing will sometimes involve the exercise of the examiner’s judgment to interpret what is visualized.

Insofar as defendant attacks the reliability of PCR analysis, his argument is foreclosed. Defendant’s complaints that the experts’ evaluations of the test results were unreliable and unscientific raise a prong one inquiry, not a prong three issue. (See

¹¹ Prior to 1994, the Technical Working Group on DNA Analysis Methods (TWGDAM) formulated guidelines for DNA testing. Subsequently, Congress passed legislation that created the DAB to develop standards of quality assurance for forensic labs testing DNA samples. (42 U.S.C. § 14131; NRC II, pp. 24, 76-78.) The procedures set forth in the laboratory manual for the San Francisco Crime Lab and employed by Keel are based on DAB and TWGDAM guidelines.

Barney, supra, 8 Cal.App.4th at pp. 813-814.) The use of PCR methodology to analyze a mixed-source sample has been accepted under prong one of *Kelly*. (*People v. Smith* (2003) 107 Cal.App.4th 646, 665-666, 671-672; *Henderson, supra*, 107 Cal.App.4th at pp. 785-789.)

As for the particular procedures employed here, all of the safeguards recommended to preclude bias in the examiner's judgment were in place. Keel and Fedor provided complete documentation of the raw data derived from the testing of the fingernail sample and of the ambiguities detected in the data. Both explained how they reached their expert conclusions on pairing the identified alleles to create the profile of the major contributor. Keel's interpretation was peer reviewed by Dr. Blake, and a year later Fedor independently and blindly derived a DNA profile for the major contributor that matched the profile derived by Keel. The ultimate determination of whether the analyses of Keel and Fedor were helpful or persuasive was a question for the jury on the weight to be given to the evidence. (*Henderson, supra*, 107 Cal.App.4th at p. 788.)

Degradation

Over time DNA in an evidence sample will degrade—i.e., parts of the DNA ladder will disappear. A degraded sample, therefore, may be difficult to analyze because some alleles may be missing. The degradation in (or disappearance of) some parts of the DNA ladder does not affect the alleles that remain. Degradation affects the ability to visualize alleles; it does not affect the accuracy of what is visualized.

Both Keel and Fedor recognized that the DNA in the fingernail sample was degraded; some alleles were missing. Both experts explained that degradation occurs systematically, with longer alleles degrading first, and both took degradation into account when pairing the alleles to produce a DNA profile. Both experts concluded the profile of the major contributor could be determined from the intensities of the visualized alleles at many loci despite the degradation of other alleles.

The conclusions of Keel and Fedor were contradicted by defense experts, who testified that degradation does not occur systematically and that an accurate profile could not be produced from the degraded fingernail sample. The trial court ultimately accepted

the opinions expressed by Keel and Fedor. We are bound by the trial court's resolution of the conflicting evidence. We reject defendant's assertion that the trial court's ruling on admissibility of the DNA evidence was unsupported by substantial evidence. The fact that the expert testimony of Keel and Fedor was contradicted does not render their testimony insubstantial.¹²

Post-Hoc Profiling

When Keel employed the DQ-Alpha test kit, he was not aware that he had a mixed-source sample. He identified the alleles present for the DQ-Alpha marker as 1.2 and 4.1. Dr. Edward Blake, who served as a peer reviewer, disagreed with that analysis and believed that the genotype could be 1.2 and 4.1 or 4.1 and 4.1. Keel then used the Green One test and later the Profiler Plus to get more information and learned that there were at least three contributors to the fingernail DNA. Keel then reexamined the results of the DQ-Alpha test and eventually decided that there were three alleles present in the fingernail sample—1.1, 1.2, and 4.1. (Defendant has 1.1 and 1.2 alleles at the DQ-Alpha marker.)

Defendant maintains that Keel acted unscientifically when he used the results of the later tests to reinterpret the DQ-Alpha test. Again, we are bound by the trial court's resolution of the conflicting evidence and the court's acceptance of Keel's expert conclusions. In any event, Keel did not reach a firm conclusion on which DQ-Alpha alleles should be paired to form a genotype. He only went so far as to identify the presence of three alleles that might exist in five possible pairings: 1.1 & 1.1, 1.1 & 1.2, 1.1 & 4.1, 1.2 & 1.2, or 1.2 & 4.1. Contrary to defendant's assertion, there is nothing apparent in the record that Keel used the profile obtained from defendant's oral swabs to reinterpret the fingernail sample; rather, Keel used the results of the later tests on the

¹² Defendant insinuates that the fingernail sample was improperly stored for the 10-year period, causing degradation of the DNA. The evidence was in conflict on this point. Keel testified that he received the fingernail clippings from the medical examiner, and his notes showed that the clippings had been kept in a freezer. Dr. Boyd Stephens, the medical examiner, had no recollection of the case but testified that the normal procedure is to keep fingernail clippings in an envelope in a file cabinet.

fingernail sample (the Green One and the Profiler Plus) to reconsider the presence of alleles from multiple contributors. Defendant's DNA profile was not determined until later.

b. Repeat Testing

After Keel determined the DNA profile of the male major contributor to the fingernail sample and confirmed the presence of DNA from Virginia Lowery, he attempted to derive a profile for the third, minor contributor. To do so he repeated the Profiler Plus test, making some changes in the test protocol. Fedor, too, repeated the Profiler Plus test.

Amount of DNA

Though the manufacturer recommended using 1 to 2.5 nanograms of DNA, Keel used 4 nanograms of DNA in his repeat test, redoing both the amplification and visualization steps. Keel knew from his experience that using more than the recommended amount would push off the scale the DNA already present in high concentration but it would make known the DNA of a minor contributor (i.e., the DNA in low concentration).

Fedor did not repeat the amplification step, only the capillary electrophoresis. He used twice as much amplified DNA (2 microliters instead of 1) in the repeat test as he had used the first time—likewise to visualize weaker alleles. He found two new alleles in his repeat test that had not been labeled in the first test.

Injection Time

In the repeat tests, both Keel and Fedor kept the sample in the 310 Genetic Analyzer (the tube) for a longer period of time than recommended (10 seconds instead of 5), thereby giving a longer laser reading time.¹³ Again, they were seeking to identify peaks for alleles of low intensity.

¹³ Keel ran both tests at 5 seconds and again at 10 seconds.

Lower RFU Threshold

Also in the repeat tests, Keel and Fedor altered the computer program to read fluorescent levels (Relative Fluorescent Units, or RFU's) that were below the threshold level recommended by the manufacturer. The recommended threshold for identifying an allele was 150 RFU's, but Keel and Fedor altered the setting to take a second look at readings with RFU's as low as 50.

Defendant's objections to these deviations from the manufacturer's recommended protocol pertain to the adequacy of the performance of the DNA testing, not the scientific correctness of the PCR methodology. (*Morganti, supra*, 43 Cal.App.4th at pp. 667-669 [deviations from manufacturer's guide affected weight, not admissibility]; see NRC II, pp. 179-180.) Defendant's arguments do not raise a prong three issue.

In any event, defendant's objections to the retesting are immaterial. Keel testified that the repeat testing was an effort to ascertain the identity of the third, minor contributor and had no effect on the relative proportion of the alleles present or the profile already created of the male major contributor. The profile of the major contributor was not in doubt. What was ambiguous was the profile of the third contributor. Moreover, the manufacturer's user's guide allowed for deviations by an experienced examiner. Both Keel and Fedor knew from their experience what effect the deviations would have on the data.

c. Other Testing Defects

Defendant raises several other defects in the DNA testing, none of which are prong three issues on whether the correct scientific procedures were used. Defendant's complaints concern the quality of the testing—the “degree of professionalism”—and thereby raise questions for the jury concerning the weight of the DNA evidence, not admissibility.

Defendant complains that the San Francisco Crime Lab was not accredited when Keel performed the DNA testing. Accreditation has no effect on the procedures used by the lab.

Defendant contends Keel should not have pooled all the swabs from the fingernails into a single sample but should have created separate samples from each finger and thereby opened the possibility of finding a non-mixed-source sample. Keel testified that he pooled the swabs because he did not know how much DNA he would get from each fingernail and that the procedure he used was scientifically correct. The trial court agreed with defendant's criticism, but the court found that the pooling did not affect the accuracy of the DNA profiling.

Defendant points to evidence that the PCR amplification process poses a risk of contamination from another source because outside strands will be amplified along with the DNA strands present in the evidence sample. However, there was no evidence that the fingernail sample was contaminated. Further, the record shows that the risk of contamination was controlled through positive and negative controls. A positive control is a sample of known DNA that shows whether the all the expected alleles are visualized. A negative control is a blank that shows whether stray DNA was present in the chemical reagents.¹⁴

The NRC II advises that the risk of laboratory error can be minimized by providing the opportunity for a second test by an independent lab or by the defendant's own expert. (NRC II, pp. 81-82, 87, 180-184.) That opportunity was provided here. Keel preserved a portion of the DNA extracted from the fingernails, and a second analysis was performed by Fedor test at an independent laboratory.¹⁵ Fedor, too, saved some of the unamplified DNA for possible future testing, but no defense expert ever undertook an independent analysis.

¹⁴ Defendant complains that Keel did not use a reagent blank in all of the tests he ran. Because tests were being run at the same time on other cases and those other tests had reagent blanks, he believed the negative control was sufficient.

¹⁵ Defendant erroneously states that Keel consumed the entire sample in his tests. In fact, Keel extracted all of the DNA from the fingernails but used only a portion of the extracted DNA and turned over the unused, unamplified portion to Fedor.

d. Statistical Database

Defendant complains that the experts improperly used only a Caucasian database in determining the frequency with which the DNA profile of the major contributor would occur. Defendant contends that limiting the database to the Caucasian population (because defendant is Caucasian) erroneously presumed the defendant was the DNA contributor.

The record does not support defendant's assertion that the experts used only a Caucasian database. Keel assessed the rarity of the DNA profile within the general population. He derived the probability factor for the DQ-Alpha, the Polymarker, and the Green One genotypes from the FBI database, containing profiles of 197 Caucasians, 198 Blacks, and 206 Hispanics. For the Profiler Plus test results, Keel used the SERI database, consisting of DNA profiles of 200 whites, 200 Blacks, and 200 Hispanics. Keel's written report shows that he looked at the statistical frequency of the genotypes in each of the three population groups. The lowest frequency of the combined genotypes was in the Caucasian group—1 in 19,000 trillion, as contrasted with 1 in 280,000 trillion for African-Americans and 1 in 340,000 trillion for Hispanics. In his testimony, Keel was asked about and used the figure for the Caucasian population, presumably because that figure was the most conservative, i.e., the most favorable to the defendant. Defendant raised no objection below that Keel used only a Caucasian database.¹⁶

For his calculation, Fedor used the database from SERI, which contained the separate DNA profiles of 200 whites, 200 Hispanics, and 200 Blacks. Fedor's statistical probability of 1 in 567 billion was the probability within the general population, using a combined weighted average for all three racial groups.

¹⁶ At the conclusion of the pretrial hearing on the admissibility of the DNA evidence defendant raised the objection that the statistical database did not include Asians so as to reflect the population of San Francisco. Defendant never argued that Keel or Fedor had improperly confined the population database to Caucasians. Nor did defendant's own experts find fault with the databases.

In short, there is no basis for defendant's assertion that the expert testimony on statistical probability presumed that the perpetrator was Caucasian or that defendant was the perpetrator. Nor is there any validity to defendant's contention that the prosecutor referred in closing argument to the statistical probabilities among Caucasians. The prosecutor made no mention of a racial group.¹⁷

e. Probative Value

Expert testimony showed that cells containing DNA are easily transferred through the air and by touch and that DNA endures for a long time. The experts also acknowledged that there was no way to determine when or how defendant's DNA was deposited on Virginia Lowery's fingernails. Based upon this evidence, defendant contends that the DNA evidence was purely speculative on the identity of the killer, and from this premise defendant argues, as he did below, that the DNA evidence lacked probative value or, alternatively, that its minimal probative value was outweighed by the strong prejudicial effect.

We reject defendant's premise that the DNA evidence was speculative. The DNA evidence included more than the mere presence of defendant's DNA at the murder scene. First, the amount of defendant's DNA in proportion to other DNA contributors made him a major contributor, overwhelming even the victim's own DNA. Keel testified that it was not likely the DNA on Virginia Lowery's fingernails came from cleaning or touching furniture. Further, the DNA was found on the victim's fingernails, and there was other evidence that Virginia Lowery had a penchant for cleanliness. Although no scientific measurement was available to detect exactly when the DNA was left on the fingernails, the evidence concerning the quantity and location permitted a reasonable inference that

¹⁷ The facts of the present case make it unnecessary for us to comment on the conflict in the case law concerning admissibility of DNA profile frequencies within particular racial groups. (Compare *People v. Wilson* (2004) 124 Cal.App.4th 38, with *People v. Pizarro* (2003) 110 Cal.App.4th 530.)

the DNA was left at the time of the murder.¹⁸ Keel ventured the opinion that Virginia Lowery's fingers might have gone into defendant's mouth and defendant's DNA could have come from his saliva. The connection between the DNA evidence and the murder was circumstantial, but it was not speculative. The evidence was properly admitted for the jury's consideration.

B. INSTRUCTION ON DNA EVIDENCE

The jury heard from the DNA experts that the DNA analysis could not determine when defendant's DNA was deposited on Virginia Lowery's fingernails. Defendant contends the trial court should have given his requested instruction on assessing the probative value of the DNA evidence. Specifically, defendant asked that the jury be instructed to consider the DNA evidence only if the jury first found beyond a reasonable doubt that the DNA could have been deposited on Virginia Lowery's fingernails only at the time of the murder.¹⁹ We find no error in the omission of the instruction.

A criminal defendant is entitled upon request to an instruction that "pinpoints" the crux of the defense case, such as mistaken identity or alibi. (*People v. Saille* (1991) 54 Cal.3d 1103, 1119; *People v. Sears* (1970) 2 Cal.3d 180, 190.) On the other hand, the effect of particular facts on the defendant's theory is best left to argument by counsel,

¹⁸ At trial, Fedor explained that the more recent the deposit the more likely the recovery of DNA and a major contribution of DNA, overwhelming the host's own DNA, is likely due to a large deposit of DNA or of body fluid containing DNA.

¹⁹ The requested instruction reads as follows: "[T]he State has offered evidence that DNA of the defendant was found on the fingernails of Virginia Lowery. I instruct you that if you should find that the DNA does belong to the defendant, such finding is without probative force and cannot be considered by you as evidence against the defendant unless the circumstances are such that the DNA of the defendant was deposited on [the] fingernails at the time the alleged crime was committed. The burden of proof is on the People to establish that the circumstances were such that the DNA of the defendant could have been so deposited only at the time of the commission of the alleged crime, and if after considering all of the evidence, you have a reasonable doubt as to whether the DNA of the defendant could have only been deposited on the fingernails at the time of the commission of the alleged crime, then it would be your duty to not consider the DNA evidence at all in determining whether the People have proven the guilty of the defendant to the alleged crimes charged beyond a reasonable doubt."

cross-examination, and expert testimony. An instruction that attempts to relate the effect of the facts on a legal issue is objectionable as argumentative. (*People v. Wharton* (1991) 53 Cal.3d 522, 570; *People v. Wright* (1988) 45 Cal.3d 1126, 1137, 1143.)

Defendant's requested instruction was properly rejected. The instruction was not an instruction that pinpointed the crux of the defendant's case. Pursuant to CALJIC No. 4.50 the jurors were given an explicit instruction on the defense of alibi that advised them to find the defendant not guilty if they had reasonable doubt the defendant was present at the time of the murder.²⁰ The requested instruction was an attempt to advise the jury on the effect of the DNA evidence upon the alibi defense and was therefore argumentative. Defendant's point was properly left to cross-examination and argument.

In any event, the nature of the crime and the evidence in this case required the jury to draw various inferences and make deductions. From the amount and location of defendant's DNA, the jury was entitled to infer that defendant came in close contact with Virginia Lowery near the time of her death. And from that inference, in the absence of any reason why defendant should come in such close contact with the victim, the jury was entitled to deduce that defendant was the killer. The jury was instructed pursuant to CALJIC No. 2.01 on circumstantial evidence, including the principles that "each fact which is essential to complete a set of circumstances necessary to establish the defendant's guilt must be proved beyond a reasonable doubt. In other words, before an inference essential to establish guilt may be found to have been proved beyond a reasonable doubt, each fact or circumstance on which the inference necessarily rests must be proved beyond a reasonable doubt. [¶] Also, if the circumstantial evidence [¶] permits two reasonable interpretations, one of which points to the defendant's guilt and the other to his innocence, you must adopt that interpretation that points to the defendant's innocence

²⁰ The jury was instructed as follows: "The defendant in this case has introduced evidence for the purpose of showing that he was not present at the time and place of the commission of the alleged crime for which he is here on trial. If, after a consideration of all the evidence, you have a reasonable doubt that the defendant was present at the time the crime was committed, you must find him not guilty."

and reject that interpretation that points to his guilt.” Defense counsel was fully able to argue that the DNA found on Virginia Lowery’s fingernails was not necessarily connected to the murder. If the jury had a reasonable doubt that defendant’s DNA was deposited at the time of the murder, the jury would not have found defendant guilty.

C. ADMISSIBILITY OF OTHER EVIDENCE

1. David Lowery’s Statements

Luz Gutierres had cleaned Virginia Lowery’s house since 1980 and also cleaned for Virginia’s stepson, David Lowery. Ms. Gutierres arrived to clean Virginia Lowery’s house on Wednesday, October 28, 1987, the day before the body was discovered. She had cleaned David Lowery’s house two weeks earlier, and he had conveyed a message from Virginia Lowery not to clean until Wednesday the 28th.

Ms. Gutierres tried to open the garage door with her key, but could not open the door more than a foot before it fell down. She knocked on the front door, rang the bell, and shouted but got no answer. Looking through a small opening in the garage door, Ms. Gutierres could see Virginia Lowery’s car and a pile of mail. Eventually, she left a note for Virginia Lowery in the mail slot. That afternoon, Ms. Gutierres telephoned David Lowery to ask where Virginia was, and David Lowery told her there had been a “tragedy” and his stepmother had been killed.²¹

Defendant contends the statements of David Lowery should have been excluded as they were hearsay and irrelevant. We find no error in the trial court’s ruling. The statements were not hearsay. They were not introduced to prove the truth of the matter stated, i.e., that Virginia Lowery had been killed. The prosecution introduced copious other evidence to establish the killing. Instead, David Lowery’s statements were admitted to show that he knew about the murder even before the police discovered the body. Statements tending to prove the declarant’s guilty knowledge are not hearsay. (*People v. Jackson* (1989) 49 Cal.3d 1170, 1185-1187.) The statements were relevant to

²¹ David Lowery asserted his Fifth Amendment privilege and refused to testify at trial. The trial court gave a limiting instruction that the statements were to be considered only for showing the knowledge of David Lowery.

the prosecution's theory of motive. That David Lowery had advance knowledge of the killing supported the prosecution's theory that William and David Lowery were involved in the crime and that defendant killed Virginia Lowery at the behest of William Lowery. The prosecutor conceded that the evidence of motive was not clear but correctly emphasized that motive was not an element the prosecution had to prove. Nothing in Ms. Gutieres's testimony imputed David Lowery's guilty knowledge to defendant. The evidence of David Lowery's early awareness of his stepmother's death was simply one piece of circumstantial evidence that could be considered by the jury.

2. Another Killing

Defendant contends that the prosecutor engaged in misconduct when he asked defense witness Jack Colevris on cross-examination: "[Did defendant tell you] that in prison, he was segregated for killing somebody?" The question arose in the context of a meeting between Jack Colevris and defendant in 1998, after defendant had gotten out of federal prison. The trial court sustained defendant's objection, and the witness gave no reply. The trial court immediately admonished the jury to disregard the question and instructed that a question is not evidence. Outside the presence of the jury, the trial court reprimanded the prosecutor for the improper question but denied defendant's motion for mistrial, finding no harm in that no answer was given to the question and the jury was admonished to disregard the question.

We agree that the question was improper in attempting to elicit inadmissible evidence.²² (*People v. Wagner* (1975) 13 Cal.3d 612, 619.) We cannot accept the Attorney General's assertion that absent a pattern of egregious conduct no prosecutorial misconduct occurred. An inadvertent act of misconduct is no less erroneous than an intentional one. (*People v. Hill* (1998) 17 Cal.4th 800, 822-823 (*Hill*); *People v. Bolton*

²² Earlier in the trial, the trial court had twice admonished the prosecutor about eliciting testimony concerning other crimes. The court directed counsel to seek a ruling before eliciting any other evidence of other crimes. The prosecutor professed to be unaware of the trial court's previous rulings and argued that the elicited testimony would have been admissible as an admission by defendant.

(1979) 23 Cal.3d 208, 213-214.) As our Supreme Court has explained, “[T]he term prosecutorial ‘misconduct’ is somewhat of a misnomer to the extent that it suggests a prosecutor must act with a culpable state of mind. A more apt description of the transgression is prosecutorial error.” (*Hill, supra*, at p. 823, fn. 1.) Here, though the trial court charitably mentioned that the prosecutor may have “forgotten” the court’s earlier ruling, the court nonetheless found the prosecutor’s question improper.

The issue we must decide is whether the prosecutorial error was so prejudicial as to require a reversal of the conviction. It was not. First, the prosecutor’s question was left unanswered, and the jury was told to disregard the question. At other points in the trial the jury was similarly instructed to disregard an objectionable question. At the end of trial, the jury was instructed pursuant to CALJIC 1.02 that statements by counsel are not evidence and questions are not evidence. The instruction reads in part: “If an objection was sustained to a question, do not guess what the answer might have been. Do not speculate as to the reason for the objection. [¶] Do not assume to be true any insinuation suggested by a question asked a witness. A question is not evidence and may be considered only as it helps you to understand the answer.” We agree with the trial court’s assessment that the admonition and instructions cured the error.

We also point out that jurors were well aware of the extensive criminal background of William Lowery and Jack Colevris. The jury knew that defendant was a heroin dealer who served 10 years in federal prison on drug charges and had been released in 1998. The jury heard no other suggestion that defendant had killed before.

Finally, the evidence connecting defendant to the murder of Virginia Lowery, although circumstantial, was compelling. Defendant’s DNA was a major contributor to the DNA found on the victim’s fingernails, outnumbering even the victim’s own DNA. His fingerprints were found near the body. He was in San Francisco the day after Virginia Lowery was killed, and he had connections to William Lowery. After the police interviewed him in 1998—10 years after the murder—defendant fled to Mexico, explaining he was wanted for murder, though the police had not mentioned Virginia Lowery’s murder. Based on the totality of the circumstances, we conclude there is no

reasonable probability the jury would have acquitted defendant absent the prosecutor's improper question.

3. Handwriting Expert

In order to show that defendant was in San Francisco at the time of the murder, the prosecution introduced evidence (1) that "Sam Zanca" had entered his safe deposit box at the San Francisco branch of the Bank of America on Monday, October 26, 1987, and (2) that the signature of Sam Zanca on the safe deposit box entry ticket matched the signature of Sam Zanca on other documents that were written by defendant.

As documentary evidence, the safe deposit entry ticket had to be authenticated, e.g., by showing that the handwriting on the document was that of the defendant. (Evid. Code, §§ 1400, 1415.) One method of authentication, of course, is to show that the handwriting on the target document is the same as the handwriting on a specimen document known or proven to be signed by the defendant. (Evid. Code, §§ 1417, 1418.) Proof that the defendant signed the specimen document may be circumstantial, including evidence of its contents. (Evid. Code, § 1421; *People v. Gibson* (2001) 90 Cal.App.4th 371, 383.) Here, the prosecution's expert compared the signatures of Sam Zanca on the 1987 Bank of America safe deposit box entry ticket and 1987 rental agreement with the signatures of Sam Zanca appearing on copies of two separate passport applications from 1987 (with the applicant's photograph), a statement from 1987 for a lost passport, and a 1988 safe deposit box rental agreement (for the box in which the heroin had been found by the DEA). The trial court found that circumstantial evidence sufficiently established that the specimen documents were written by defendant.

Defendant does not challenge that ruling on appeal, but he argues that the prosecution's handwriting expert should have been required to conduct her comparisons using original documents, not copies. We reject the argument. First, insofar as defendant complains the expert did not obtain an original exemplar of his handwriting, the complaint is contrary to the law. A self-serving exemplar obtained after arrest is not useable because of the risk of deceit. (*People v. Sauer* (1958) 163 Cal.App.2d 740, 745; *People v. Golembiewski* (1938) 25 Cal.App.2d 115, 119.) Handwriting comparisons may

properly be made with copies. (*People v. Norwoods* (1950) 100 Cal.App.2d 281, 285.) Defendant's own handwriting expert so testified. The evidence sufficiently established that the comparison documents were genuine copies, and defendant makes no contrary claim on appeal.²³

The prosecution's expert acknowledged that the use of copies made the comparisons more difficult and precluded an absolute identification.²⁴ However, the expert found several visible characteristics, such as formation design of the letters, height ratios, and spacing, that enabled her to conclude with a high degree of probability that the signature on the safe deposit entry ticket was by the same person who signed the specimen documents. She found no dissimilarities between the signatures. The jury heard the limitations faced by the expert and was entitled to decide what weight should be given to her conclusions. The limitations did not preclude admissibility of the expert's testimony.

Defendant further complains that the prosecution's handwriting expert should not have been allowed to testify without preliminary proof of the scientific reliability of handwriting comparisons under prong one of the *Kelly* test. We reject this argument, too. We recognize that some federal trial courts have questioned the reliability of handwriting comparisons and the admissibility of such evidence under the federal rules of evidence. (E.g., *U.S. v. Hines* (D.Mass. 1999) 55 F.Supp.2d 62, 68-71; *U.S. v. Saelee* (D.Alaska 2001) 162 F.Supp.2d 1097.) However, all federal appellate courts to consider the issue

²³ The police obtained the copy of the safe deposit box entry ticket and of the box rental agreements from the bank. They obtained the passport applications from the DEA investigation file.

²⁴ The defense put on its own expert witness, a forensic document examiner, who analyzed the signatures of Sam Zanca on various documents, including the safe deposit box entry tickets. He then compared the signatures on those documents with signatures on certain documents known to be signed by defendant using the name Sam Zanca. The expert opined that because only copies were available—not the originals—and because the copies were poor, no conclusion could be reached on whether the same person signed all the documents. However, the expert found no significant dissimilarities between the questioned signatures and the known signatures.

after *Daubert* have found handwriting evidence admissible. (*U.S. v. Crisp* (4th Cir. 2003) 324 F.3d 261, 270 and cases cited therein.)

Handwriting comparisons have been routinely used in California courts for decades (e.g., *People v. Storke* (1900) 128 Cal. 486, 488), and the Legislature has given its imprimatur to the use of handwriting comparisons to authenticate a writing. (Evid. Code, §§ 1415, 1418.) The Evidence Code expressly allows expert testimony and further allows the jurors to make their own determination of handwriting comparison without expert testimony. (Evid. Code, §§ 1417, 1418.) Our Supreme Court has held that the rule of *Kelly* does not apply to a procedure that isolates physical evidence whose appearance, nature, and meaning are obvious to the senses of a layperson. (*People v. Webb* (1993) 6 Cal.4th 494, 524 [laser reading of fingerprint]; *People v. Ayala* (2000) 24 Cal.4th 243, 281 [X-ray of bullet size].)²⁵

In any event, any error in admitting the testimony of the handwriting expert without a prong one *Kelly* hearing was harmless. First, the jurors were capable of discerning handwriting similarities even without an expert. Furthermore, even aside from the comparison of signatures, there was strong evidence to suggest that defendant was the person who signed the entry ticket for the safe deposit box. Defendant had used the alias Sam Zanca on other occasions, and in fact documents in the name of Sam Zanca were found in the brown Cadillac driven by defendant's wife. Defendant had another safe deposit box at the Bank of America (though at a different branch) in which the heroin had been found in 1988—the heroin that formed the basis of the drug charges to which defendant pled guilty in 1988. Finally, defendant was connected to the murder of Virginia Lowery through his DNA found on her fingernails. There is no reasonable likelihood that the jury would have reached a different verdict had the handwriting expert's testimony been excluded at a *Kelly* hearing.

²⁵ The *Kelly* rule is also limited to *new* scientific methods of proof. The reliability of a long-established procedure need not be proven. (*People v. Clark* (1993) 5 Cal.4th 950, 1018 [blood splatter evidence]; *People v. Municipal Court (Sansone)* (1986) 184 Cal.App.3d 199, 201 [urine test for blood alcohol].)

D. FLIGHT INSTRUCTION

Defendant contends the trial court erred in giving CALJIC No. 2.52 on flight.²⁶ Defendant asserts there was no evidence to support such an instruction as there was no evidence he fled from the crime scene in 1987 and no evidence he had been accused of the murder when he left San Francisco in 1998. We conclude the instruction was appropriate under the facts of this case.

A flight instruction is warranted when the evidence suggests the defendant's movement was motivated by guilty knowledge. (*People v. Smithey* (1999) 20 Cal.4th 936, 982 (*Smithey*); *People v. Lucas* (1995) 12 Cal.4th 415, 470-471.) The record shows that defendant owned a house in San Francisco at the time of the murder and sold it a few months afterward, in 1988. That same year, defendant was stopped in Canada using false identification and with alterations to his appearance. Ten years later, upon his release from prison, defendant returned to San Francisco. Yet, within a month after the police interviewed defendant in May 1998, defendant moved out of the city again. The police had not mentioned Virginia Lowery's murder in their questioning, but defendant went to Mexico, telling William Lowery that he was wanted on a murder charge and that he planned to get a boat to Thailand. The evidence was sufficient to permit a logical inference that defendant left town out of a consciousness of guilt.

Contrary to defendant's contention, an instruction on flight is appropriate even when the identity of the perpetrator is disputed, as long as there is evidence that the person who fled was the defendant. (*People v. Mason* (1991) 52 Cal.3d 909, 943; see also *People v. Pensinger* (1991) 52 Cal.3d 1210, 1245.) There was no question that defendant was the person who moved out of San Francisco. By the terms of the instruction, it was up to the jury to decide whether defendant's conduct amounted to

²⁶ The jury was instructed on CALJIC No. 2.52 as follows: "The flight of a person immediately after the commission of a crime, or after he or she is accused of a crime, is not sufficient in itself to establish his or her guilt. [¶] It is a fact, if proved, which may be considered by you in the light of all the other proved facts in deciding whether a defendant is guilty or not guilty. The weight to which this circumstance is entitled is a matter for you to decide."

“flight.” Consequently, the instruction does not create an unconstitutional presumption of guilt. (*Smithey, supra*, 20 Cal.4th at p. 983.)

E. JUROR MISCONDUCT

On a motion for new trial, defendant presented evidence that the domestic partner of one of the jurors worked at the San Francisco jail and that the juror had failed to disclose this connection to “law enforcement” during voir dire.

We uphold the trial court’s decision to deny a new trial. The affidavits submitted with the motion for new trial did not demonstrate deception, concealment, or misconduct by the juror. The affidavits disclose that Victor French, the domestic partner of juror 210130702, was a public health nurse who worked at the San Francisco County Jail, though not at the site where defendant was housed. While the trial was in progress, Mr. French was aware of the case, and he surreptitiously examined defendant’s medical records. He did not discuss the case with juror 210130702, but after the trial was over, at a social gathering of all the jurors, Mr. French regaled the party-goers with details of defendant’s physical condition.

During voir dire, juror 210130702 had replied “no” when asked if he had family or friends who worked in law enforcement. The juror said that he worked as a nurse at San Francisco General Hospital and that his domestic partner was also a nurse “for the city.” The post-trial affidavit showed that Mr. French was indeed a nurse employed by the city’s Department of Public Health. As far as juror 210130702 knew, the Sheriff’s Department had no control over the public health staff at the jail.

III. DISPOSITION

The judgment is affirmed.

STEVENS, J.

We concur.

JONES, P.J.

SIMONS, J.